

**A SOCIO-ECONOMIC ASSESSMENT OF COMMUNITY  
LIVELIHOODS IN AREAS ADJACENT TO CORRIDORS  
LINKING QUEEN ELIZABETH NATIONAL PARK TO  
OTHER PROTECTED AREAS IN WESTERN UGANDA**



*Mpanga Falls with endemic Cycad, *Encephalartos whitelockii**

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## **ACRONYMS AND ABBREVIATIONS**

ACODE	Advocates Coalition for Development and Environment
BMU	Beach Management Units
CARE	Cooperative Assistance and Relief Everywhere
CITES	Convention on International Trade in Endangered Species
CPI	Community Protected Area Institutions
DFID	Department for International Development
FR	Forest Reserve
IBA	Important Bird Area
ILMP	Integrated Lake Management Project
KFR	Kalinzu Forest Reserve
KKFR	Kasyoha-Kitomi Forest Reserve
KSCDP	Kibale Semliki Conservation and Development Project
KWR	Kyambura Wildlife Reserve
LAGBIMO	Lake George Basin Integrated Management Organization
MWEL	Ministry of Water Lands and Environment
PA	Protected Area
PRIME West	Promotion of Resources Investment and Management of Environment in Western Uganda
QECA	Queen Elizabeth Conservation Area
QENP	Queen Elizabeth National Park
NAADS	National Agricultural Advisory Services
NAYODE	National Youth Organisation for Development
NEMA	National Environment Management Authority
NEAP	National Environment Action Plan
NGO	Non Governmental Organisation
NP	National Park
REPA	Rights, Equity and Protected Area
UBOS	Uganda Bureau of Statistics
UWA	Uganda Wildlife Conservation Society
WCS	Wildlife Conservation Society
WR	Wildlife Reserve

## **EXECUTIVE SUMMARY**

This report summarises the results of a baseline survey of the socio-economic conditions of people living in, or adjacent to, corridors that link Queen Elizabeth National Park (QENP) to other protected areas in western Uganda. This region has very high biodiversity and conservation values (QENP is the second ranked park in Africa for numbers of bird species – 610), but also faces the greatest challenge of human population growth exerting pressure on protected areas. The most notable challenges include protected area encroachment, poaching, and illegal and unsustainable harvesting of natural resources. QENP is part of a much larger landscape of contiguous protected areas, the Greater Virunga Landscape, which conserves species such as elephants, chimpanzees, buffalos, giant forest hogs, lions, leopards and golden cats. This park plays an important role in linking two parks, two wildlife reserves and two forest reserves within this landscape and contains four three narrow corridors that are currently threatened. QENP also contains a narrow strip of land along the Mpanga river acting as a corridor to some spectacular falls, the Mpanga Falls. This corridor is also severely threatened with encroachment by local people.

The gorge along this river contains some endemic plants, found nowhere else, and hence it is important this gorge is saved. In Uganda many institutions including government agencies, donor agencies and non government organisations have jointly been piloting several approaches to integrate conservation and development concerns for the benefit of local communities and protection of natural habitats. This survey was intended to assess community livelihoods, current land use practices, identify potential development activities and main causes of human-wildlife conflicts, and provide information on how these three existing corridors could be strengthened and become more effective with community involvement.

A total of 109 households, representing 8976 people were sampled from all parishes and districts surrounding the four protected area corridors. The results are presented in chapter 4 addressing the socio-economic status of local communities in the corridors, assessment of the economic activities and their sources of income generation. We also assessed which species of animal use the corridors and the occurrences of wildlife-human conflicts in the corridor areas. Finally we investigated options for management of the corridor, what it might cost to move people, what options there would be for fencing and how much income generating projects would have to generate to be attractive to people to leave what they currently do to earn income.

## CHAPTER ONE

### 1.0 CORRIDORS WITHIN THE GREATER VIRUNGA LANDSCAPE

#### 1.1 General introduction

Uganda has a wide variety of habitats, from dry savannas to wetlands, tropical forests and high mountains very rich in flora and fauna, however, the country is rapidly losing its biodiversity. A preliminary estimate by Arinaitwe *et al.* (2000) suggests an overall rate of loss of about 1% per year. Land use changes such as clearance for agriculture, swamp drainage, and pollution of water bodies are some of the driving processes of habitat loss (Pomeroy *et al.*, 2004). In addition many other factors such as grazing pressure (NEAP 1995, NEMA 1996), over-exploitation of fisheries (Ogutu-Othwayo *et al.* 1998), uncontrolled harvesting of forest and plant products (Kigenyi *et al.* 1998; Wasswa *et al.* 1998; Pomeroy *et al.*, 2004), and unsustainable utilisation of wetland products (Mafabi *et al.* 1998) are all widely cited as major causes of biodiversity loss in Uganda. Western Uganda forms part of the Albertine Rift ecoregion. Within this ecoregion there are a group of contiguous protected areas that form one large landscape, the Greater Virunga Landscape, which contains more vertebrate species than any other landscape in Africa. The Queen Elisabeth National Park (QENP) is a key component of this landscape as it links the Virunga National Park in the Democratic Republic of Congo to Kigezi Wildlife Reserve, Kyambura Wildlife Reserve and on to Kasyoha-Kitomi Forest Reserve, to Kalinzu Forest Reserve and also to Kibale National Park (Figure 1.1).

QENP constitutes one out of the thirty Important Bird Area (IBA) sites in Uganda (Byaruhanga *et al.*, 2001) and it contains critical wetlands that support migratory bird species, which are recognised under the Convention on Biological Diversity and the Ramsar Convention on wetlands (Pomeroy *et al.*, 2004). QENP is a UNESCO Man and Biosphere Reserve because of the presence of 11 fishing villages within its boundaries which date to the time it was gazetted in 1952. Unfortunately, the park has suffered from heavy poaching and resource degradation. Much of this poaching was conducted by armed groups operating in the parks during and following the regime of Idi Amin in the mid-1970s-early 1980s. In the early 1980s, Kyambura WR and Kigezi WR suffered severe encroachment by local communities (Eltringham and Malpas 1983; Lamprey *et al.*, 2004). In the late 1980s, intensive efforts were made to rehabilitate QENP. Law enforcement patrols were effective in curbing poaching. Encroaching communities in Kyambura WR were persuaded to leave, and efforts were made to contain the expansion of fishing communities within the borders of QENP. The boundaries of Kigezi WR were adjusted to exclude settled areas. However, human populations around the protected areas are increasing rapidly and there is a high demand for land, forest products, water, fish, grazing land, and game meat by the rural communities and also in local towns such as Kasese to the west of QENP. The problem is exacerbated by the general design of QENP and the adjacent wildlife reserves. With so many public roads running through it, virtually all parts of the ecosystem may be accessed with limited control by UWA. As a long and narrow protected area, core areas of the QECA ecosystem may be easily reached from all borders and many linkages between different areas of the park rely on narrow corridors of land.

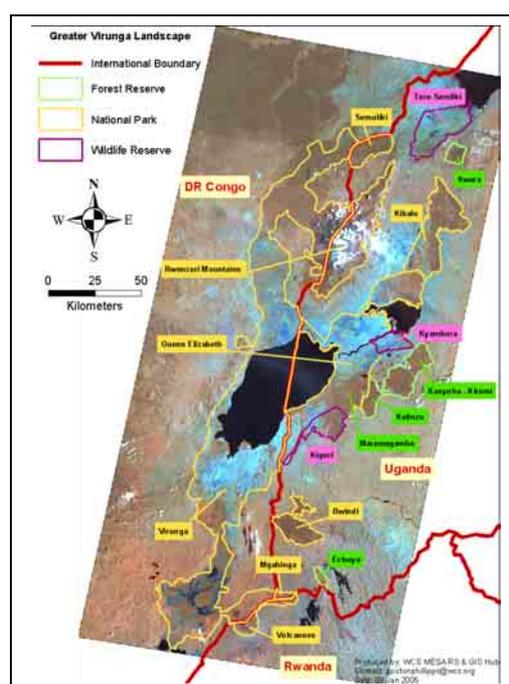


Figure 1.1 The Greater Virunga Landscape showing the location of QENP within its centre

## **1.2. Background to the study**

This socioeconomic study builds on an aerial survey that was conducted by Wildlife Conservation Society (WCS) and Uganda Wildlife Authority (UWA) on June 18<sup>th</sup> 2004 to assess the possibility of strengthening the management of existing corridors between QENP and surrounding protected areas. Several animals species in the Greater Virunga Landscape rely on these corridors for gene flow and dispersal. Elephants are at low density and numbers in many of the areas that connect to QENP and rely on the connectivity to mix with the QENP population. Chimpanzees populations are less than 500 individuals (often considered a benchmark for viability) in Kyambura Wildlife Reserve, Kasyoha-Kitomi Forest Reserve and Kalinzu Forest Reserve but when linked together the total population exceeds this. Large carnivores such as leopards and lions probably also require the presence of these corridors to maintain viability. Following the aerial survey this ground survey was made to collect socioeconomic information concerning the quality of land, numbers of households, land use, and some economic valuation of farmers' livelihoods living in or adjacent to these corridors. The information generated will be utilized in the design and planning of both ecological and economic interventions on how to strengthen the existing corridors and the possibility of expanding the corridors and QENP to include Mpanga Waterfalls. These waterfalls are at the end of a deep gorge, which contains some unique plant species including a species of Cycad, *Encephalartos whitelockii* (A.Braun & C.D. Brouché), found nowhere else in the world and hence the place is of great conservation importance.

## **1.3 Geographical setting and History of the protected areas in QENP landscape**

The protected areas we focused upon included Queen Elizabeth National Park, its neighbouring Kyambura Wildlife reserve and Mpanga Falls, Kasyoha-Kitomi and Kalinzu Forest Reserves.

### *1.3.1 Queen Elizabeth National Park, Kyambura Wildlife Reserve and Mpanga Falls*

QENP was established in 1952 immediately after the enactment of the National Parks Act, 1952 and managed by the Uganda National Parks. However, the Wildlife Statute of 1996 mandated the establishment of Uganda Wildlife Authority currently managing parks. Queen Elizabeth Conservation Area (QECA) includes the Queen Elizabeth NP (QENP) with an area of 2,080 sq.km, Uganda's second largest national park buffered by Kyambura (154 sq.km) and Kigezi Wildlife Reserves (265 sq.km) (Lamprey *et al.*, 2004). It borders Lake George and Edward and includes the Kazinga channel, a range of crater lakes and a major wetland included on the Ramsar Convention's list of wetlands of international importance. QENP was designated a Biosphere Reserve in 1979. Mpanga Falls is located at the end of a narrow extension of QENP north east of Lake George in Mahyoro subcounty, Kamwenge district and the Mpanga river drains from these falls into Lake George.

### *1.3.2 Kalinzu and Maramagambo Forest Reserves*

Maramagambo and Kalinzu Forest Reserves were established in 1932 as central forest reserves. They are located on the floor and escarpment of the western rift valley respectively to the east of Lake Edward and form one continuous forest. This large block of forest is gazetted as the North Maramagambo (291 km<sup>2</sup>), South Maramagambo (152 km<sup>2</sup>) and Kalinzu (137 km<sup>2</sup>) forest reserves (Howard, 1991; Plumptre *et al.*, 2001). It straddles Bunyaruguru, Igara and Ruhinda counties in Bushenyi district and Rujumbura county in Rukunguri district. The Kalinzu FR is also contiguous with the Kasyoha-Kitomi FR (399 km<sup>2</sup>) along 3 km of boundary. Approximately 75 km of boundary adjoins settled agricultural areas and tea estates. Plumptre *et al.* (2003) estimated the population of people living in the reserve to be 220. Kalinzu-Maramagambo like other forests has experienced deforestation within its vicinity with an annual rate of forest loss of about 1.5 km<sup>2</sup>/yr around its borders (Laporte *et al.*, 2004). Kalinzu Forest is managed for timber and charcoal by the National Forest Authority.

### 1.3.3 Kasyoha-Kitomi Forest Reserve

Kasyoha-Kitomi Forest Reserve (399 km<sup>2</sup>) was gazetted in 1932. It is located on the escarpment south of Lake George. The forest stretches from the counties of Bunyaruguru, Igara and Buhweju in Bushenyi district, Ibanda (Mitoma) county in Mbarara district to Kibale county in Kamwenge district (Howard, 1991). In the north west, the reserve borders with the Kyambura WR along the banks of the Kyambura River. River Kyambura and Buhindagi drain from the escarpment in a northerly direction to Lake George and the Kazinga channel. The boundaries were re-aligned in 1965 following the rivers and streams and cut-lines marked at the corners by cairns and direction trenches (Howard, 1991). The boundary has received little or no maintenance during the past decade. The reserve is isolated from the protected areas by surrounding subsistence (peasantry) agricultural lands, except for the 3 km boundary shared with Kalinzu forest reserve. This boundary corridor on the south-facing slopes of Lubare ridge is currently being planted with Eucalyptus trees under a lease agreement between the National Forest Authority and local people under a community forest management agreement. Encroachment has been reported to be particularly intense in the south east (Plumptre *et al.*, 2003) where an area of at least 10 km<sup>2</sup> was cleared for agriculture in 2002 and a population of about 370 people was living in the reserve (Plumptre *et al.*, 2003). These people have subsequently been evicted.

### 1.3.4 Corridor areas

The study was conducted in three existing corridors and Mpanga Falls area in QENP in south western Uganda. The study sites were selected as a result of discussions between UWA and the Wildlife Conservation society as ke areas for possible expansion of already existing corridors namely;

1. the corridor in the north of the Queen Elizabeth National Park to the west of Lake George
2. between Kasyoha-Kitomi Forest Reserve (KKFR) and Kyambura Wildlife Reserve (KWR)
3. between Kalinzu Forest Reserve to Kasyoha-Kitomi Forest Reserve

The area around Mpanga Falls was also selected because it is a potential tourist attraction and because it is under threat from encroachment and illegal grazing.

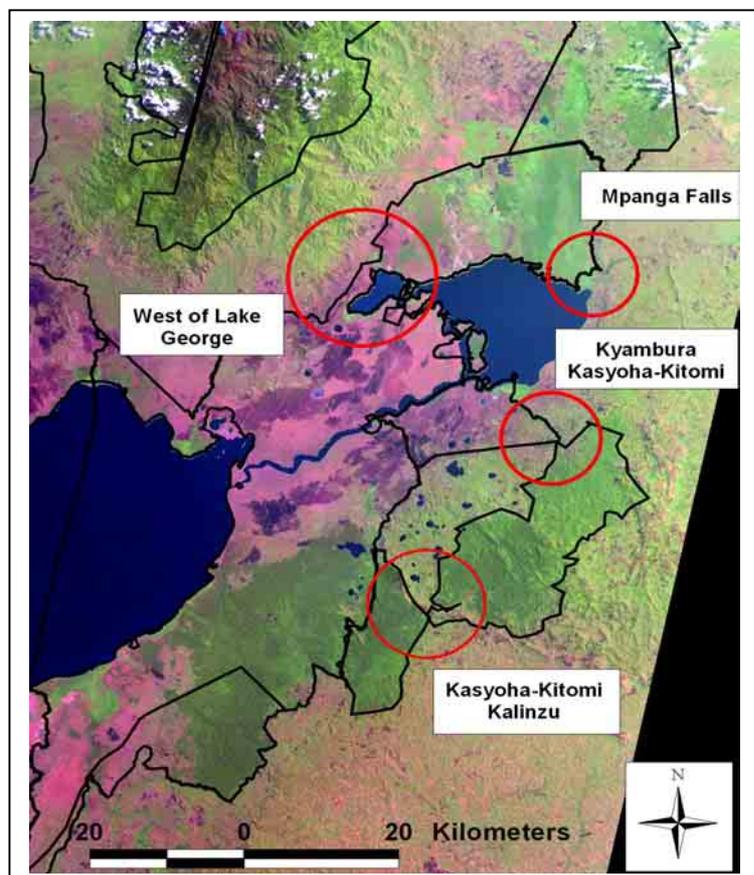


Figure 1.2 The Linkages between Queen Elizabeth, Kibale, Kasyoha-Kitomi and Kalinzu

### *Mpanga Falls*

Currently Queen Elizabeth National Park includes a narrow extension from the main body of the park up to Mpanga falls along the gorge in which the Mpanga river flows. There is the possibility to expand the width of this narrow strip of park to better protect the gorge and the endemic plants found within it. Currently part of this area is being used to graze cattle both outside and inside the park. There are no boundary marker pillars to the south of the river and it is unclear where the park boundary exists on the ground. Close to the river some subsistence farming is taking place as a result.



### *West of Lake George*

There is a narrow strip of Queen Elizabeth National Park that links the Kasenyi region with the Dura region of the park west of Lake George. There is a village that has an enclave in this region, Muhokya, which effectively narrows the corridor to about 600 metres width. It would make sense to negotiate with the community a change in the village shape, moving people to a longer strip along the Kasese-Bushenyi road and reducing the width of the village. This would increase the width of land that animals could move through.

### *Kyambura - Kasyoha-Kitomi (KWR-KKFR)*

There is a very narrow corridor that links Kyambura Wildlife Reserve to Kasyoha-Kitomi Forest Reserve. This narrow strip of forest is about 20 metres wide at its narrowest but much of it is about 200 metres wide and allows large mammals such as elephants and chimpanzees to move through. The two protected areas are gazetted so that the boundaries touch but at a very narrow point. It may be possible to increase the width of the corridor at this point and manage the boundaries of the whole corridor to facilitate animal movements while minimising crop-raiding damage.



### *Kasyoha-Kitomi - Kalinzu (KKFR-KFR)*

This corridor is in fact gazetted already with the boundaries of the two forest reserves separated only by the Kasese-Bushenyi road. The width of the corridor is about 3 km along this road. This area of Kasyoha-Kitomi is grassland which local people have been allowed to develop as pine and eucalyptus plantations by the Forest Department. It is potentially important for chimpanzee movements because neither Kalinzu nor Kasyoha-Kitomi have large populations but together they number about 500 individuals and with the adjacent Maramagambo forest this is increased to 720 individuals. Its management therefore should incorporate this idea of corridors as well as benefiting local community members.

## **1.4 Objectives of this project**

This survey resulted from a series of discussions between Dr Arthur Mugisha, Executive Director of the Uganda Wildlife Authority (UWA), and Drs Colin and Lauren Chapman from the University of Gainesville, Florida. For some time Dr Mugisha had been thinking about the possibility of expanding the Queen Elizabeth National Park (QENP) to include the area around Mpanga Waterfalls which currently lie outside the park. There was also an idea that it might be possible to create a corridor that would link the northern part of QENP down the eastern side of Lake George to Kyambura Wildlife Reserve or to Kasyoha-Kitomi Forest Reserve (Figure 1) with some innovative planning with local communities on the use of this land. An approach was made by the Chapmans to Conservation International to ask if their Global Conservation Fund could support the conservation of such corridors and they were encouraged to submit a proposal to assess the possibility of doing this. In order to really assess the feasibility of developing corridors in this region it was felt that there was the need for an aerial reconnaissance of the potential sites to assess how much wild land still remained and where a potential corridor might be possible. This was carried out in June 2004 and a report submitted (Plumptre and Nampindo, 2004). Following the aerial survey of the region it was decided to focus on the four corridors outlined above and undertake an assessment of the livelihoods and socioeconomic needs to better understand the situation on the ground and the feasibility of persuading people to move so that corridors can be widened or the incentives required to better manage the existing corridors.

This survey, therefore, provided an opportunity to better understand the social and economic activities of the people living in or adjacent to these corridors and how they rely on the natural resources for their survival. Local populations in the region depend heavily on subsistence agriculture and protected areas for a number of products for household needs. At present, there are few data available concerning the exact numbers of people, economic activities, land ownership and the state of the habitat yet such information is very crucial for both protected area managers and development agencies involved in the conservation of the natural resources and landscape management.

The aims of the study were to:

1. assess the socioeconomic conditions and livelihoods of the people living in or adjacent to the protected area corridors in the QENP landscape;
2. describe the current land use practices and state of the habitats in the corridors;
3. identify the threats, people-protected areas conflicts and any tourism and development potential existing in the area;
4. provide specific recommendations on the park corridor management aimed at ensuring integrated community development and conservation of the wildlife.

## CHAPTER TWO

### 2.0 COMMUNITIES AND PROTECTED AREA MANAGEMENT IN QUEEN ELIZABETH NATIONAL PARK

#### 2.1 People and the Park

Since its inception, Queen Elizabeth National Park inherited a complex and particularly intractable set of problems collectively known as the fishing village problem. Eleven fishing villages exist in the park, having been part of the landscape before the park was created. Associated with these human settlements in the park are a range of activities which park management view as impinging directly upon the resources and the overall integrity of the park. Most challenging though is the demand for access to natural resources (e.g. fisheries, forest products, water, game meat, grazing and land for agriculture). Other problems include encroachment for agricultural land, pollution from industrial waste and urban refuse disposal. Encroachment mainly involves the settlement of forest and park land by people practising subsistence agriculture or the production of cash crops by the people living outside the reserve. On the other hand people living adjacent to the park suffer heavily from crop raiding damage. Cotton which is the major cash crop in the area is highly vulnerable to elephant damage especially at bolling stage (CARE, 2000). Detailed analysis of crop damage losses and associated costs are presented in this report below.

Almost 65% of Kasese district is protected (primarily Rwenzori and Queen Elizabeth National Parks) and therefore, land shortage is a big problem for the communities (CARE, 2000). Unfortunately, the revenues from the park entry fees given to the local people are insignificant and do not trickle down to the most affected people. The people and their livestock populations are steadily increasing and soil fertility has declined considerably. Emerton and Muramira (1999) reported the opportunity costs that districts overlapped by protected areas incur based on the lost agricultural land and grazing land foregone (Table 2.1). Rukungiri and Kasese districts experience the highest opportunity cost from parks (19,111 and 22,241 millions of Uganda shillings per year) respectively while Bushenyi district suffers the (US\$ 10,920) cost as a result of gazetted forest reserves. Given these numbers it is not surprising that people will encroach for land where they can.

Table 2. 1 Opportunity costs of protected areas by District

Region	District	Forest protected areas (US\$ mill/yr)	Wildlife protected areas (US\$ mill/yr)
Western	Bushenyi	10,920	11,464
Western	Kabarole	5,582	13,667
Western	Kasese	773	22,241
Western	Mbarara	2,010	3,921
Western	Rukungiri	3,235	19,111
<b>TOTAL</b>		<b>22,520</b>	<b>70,404</b>

(Source: Emerton and Muramira, 1999. Assumed that 25% of protected areas are suitable for crop production, 30% for livestock production. Opportunity cost valued in terms of gross returns to production foregone. Where wildlife protected areas overlap Districts, total area is divided by number of Districts).

Diseases and pests to both domestic livestock and people present problems to the neighbouring communities. Apart from crop damage, wild animals transmit diseases to people and livestock. As such people have been forced to abandon cattle rearing in some places. The nearest health centre is over 10 km for most communities and medicinal herbs from the park have restricted access. Efforts to plant trees have been devastating as termites destroy both trees and the houses (CARE, 2000).

## 2.2 Fishing villages Profiles

There are eleven fishing villages on Lake George and Edward in Queen Elizabeth National park. In this report, the fishing villages on Lake George were considered in more detail in relation to the corridors that were studied. These fishing villages include Hamukungu, Katunguru Bushenyi, Katunguru Kasese, Kahendero, Kashaka, Kasenyi, Kayinja, Mahyoro and Nyakera. There is insufficient data on social and institutional characteristics of the fishing villages, however, attempts have been made to document the information under the Integrated Lake Management Project (ILMP) and CARE reports including settlement characteristics, historical timeline, resource/population timelines, population trends, ethnic groups, community income and livelihood security amongst others (CARE, 1999; Development and Management Consultants International, 1998; Risby, 2000). A brief description of eight fishing villages both legal and illegal located on Lake George is shown in Table 2.2.

Table 2. 2 Fishing village profiles on Lake George

Landing Site	Size (km <sup>2</sup> )	Population			Economic Activities
		Totals	Resident (%)	Non-Resident	
Hamukungu	6	1977	46	54	Firewood & Herbal medicine selling, fishing, cattle grazing, retail trading
Katunguru B	3	580	60	40	Fishing, small stock grazing, retail trading, sand mining, small scale cultivation
Katunguru K	2	2400	65	35	Fishing, small scale chicken & goat rearing, retail trading, crafts
Kashaka	1	1160	60	40	Fishing, small stock grazing, handicraft selling, retail trading
Kasenyi	5	2283	30	70	Apiary & small scale cultivation
Kahendero	2	2675	40	60	Fishing, small scale cattle grazing, retail trading, salt mining
Kayinja	1.5	2076	70	30	Firewood selling, lime mining, fishing, livestock grazing, retail trading, crafts, beer brewing, brick making
Mahyoro*	2	2306	60	40	Fishing, cultivation, cattle & small stock grazing, retail trade
Nyakera*	1	1200	40	60	Fishing, retail trading, charcoal business, cultivation, small scale grazing, beer brewing

Source: Risby, 2000. Total population figures were extracted from Kasese district population office

\* Illegal fishing villages

According to CARE (1996), Katunguru Bushenyi is the only village in the ILM project area that experiences few (3% n = 247) short-term migrants in comparison to long term. The rest of the villages experience occasional short-term migrants exceeding 10%, Hamukungu exhibiting the highest (12% n = 247). 35% of the migrations are due to marriage, 46% is due to search for employment (CARE, 1999; Risby, 2000). The most predominant economic activities for men in Hamukungu village are fishing and livestock herding. There is a significant Basongora population with 600-700 cattle that are grazed in the park (Risby, 1999, Owen, 1999). In almost all fishing villages, 10% of the people have alternative employment outside and 94% of their investments are in agriculture. Both Nyakera and Mahyoro fishing sites are popular for the cat fish (*Bagrus docmak* local name Semutundu) and mudfish (*Clarias gariepinus* local name Male) (Photo i) but are now illegally fished. These fishing

villages conduct activities that degrade the environment, such as cutting of papyrus for mats and cutting 'Ambatch trees' (*Aeschynomene elaphroxylon*) for fishing net floats (Risby, 1999), illegal



Photo 1. *Illegal fishing of Cat fish (Bagrus docmak) and mudfish (Clarias gariepinus) at Nyakera Fish Landing site in Mahyoro subcounty Kamwenge district, Mpanga Falls area*

firewood harvesting for both domestic and commercial purposes, disposal of agrochemicals, careless disposal of used dry cells, poor waste material and sewage management, polyethylene bags, grazing in the park, over fishing (destruction of fish breeding sites) and burning of swamps especially for pasture rejuvenation .

### **2.3 Projects and interventions conducted in QENP to improve community livelihoods**

A number of projects and interventions have been initiated in order to address the conservation and community development challenges in the region by UWA and other conservation NGOs operating in the area. A brief discussion of the projects and the associated lessons learnt are noted below.

#### *2.3.1 Non government and Community Based Organisations interventions*

CARE's Fishing Villages Project aimed to promote conservation of wildlife resources through development interventions expected to generate benefits to local communities and also through on-farm substitution of forest products through woodlot establishment and promotion of energy saving stoves. According to the 1992 Uganda population Census, it was estimated that 66,000 people live in the parishes bordering the park while 19,000 people live in the fishing villages. The firewood demand for the people living in the fishing villages alone was estimated to be 935 tons/year (Owen, 2000). Currently, the number of people living in QENP is slightly above 20,000 and 1500 in Kyambura WR (UBOS, 2002).

In 1993 CARE initiated and implemented the woodlot project to address the firewood used for smoking fish and for domestic use so as to reduce pressure on the park for the eleven fishing villages (Bromley, 2000). Other negative impacts addressed included collection of poles and posts for construction, grazing of livestock, burning pastures, encroachment into the park territory for settlement or agricultural production and illegal poaching. Results showed that participation in woodlot establishment was dominated by more wealthy (referred to as more secure) households (27% n = 616) and middle category (secure) households (59%) compared to the poor households (14%). However, the poor households used more firewood than the other wealth categories. Poor households were more likely to use firewood as a principal energy source as opposed to more wealthy households

who tended to use charcoal, kerosene and gas (Bromley, 2000). At the household level, men exclusively owned the woodlots established. Therefore, the women became more marginalised and continued to collect firewood from the park. In addition, fish smokers preferred certain tree species different from those planted (primarily Eucalyptus and Cassia species), which could only be accessed from the park. Land tenure and tree tenure was very complex and constrained the tree establishment since heavy users of forest products did not own land and the land holdings were small. In addition, due to both small land size and labour constraints, those who planted trees, intercropped the woodlots with crops, which created more conflicts as animals raided the crops (Bromley, 2000). Experiences from the project showed that interventions seeking to reduce demand for natural resources from surrounding communities must look beyond simple models of “resource substitution” that is, reducing demand and developing alternative supply source. There is a need to invest necessary time (two years was too short) to analyse and understand the flows of people using the resource and the resource stocks being harvested from the park (Bromley, 2000). In addition, analysis of the complex gender and tenure relationships pertaining to the rights in order to address issues in the design of interventions that address the challenges of resource utilization. Adequate data during planning to reduce real risks is needed and donors and other partners involved in protected areas conservation should be ready to invest sufficient time in the analysis of local environment, ecological, social and institutional conditions before embarking on full-scale interventions.

The UK government through its Development for International Development (DFID) supported the government of Uganda to develop sustainable mechanisms by which lake resources could be managed. It provided the support through the Integrated Lake Management Project (ILMP) piloted on both Lake George in QENP and Lake Kyoga. The project aimed at improving livelihoods of poor people in lakeside communities by establishing a more integrated and participatory approach to the management of lake resources (ILM, 2004; Nunan and Scullion, 2004). CARE played a leading role in the Fisheries co-management implementation a component of the integrated lake management. CARE promoted the resource user’s interests including mechanisms for a more equitable sharing of the costs and benefits of conservation, promoting economic development, and building the capacity of local civil society to understand and represent its rights. Advocates Coalition for Development and Environment (ACODE) was critical in assisting local stakeholders in institutional development at Lake George. Lake management organizations such as Beach Management Units (BMU) and Lake George Basin Integrated Management Organisation (LAGBIMO) facilitated the formation and enforcement of legal principles during the ILM project. A number of outputs were recorded: namely an effective institutional and operational framework for integrated lake management, improved capacities of communities and government to participate in integrated lake planning and management, integrated lake management plan developed and agreed by stakeholders at all levels, integrated lake management plan implemented, monitoring and evaluation systems operationalised at all levels, national and district policies informed and improved by ILM experience and knowledge. However, a number of challenges are still faced by the management of lake resources.

At present, CARE is implementing the Rights, Equity and Protected Areas (REPA) project, funded by DANIDA. It is a subsidiary project of the Development Through Conservation (DTC) program addressing equitable resource use by communities and also involves lobbying and advocacy as a component. In Muhokya subcounty, CARE is supporting a local community based organization, National Young adults Organisation for Development (NAYODE) to establish a problem animal deterrent of Mauritius thorn tree (*Ceasalpanea decapitate*) in Rutokye village in collaboration with the community (planting commenced in November 2004). In addition, PRIME West (Promotion of Resources Investment and Management of Environment) in western Uganda is involved in enterprise development, community based natural resource management and information education and communication strategies intended to reduce environmental degradation threats. In Bushenyi, ECOTRUST is promoting carbon trade, where farmers are funded to plant trees and woodlots for carbon credits. The National Forest Authority is encouraging private developers to apply for land in the gazetted areas of the forest reserves that are degraded to establish plantations. At Lubare ridge, an area of 555 ha has been leased (lease period of 5 years) out to private individuals to plant trees. A total

of 323.5 ha have been planted of which 100 ha are planted with pine and Cyprus tree species while the rest is Eucalyptus and 231.5 ha already leased out are yet to be planted (NFA).

### *2.3.2 Uganda Wildlife Authority interventions towards conflict management*

UWA has devoted many efforts towards solving the people-park resource conflicts by initiating a number of interventions through its community conservation strategy. Despite these difficulties, mechanisms for rural people to benefit from wildlife in Uganda have been introduced by UWA. These include:

- **Community-Protected Area Institutions (CPIs) and revenue-sharing:** the Statute requires that 20% of protected area gate entry fees are disbursed to local governments. UWA has worked to establish CPIs as bodies composed of local government administrators and protected area staff to define community projects for funding from the revenues, and to form a link between the protected areas and the communities. During the period 2000-2002, revenues accruing to local governments from park entry fees was US\$ 941,493,597 (equivalent to US \$ 500,000) of which, local governments bordering QENP received US\$ 212,606,974 (Lamprey et al. 2003). The revenue-sharing account has grown significantly and is expected to reach 1.5 billion shillings in disbursement period 2003/4 (UWA Finance Director pers comm.).
- **Resource-sharing:** UWA is creating mechanisms through which local communities may access resources such as firewood and poles from protected areas. Piloting of this type of resource sharing scheme has been carried out in Murchison Falls National Park and Kibale National Park. Appropriate guidelines are still being developed.
- **Community wildlife areas (CWAs):** these are officially gazetted areas where landowners and communities may benefit from wildlife. The strategy has been tested and implemented in Lake Mburo National Park.
- **Ad-hoc community tourism projects** within and outside protected areas. Efforts by UWA to involve the private sector in tourism development are being implemented. Local people have been supported to start up tour companies providing services such as guided tours, management of camp sites and invest in souvenir shops (particularly gift shops).
- **Enabling laws and regulations** e.g. Wildlife use rights (Wildlife Statute, 1996)
- **Problem animal management**

### *2.3.3 Community-PA-Institutions (CPIs)*

In the early 1990s Uganda National Parks established Park Management Advisory Committees (PMACs) as a mechanism by which local communities could interact with PA staff and provide an input in management decisions. However, PMACs had no formal status within the LC system and were dissolved in 1996 at the inception of UWA. In the year 2000, a new mechanism for protected area and community interaction, the 'community Protected Area Institution' (CPI), was introduced by UWA. It is intended that each protected area, or protected area complex (parks and adjacent reserves), will have a CPI, and that the CPIs are integrated within Local Environment Committees, and report to local councils. CPIs are expected to address community issues in PA management, to act as intermediaries facilitating communication, and to plan and implement revenue sharing projects. UWA's CPI Policy indicates that CPIs are funded ('facilitated') out of council budgets in order to be financially independent of the protected area and become accountable to the local councils.

As a concept, the CPI was originally intended to be a forum for discussion and create partnerships between local communities and protected area managers. However, their functions have become dominated by one issue; the disbursement of revenue to local governments. According to the Wildlife Statute 1996, Section 70(4), "the Board shall pay twenty 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". Revenue sharing has become very sensitive. As UWA struggled to rehabilitate its protected areas, the issue of revenue-sharing was put aside for a later time when accounting systems were more organized, more tourists visited, and when guidelines for revenue-

sharing had been carefully developed. However local governments have exerted great pressure on UWA to pay the 20%, and not to ‘hoard’ the revenues. The revenue sharing directive has been complex to implement, as the following pressing questions have had to be addressed:

- What constitutes the ‘local government’, the district, the sub-county or the parish?
- Should the 20% revenue simply be paid without controls over how the money should be spent? What influence should UWA have over the use of the money?
- If a large protected area spans several districts and sub-counties, who gets the 20% revenue, and how might it be divided up? For example, Murchison Falls Conservation Area spans 4 districts and 13 sub-counties.
- How are accounts kept for the revenue-sharing?

Apparently, UWA has now formulated guidelines for the role of CPIs in revenue-sharing. The CPI will comprise a committee, composed of the ‘Secretary for Production and Environment’ of each sub-county adjoining the protected area, and the warden of the protected area. The CPIs are expected to meet periodically to determine the projects that the money will be spent on. On the basis of gate entry takings for the protected area, UWA Headquarters now retains the 20% in a special account for disbursement, and maintain books of accounts for inspection. Accounts have been set up at sub-county level for receiving the funds, with CPI secretary, the secretary of production and environment, and the subcounty chief as signatories.

#### 2.3.4 Problem animals

Problem animals refer to any wild animals that cause damage to agricultural crops and/or human beings. Animals which cause significant damage around the park include elephants (*Loxodonta africana*), buffaloes (*Syncerus caffer*) baboons (*Papio anubis*), bushpigs (*Potamochoerus porcus*), vervet monkeys (*Cercopithecus aethiops*) and Chimpanzees (*Pan troglodytes*). Conflicts between wild animals (in particular elephants) and human beings are not new but often poorly understood (Parker and Osborn, 2001). Due to the shift from a government policing approach to collaborative management and community conservation, efforts have been made to understand human-wildlife conflicts (Hoare, 1995; Hill *et al.*, 2002; Purna *et al.*, 2004). In some places, the problem of conflict has become so severe that relocation of people has been suggested (Karindaworo, 1998) while other scholars argue that this approach cannot solve the problem (Hoare, 2001).

The damage caused by problem animals ranges from 10% to 90% depending on the location and crop types (Purna *et al.*, 2004). Naughton-Treves (1997) noted that crop loss caused by the park animals along the Kibale National Park boundary was between 4-7% which equates to nearly US\$ 6 per farmer per year. Other studies by Emerton and Muramira (1999) who estimated the crop damage costs per district overlapped by protected areas in the QENP landscape in relation to the boundary length predicted that Kabarole would experience the highest value of crop losses per kilometre per year of about USh 288 million (Table 2.3).

Table 2. 3 Estimated Wildlife crop damage costs for the four districts overlapped by PA

Region	District	Boundary length (km)	Value of crop losses (USh mill/km/yr)	Value of crop losses (USh mill/yr)
Western	Bushenyi	40	92	3,672
Western	Kabarole	24	288	6,911
Western	Kasese	52	114	5,935
Western	Rukungiri	35	109	3,810
<b>TOTAL</b>		<b>151</b>	<b>603</b>	<b>20,328</b>

Source: Emerton and Muramira, 1999. Refers to forest and wildlife protected areas larger than 100 km<sup>2</sup> only. Where protected areas overlap Districts, total boundary length is divided by number of Districts.

Uganda Wildlife Authority worked with the IUCN Kibale-Semliki Conservation and Development Project (KSCDP) to develop, test and implement various problem animal management options around the border of Kibale National Park (KNP). A number of deterrents were tried targeting mainly elephants and bush pigs and lessons were drawn (Purna *et al.*, 2004). Table 2.4 provides a summary of the tested deterrents, effectiveness and the associated costs.

Table 2. 4 Summary of deterrents tested in parishes around KNP with support from KSCDP

<b>Deterrent</b>	<b>Size of experiment</b>	<b>Cost (US\$/Km)</b>	<b>Comments</b>
Trench	2 m Wide & 1.5 m deep	1,072	Labour intensive Not suitable for all terrain
Sharp sticks	Height between 1.5-2m, planted at <45° towards park	2,200	Sticks rot easily in moist places, susceptible to termites
Placement of stones	8 m long barrier, 2 m wide average stone size of 0.028cm <sup>3</sup>	6,500	Labour intensive, stones not easily available, sink in wet ground
Mauritius thorn tree	Planted 50cm intervals in three rows 30 cm apart	170 (66 for seeds & 103 for labour)	Labour intensive, invasive if not cared for, not easy to work with, cannot eliminate all problem animals

Source: Purna *et al.*, 2004.

Sam (1998) estimated the cost of establishing a pilot 2 km experimental electric fence and maintaining it for the first year in the Red Volta Valley (Ghana) to be US\$ 3,278/km. While this is lower than the cost estimated for Tsavo National Park (US\$ 10,800), it is higher than (US\$ 500-1,500) in Zimbabwe (Hoare,1995). It was also estimated that during its 10<sup>th</sup> and 20<sup>th</sup> years, the cost of the fence would have fallen to US\$ 54/ha and US\$ 44/ha respectively. The use of cable wire or electric fences, although very effective and it can facilitate public relations, is very expensive to install and maintain (Sam, 1998). In addition, it leads to the formation of a hard edge and the stolen wires are used for poaching. The other deterrent tried was the use of pepper spray, however, due to the insurgency in the area at the time, the consultant left without much lessons drawn. The other common deterrent tested was scare shooting particularly for elephants. However 10% of the elephants were resistant to scare shooting and became habituated to the sound. Worse still, if the same elephants that were scared previously returned to raid, 14% were immune to scare shooting (Purna *et al.*, 2004). As such, the deterrent was very expensive and ineffective. At present, UWA is constructing a trench along the Kyambura Wildlife Reserve on the side of Katerera subcounty and six kilometers have been covered at a cost of US\$ three million per km. Problem animal management goes beyond establishment of barriers. Multiple approaches need to be applied such as use of buffer crops (e.g. tea, coffee), physical barriers (fences), compensation through revenue and resource sharing and increased park boundary surveillance among others.

## CHAPTER THREE

### 3.0 METHODS AND MATERIALS

#### 3.1 Sampling and sample size

Selection of the study area was purely purposive focusing on the corridors adjoining the Protected Areas (PA) of Kyambura Wildlife Reserve and Kasyoha-Kitomi Forest Reserve (KKFR), KKFR-Kalinzu, West of Lake George and Mpanga Falls area in QENP. The villages selected for interviews were those located directly in or adjacent to (distance of 3km) the protected area corridors and Mpanga Falls area. A total of 17 villages (on average four LC1 per study site) in the four sites were selected of which at least 5% of the households from each village were selected for household interviews and focus group discussions. The sample unit of the study was a household<sup>1</sup>. Simple random sampling was used to identify the households with the help of a local council register such that every household had an equal chance of being selected. The household heads were picked from the village register book where all members of the village and households are listed, a method which has proved useful in other studies (Deaton, 1998). The distribution of respondents in the study villages are shown in Table 3.1. A total of 109 households were interviewed out of the 1,496 households at a sampling intensity of at least 5% per study site.

Table 3. 1 Distribution of respondents and main ethnic group by village

Study site/Corridor	Villages	Number of Households	No. of HH interviewed	Main ethnic group
KWR-KKFR	Kagarama, Rusoro Nyandongo-I, Kagyezi, Katabago-I	350	41	Bafumbira, Bakiga, Banyarwanda Banyankole
KKFR-Kalinzu	Nyamisheke, Nyangorogoro-I, Kabukwiri	200	17	Banyakole, Bakiga & Bafumbira
West of L. George	Rutokye, Kahendero, Kikolongo, Kazinga & Karusandara	343	23	Basongola, Bakonzo, Batooro, Baganda
Mpanga Falls Area	Ntarama, Kanyambura, Kamuganguzi, Ngoma & Nyakera	226	28	Bakiga, Batooro, Bafumbira, Banyankole
<b>Total</b>		<b>1,119</b>	<b>109</b>	

#### 3.2 Primary Data collection

Data collection was conducted using multiple approaches, including; questionnaire surveys, focus group discussions, and ad hoc discussions with district officials, particularly district agricultural officers, environmental officers and UWA staff. Additional information was collected through field observations and secondary sources from reports (e.g. district, projects, and maps).

##### 3.2.1 Household questionnaire survey

A questionnaire was designed (appendix 1) that collected information about household wealth, types of income, use of the corridor areas, problems with crop raiding and their attitudes to different management options for the corridors. The questionnaire consisted of open-ended and closed questions. According to Newell (1993), open questions allow the respondent to express fully her opinions freely while the closed questions can be pre-coded easily and save time for both the interviewer and the respondent. The household survey questionnaire information collected relied

<sup>1</sup> Household meant a group of people living together and identifying the authority of one person the household head, who is also the decision-maker

heavily on peoples' own perceptions and reported values about the household wealth and incomes from agricultural produce in their local context. The information regarding household consumption of agricultural products was cross-checked using the cost approach of all meals consumed by the household per day. However, this technique did not include the fruits consumed as respondents were not very clear about how much they consume.

### *3.2.3 Focus group discussions*

Group discussions provide access to a larger body of knowledge of general community information (Mikkelsen, 1995; Borrini-Feyerabend, 1997). Group discussions enable quick access to many people and are also cheap and quick to conduct compared with individual interviews with the same number of respondents. Mikkelsen (1995) recommends groups of not more than 25 people since large groups become difficult to manage. Therefore, at least but not limited to 20 people were invited to participate in the focus group discussion. However, the number of participants was dependent on the level of community mobilisation by the Local Council chairpersons after booking and magnitude of existing conflicts in relation to the protected area (e.g. problem animals, land and resource use conflicts). Eleven focus group discussions were held in the four study sites with a representation of women, men >40 years, young adults (between 18 and 35 years) and Government workers. The reason for such grouping was to capture the perceived needs and problems faced by each category of community members but also to ascertain the salient issues specific to the group. The focal subjects of discussion involved;

1. The direct products and indirect benefits derived from the park/forest (now and before its gazettement);
2. Problems and conflicts arising from the park and different land uses,
3. The threats to the protected areas;
4. Potential economic activities (income generating activities) in the area;
5. Proposed solutions to the problems and park –people conflicts.
6. The corridors and their use and whether or not local people are will to contribute to their maintenance.

The groups were also requested to rank the perceived problems and threats in order of severity. Other issues ranked included the benefits derived from the park and any potential economic activities that people are willing to undertake. The ranks were given in ascending order where any item ranked as one, is the most important (benefit) or severe (threat) and the highest number stood for the least important (Shechambo, 2002). After generating the rankings for each item by groups, all ranks per row were summed up to give the total group ranking from which the final rank, combining all groups was produced.

The discussions were conducted in community centres where chairs were available and materials such as pens, pencils, papers and markers were provided for information recording. The researcher and his assistant guided the discussions by first explaining the purpose of the meeting and the checklist topics emphasising the relevancy of each section and assuring the participants how the information will be used in the development of park management plans and in the design of appropriate interventions towards conflict managements and addressing poverty by the Government. The Chairperson guided the members in the formation of age-groups as indicated above and one person was mandated to take note of the views of the group members and present them to the entire audience. The researcher finally reacted to any questions raised by the community members and also guided the focus group through probing and summarising all the issues raised so as to build consensus on the matters discussed. The discussion involved problem ranking, participatory brain storming on the feasibility of proposed solutions. For purposes of dialogue, information generation and analysis, the researcher provided some transport defray as a form of facilitation.

The focus group discussion checklist is shown in Appendix II. In general the focus group discussions were intended to generate qualitative information that could not be explicitly captured in the questionnaire. The technique is recommended for qualitative information gathering and has been used

in a number of related studies (Development and Management Consultants International, 2000; Muramira *et al.*, 2003; Bush *et al.*, 2004).

#### *3.2.4 Interviews with key informants*

Interviews were conducted with district environmental officers, agricultural officers, UWA and NFA staff and sub county leaders regarding the major sources of people-protected area conflicts, potential income generating activities and their opinions concerning the effectiveness of corridors adjoining protected areas.

#### *3.2.5 Researcher's observations*

Participant observations involved the researcher recording the various community and household activities, crops grown, nature of housing, livestock reared and potential attributes for tourism development.

#### *3.2.6 Secondary data collection*

Supplementary data for the study was obtained from UWA, NFA, CARE, LAGBIMO, WCS, libraries and government offices. Data accessed was in form of reports, filed information and other collections.

### **3.3 Data Analysis**

The quantitative and qualitative information collected through the questionnaire survey were coded and entered into the MS-excel computer programme. Using pivot tables, the incomes per study sites, problem animals and other simple computations were calculated. Further exploration of the data was made in SPSS ver 9.0 for windows where descriptive analyses such as percentages, cross tabulations were performed to show percentage response between corridors.

## CHAPTER FOUR

### 4.0 RESULTS

This chapter presents the results, first describing the socio-economic characteristics of the households, sources of land and resource use conflicts, and the existing and potential economic activities. It then presents community perceived remedies to the conflicts and problems that they face in daily life and conclusions and recommendations are made.

#### 4.1 Household characteristics

##### 4.1.1 Household composition

A total of 109 (N=109) households were visited for face-to-face interviews in the four regions around QENP representing 8,976 people. Table 4.1 shows the household structure, including the percentage of households headed by a man or woman, average household size, average age and structure categorised as (0-30, 31-60 and  $\geq 61$  years), the percentages in different occupations and education level of the household head for each of the corridors.

Table 4. 1 Household structure of the people living adjacent to the four corridors

Household composition	Corridor			
	Kasyoha-Kitomi-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
<b>Household head</b>				
Male	86.4	83.3	89.3	78.3
Female	13.6	16.7	10.7	21.7
Average household size	5.4	6.1	6.4	6.0
<b>Age Structure Male</b>				
0-30	28.6	30.0	25.0	35.7
31-60	42.9	60.0	37.5	42.9
$\geq 61$	28.5	10.0	37.5	21.4
Average age	42.9	39.5	50.1	43.6
<b>Female</b>				
0-30	62.5	56.3	50.0	55.6
31-60	37.5	43.8	50.0	44.4
Average age	27.0	35.1	38.4	33.8
<b>Occupation</b>				
Farming	90.9	86.1	67.9	69.6
Retail trading	9.1	2.8	0.0	0.0
Wage labour	0.0	5.6	0.0	0.0
Fishing	0.0	5.6	14.3	26.1
Pastoralist	0.0	0.0	17.9	4.3
<b>Education</b>				
No formal	27.3	5.6	67.9	26.1
Primary	63.6	77.8	32.1	69.6
Secondary	9.1	16.7	0.0	4.3

Analysis of the household head by sex showed that all corridors had more male headed households than female headed households, although West of Lake George corridor had relatively more (21.7%) female headed households. A greater percentage (over 40%) of men are between 31-60 years age category while over 50% of the women lie between 0-30 years of age. On average the age of males

was greater than the females in all sites. The average household number was similar except for Kasyoha-Kitomi-Kalinzu (KKFR-KFR) corridor which was slightly lower (5.4).

In terms of household occupation, farming and fishing are the most predominant form of employment. Pastoralism (cattle herding) was found to be present only in Mpanga Falls area and West of Lake George. This could be due to the availability of both land and pastures as a result of relatively low human population particularly in Kamwenge district. In KKFR-KFR, 90% of the households depend on farming followed by Kyambura WR-Kasyoha-Kitomi (KWR-KKFR) (86.1%). 26.1% of the households in the West of Lake George are involved in fishing and 17.9% practice pastoralism in Mpanga Falls area. It was also evident that 67.9% of the households in Mpanga Falls had no formal education. In comparison however, households in Kyambura-Kasyoha-Kitomi were more educated up to secondary level (16.7%) than the rest of the areas. In Mpanga area, no household head attained secondary education.

#### 4.1.1 District population overlapped by the boundary of QENP

In order to have a clear understanding of the human population impacts in the region, it was necessary to present the population statistics for the four districts overlapped by QENP. The population growth rates for three of the four districts overlapped by QENP boundaries are below the region's 2.9% and national average growth rate of 3.4% per annum (UBOS, 2002). Only Kasese district is higher where the annual growth rate is 3.76% (Table 4.2).

Table 4. 2 Population density and Growth rates by district, 2002.

District	Population	Population density (persons/Sq Km)	Annual growth rates (%)
Bushenyi	723,427	189	1.91
Mbarara	1,089,051	113	2.83
Kasese	532,993	183	3.76
Kamwenge	295,313	133	2.83

Source: UBOS, 2002. Uganda Population and Housing Census. Provisional Results, Entebbe, Uganda.

Compared with the national population density of 126 persons per sq km, the districts of Bushenyi (189) and Kasese (183) have higher population densities, while Mbarara has a slightly lower density of 113 persons per sq km (Table 4.2). Similarly, in the subcounties that border QENP, Bushenyi district has the highest population sizes compared to the other three district subcounties (Table 4.3). Katerera (38,043) and Ryeru (38,181) subcounties in Bushenyi district have the highest populations. In all subcounties, the number of females is greater than that of males except in Karusandara.

Table 4. 3 Population by gender in the Subcounties studied in the four districts.

District	Subcounty	Male	Female	Total population
Bushenyi	Katerera	18,067	19,976	38,043
	Ryeru	18,071	20,110	38,181
Kasese	Karusandara	4,697	4,554	9,251
	Muhokya	8,341	8,344	16,685
Kamwenge	Nyabbani	14,215	15,045	29,260
	Mahyoro	9,997	10,066	20,357
Mbarara	Kicuzi	5,037	5,272	10,309

Source: UBOS, 2002. Uganda Population and Housing Census. Provisional Results, Entebbe, Uganda.

In all corridors, the majority of households have lived in the area for over ten years (Table 4.4). KKFR-KFR and in the West of Lake George corridors have not experienced household migrations in the last five years. However, 5.6% and 10.7% of the households in KWR-KKFR and Mpanga area respectively migrated into the area in the last five years.

Table 4. 4 Time lived in the area by the respondents

Period (years)	Corridor			
	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
1-5	0.0	5.6	10.7	0.0
5-10	9.1	33.3	17.9	17.4
≥10	90.9	61.1	71.4	82.6

Mpanga area and West of Lake George corridor experienced greater percentage of household migrations (14.3% and 17.4% respectively) from Kabarole district. In all corridors, a greater percentage of the households were born in the area except in Mpanga area where only 7.1% were born in the area (Table 4.5). It should be noted that Mpanga and West of Lake George corridors form part of Kamwenge, a newly created district. Therefore, the area has a relatively low population density and has available land for human settlement which could account for the recent migrations of people in the area in search for land and employment. Many households came from Kabale, Kisoro and Rukungiri districts in south west Uganda where human population density can reach 6-700 per km<sup>2</sup>.

Table 4. 5 Percentage of households and place of origin before settling in the corridors

	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Kabale	27.3	11.1	14.3	4.3
Kamwenge	0.0	11.1	0.0	4.3
Bushenyi	0.0	0.0	0.0	4.3
Kisoro	13.6	11.1	25.0	4.3
Mbarara	0.0	22.2	17.9	8.7
Ntungamo	0.0	2.8	0.0	0.0
Rukugungiri	18.2	11.1	3.6	8.7
Kanungu	0.0	2.8	0.0	4.3
Kabarole	0.0	0.0	14.3	17.4
Kasese	0.0	0.0	10.7	0.0
Mubande	0.0	0.0	7.1	8.7
Born here	40.9	27.8	7.1	34.8

#### 4.1.2 Household Property and entitlements

The structure of houses varied between the four sites both in terms of wall and floor materials (Table 4.6). However, the roofing materials did not vary so much between sites. The predominant wall structure was made of mud and poles although brick and timber/poles were also used in KKFR-KFR and KWR-KKFR corridors. The wall structures in Mpanga area and the floor of in houses West of Lake George were completely made out of mud/poles and mud respectively. The roof structures in the rest of the sites were roofed using iron sheet except for Mpanga area where the majority (60.7%) of houses were grass thatched.

Table 4. 6 The percentage of households using different construction materials for houses

	Kasyoha-Kitomi-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls Area	West of L.George
<b>Wall</b>				
Timber	0	5.6	0	0
Bricks	22.7	5.6	0	4.3
Mud/poles	77.3	88.9	100	95.7
<b>Floor</b>				
Mud	95.5	97.2	100	100
Cement	4.5	2.8	0	0
<b>Roof</b>				
Grass thatch	22.7	44.4	60.7	56.5
Iron sheets	77.3	55.6	39.3	43.5

#### 4.1.3 Livestock

The average number of livestock possessed by the households in KKFR-KFR and Mpanga area was slightly higher than those kept by the households in KWR-KKFR and West of Lake George corridor (Table 4.7). In all corridors, chicken/ducks were the most reared livestock with an average of six birds per household compared to the number of pigs and goats. Households in Mpanga Falls area tended to rear more cattle (17.5 cows) than the rest of the places. People living in KWR-KKFR and West of Lake George corridors reported that they could not rear cattle, goats/sheep due to the presence of predators (lions and leopards) and diseases and pests from the park that infect the livestock.

Table 4. 7 The average number of domestic livestock per household

	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L. George
Goats	2.5	2.9	5.8	2.6
Sheep	1.6	4.0	3.7	5.0
Pigs	2.3	1.3	1.4	1.5
Chicken/ducks	6.9	3.8	6.8	5.5
Dogs	1.0	1.0	1.4	1.0
Cows	2.3	1.8	17.5	4.5

#### 4.1.4 Ownership of Material Possessions

Household material possessions are used as a measure of wealth. These include land, livestock, transport means (e.g. bicycle, motorcycle, vehicle), radio and the type of house structure. As such, an attempt was made to find out the number of households in possession of the above materials. In relation to household assets, the radio and the bicycle featured prominently in all corridors. A higher percentage of households in Kyambura WR-Kasyoha-Kitomi FR had a radio (29%) and a bicycle (15%), while Kasyoha-Kitomi-Kalinzu corridor recorded the lowest percentage of material possessions (Table 4.8). No household had a motorcycle except for one household that had a pick up and was excluded for statistical reasons.

Table 4. 8 The percentage of households that own a radio, bicycle

	Kasyoha-Kitomi-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
<b>Radio</b>	95.5	80.6	89.3	95.7
<b>Bicycle</b>	45.5	41.7	35.7	47.8

## 4.2 Land resources

On average, the households in Mpanga Falls area had more land size (3.9 ha) compared to the rest of the corridors (Table 4.9). Households in Kasyoha-Kitomi-Kalinzu FR had the lowest land size (0.91 ha) suggesting land fragmentation due to higher population size in Bushenyi district. Additionally, the results of land tenure systems showed that 91.7% of the land is under customary land tenure (Table 4.10).

Table 4. 9 The average land size holding per household of people living in or adjacent to corridors

Corridor	Area (ha)
Kasyoha-Kitomi-Kalinzu FR	0.91
Kyambura WR-Kasyoha-Kitomi FR	2.30
Mpanga Falls area	3.90
West of Lake George	1.50

### 4.2.1 Land tenure and ownership

The results showed that over 90% of the households held land under the customary<sup>2</sup> tenure system except West of Lake George where 36.8% of the land is under leasehold<sup>3</sup>. Households West of Lake George live on public land (particularly in the fishing villages) owned by the government under the public trust doctrine where government acts as the guarantor in *Article 237(2)(b)* of the Constitution of Uganda and reinforced by *Section 45(4)* of the Land Act, 1998. In Kasyoha-Kitomi FR –Kalinzu FR and KWR-KKFR corridor, 4.2% and 2.4% of the households respectively live on forest reserve land under the freehold tenure system (Table 4.10).

Table 4. 10 Percentages of households holding land under different Land tenure systems

	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
<b>Customary</b>	95.8	97.6	100.0	63.2
<b>Leasehold</b>	4.2	2.4	0.0	36.8

Land acquisition by the households was through purchase from local residents, although land inheritance was equally common (Figure 4.1). West of Lake George, land is publicly owned. As earlier noted, households in this corridor settled on the protected area land especially in the fishing villages and encroached on the park land. However, renting of land was reported in Kasyoha-Kitomi-Kalinzu (45%) and Mpanga area (45.6%).

In order to explain the reasons for migrations to the corridor sites, an attempt was made to find out whether or not the households had land elsewhere. Only 2.8% and 4.3% of the respondents in KWR-KKFR and West of Lake George respectively, and none of the households interviewed in the other sites, reported having land elsewhere (Table 4.11). Therefore, most households do not own land in their districts of origin.

<sup>2</sup> Customary tenure is a traditional method of owning land either by the community, clan, families or individuals with similar customs of land ownership and use, controlled or regulated by rules, which are common and respected by the people of the concerned community, or society where the land is.

<sup>3</sup> Leasehold tenure is owning of an interest in land based on an agreement with the owner of the land allowing another person to take possession and use the land to the exclusion of any one else for a specified or limited period of time, usually five years, forty nine years, on payment of money of giving service.

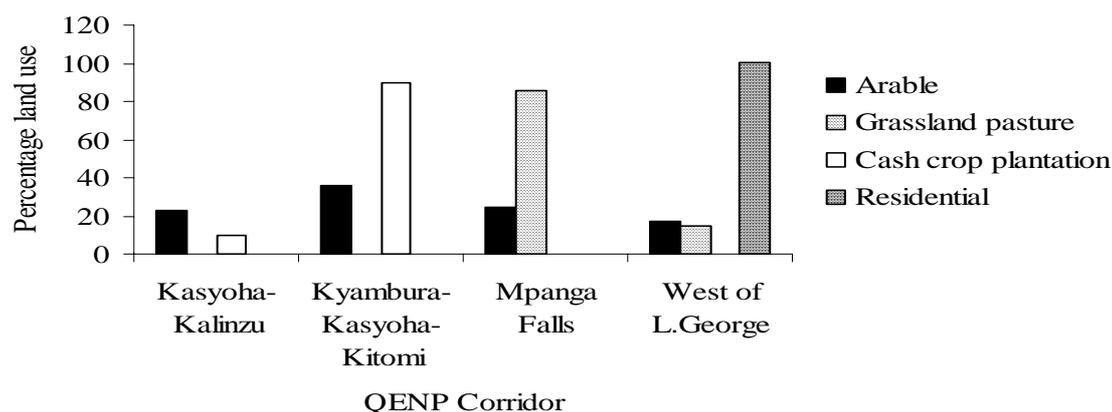


Figure 4.1 Type of land use in the corridor sites

Table 4. 11 Percentage responses of household that own or do not own land elsewhere

Forest	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L. George
Own land elsewhere	0	2.8	0	4.3
Do not own land elsewhere	100	97.2	100	95.7

#### 4.2.2 Land use types

Although qualitative soil rating is not accurate in a quantitative measurement of soil fertility, it provides a relatively fair ranking of soil fertility. Appropriate methods would involve soil analysis, plot and yield measurements which was not possible because of time and limited resources. In both KKFR-KFR (50%) and KWR-KKFR (69.4%), the households rated their land as very fertile (Table 4.12). While in Mpanga and West of Lake George, the majority (82.1% and 83.4%) households rated their land as fertile and none reported land to be infertile in all corridors.

Table 4. 12 Percentage respondent concerning the soil fertility rating

Soil fertility rate	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L. George
Very fertile	50.0	69.4	17.9	16.7
Moderately fertile	50.0	30.6	82.1	83.4
Not fertile	0.0	0.0	0.0	0.0

The land use in the corridor sites varied. Arable (agricultural) was the most common land use type in all corridors (Figure 4.2). Grassland pasture was predominant in Mpanga Falls area (Photo 2) while cash crop farming was dominant in the West of Lake George corridor. The cash crops mostly grown included cotton and tea (Photo 3). However, other food crops such as tomatoes, onions, Irish potatoes were also grown for commercial purposes. West of Lake George land is commonly used for house construction and the remaining part of the land is used for small scale agriculture because of the land tenure system (freehold). Most households do not own private land and cannot grow perennial crops due to the insecurity of ownership.

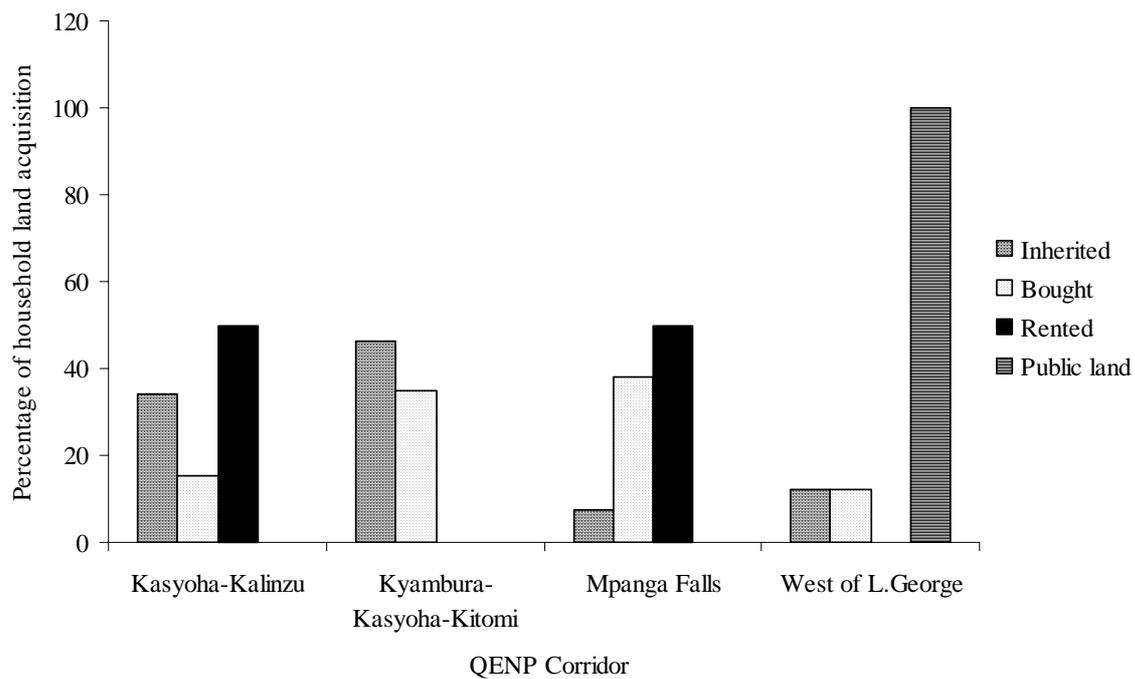


Figure 4.2 Form of land acquisition by the households in the corridors



Photo 2: Cattle grazing on-farm in Ntarama Village, Rwenshama Parish, Mpanga Falls area Kamwenge district.



Photo 3. Mixed cropping of cotton, maize and bananas in Mpanga Falls area

The types of crops grown in the different corridors did not differ considerably. The food crops included bananas, cassava, beans, cowpeas, maize, sweet potatoes and most vegetables, usually intercropped (Table 4.13). The cash crops grown included cotton, coffee, tea, and Musa bananas (for beer making) and small scale vanilla being promoted under the NAADS programme in Bushenyi and Kasese. In the north of Ibanda, Mbarara and parts of Bushenyi districts, some people are involved in rice growing especially near wetlands.

Table 4. 13 Crops grown in the region

<b>Corridor</b>	<b>Major crops grown</b>
Kasyoha-Kitomi-Kalinzu	Maize, sweet potatoes, millet, pineapple, bananas, cassava, tea, spices , beans, ground nuts
Kyambura-Kasyoha-Kitomi	Cotton, coffee, banana, millet, rice, beans, maize, cassava, rice, sorghum, onions, other vegetables, fruit trees, cowpeas
Mpanga Falls	Cotton, banana, maize, cowpeas, tomatoes, cabbages, sugarcanes, beans, rice, Irish potatoes
West of L.George	Maize, cotton, banana, beans, cassava, sweet potatoes, millet, vegetables, fruit trees

A NAADS agricultural census data for the three parishes in Katerera Subcounty, that border the KWR-KKFR corridor showed that more households are involved in crop farming than livestock rearing in this region (Table 4.14). It is important to note that in all the three parishes, households are involved in the production of a diversity of crops and rear different livestock. Generally, poultry and goats/sheep are the most common livestock species while cereals and root/tuber crops are the most grown crops by the households. At the crop production level, banana/coffee/cotton systems are more productive than the montane production systems.

Table 4. 14 NAADS household agricultural census for thee pilot Parishes in Katerera Subcounty, Bushenyi District

Parish	Animals								Crops										
	Indigenous cattle	Improved cattle	Sheep/goats	Pigs	Fish pond	Bee hives	Poultry	Totals	Cereals	Tuber/ root crops	Nuts/ Oils	Tree fruits	Trees	Vegetables/spices	Banana	Other cash crops	Pulses	Totals	
<b>Katerera</b>																			
No. Animals	50	23	884	148	0	64	N/C	<b>1,169</b>	Area (acres)	160	34	360	42	9	90	80		0	<b>775</b>
Households	24	6	242	76	0	8	N/C	<b>356</b>	Households	130	12	206	34	10	26	204		0	<b>622</b>
									Production (tons)	420	203	624	9	6	18	42		0	<b>1,322</b>
<b>Kakari</b>																			
No. Animals	40	0	111	96	0	94	5667	<b>7,011</b>	Area (acres)	105	78	N/C	28	N/C	10	N/C	207	N/C	<b>428</b>
Households	8	0	440	52	0	13	504	<b>1,017</b>	Households	300	128	N/C	18	N/C	31	N/C	311	N/C	<b>788</b>
			4						Production (tons)	500	1000		71	N/C	N/C	N/C	400	N/C	<b>1,971</b>
<b>Kyabakara</b>																			
No. Animals	43	0	569	277	0	121	N/C	<b>1,010</b>	Area (acres)	236	N/C	148	42	N/C	N/C	N/C	N/C	204	<b>630</b>
Households	9	0	262	166	0	27	N/C	<b>464</b>	Households	500	N/C	456	686	N/C	N/C	N/C	N/C	710	<b>2,352</b>
									Production (tons)	11.8	N/C	4.5	8	N/C	N/C	N/C	N/C	81	<b>105</b>

The agricultural census was conducted during the 1<sup>st</sup> planting season (June-December) in 2003 under NAADS programme. N/C –Not captured, 0- not present  
Source: Gumisiriza, NAADS Cordinator. Field Notes, Katerera Subcounty, Bushenyi district

### 4.3 Revenue Generating Activities

#### 4.3.1 Household sources of income

The main sources of income reported by the respondents were grouped as agriculture/livestock, fishing, business/retail trade, salaried employment, casual labour and sale of products from protected area (including carpentry and handicraft materials). The contribution of each economic activity was computed as shown in Table 4.15. The main sources of revenue to the households varied from one corridor site to another. In KKFR-KFR and Mpanga Falls area, agriculture together with livestock products contributed 62.7% and 41.4% of the total revenue respectively. In KWR-KKFR, business or retail trade contributed 30.4% and West of Lake George, 49.2% of household income accrued from fishing. Similarly, the second highest sources of income for households in all corridors varied. In Mpanga Falls area, the second most important source of revenue was fishing (31.2%), Casual labour (24.3%) for KWR-KKFR and business/retail trade contributing 21.6% to households West of Lake George.

Table 4. 15 Average annual household incomes derived from various economic activities

Corridor	Kasyoha-Kalinzu		Kyambura-Kasyoha-Kitomi		Mpanga Falls		West of L.George	
	Average Harvested consumed	Average Harvested sold						
Agricultural/Livestock	932,455	346,667	832,941	843,030	1,011,111	851,154	573,333	817,778
Fishing			235,000	495,000	310,000	1,120,000	696,667	2,100,000
Business/trade		323,750	670,000	1,425,000	390,000	333,333	233,333	995,000
Salaried employment			500,000	300,000				
Forest products		354,444	80,000	302,400	15,000	425,000		151,000
<b>Totals</b>	<b>932,455</b>	<b>110,6861</b>	<b>231,7941</b>	<b>4,565,430</b>	<b>1,726,111</b>	<b>2,767,987</b>	<b>1,503,333</b>	<b>4,183,778</b>

The percentage of household income from Trade/sale of protected area products was highest (17.4%) in KKFR-KFR as compared to Mpanga (9.8%), KWR-KKFR (5.6%) and West of Lake George (2.7%). Around KKFR-KFR and Mpanga, a higher percentage of total household income is consumed by the household.

Table 4. 16 Production systems and returns to agriculture by District 1998

Region	District	Production system	Gross returns to Crops (Ush/ha/yr)	Gross returns to Livestock USh/TLU/yr)
Western	Bushenyi	Montane	495,215	100,051
Western	Hoima	Banana/coffee banana/cotton	1,075,078	8,620
Western	Kabarole	Banana/coffee	531,843	50,025
Western	Kasese	Montane	473,693	100,051
Western	Mbarara	Pastoralist	372,608	72,580
Western	Rukungiri	Montane	636,386	100,051

(Source: Production systems from Fintec Consultants 1998. Returns to livestock from Mbuza et al 1998. Returns to agriculture from NEMA 1998a, b. Gross returns to agriculture include home consumed and marketed crops, and home consumed and marketed milk, meat, manure and animal sales. Where Districts contain more than one production system, average returns from all systems used.)

A comparison of the production systems and their gross returns of crops per ha per year (NEMA, 1998a), and of livestock (Mbuza *et al.*, 1998), showed that growing crops brought in more income (Table 4.16). In Bushenyi district, the gross returns to crops was 495,215 US\$/ha/yr while for the livestock, it was 100,051 US\$/ha/yr.

#### 4.3.2 Market value for land

An attempt was made to establish the cost of land from both the local government officials and local peoples' known current market prices. This was to facilitate the budgeting and planning process should the idea of relocation and compensation of households arise. Table 4.17 provides the local market prices per acre of land in each corridor site. In KKFR-KFR and KWR-KKFR prices of land are slightly higher than the prices West of Lake George with Mpanga Falls site having the lowest prices. The length of the critical areas of the corridor and an estimate of the number of households living within a distance of 1.5 km on either side of the corridor was also estimated. KWR-KKFR corridor had the largest number of households to be affected. In terms of corridor length, the West of Lake George corridor is the longest followed by KKFR-KFR.

Table 4. 17 The cost of land, land size and boundary size of the corridors

Corridor	US\$ per hectare	Length of corridor (km)	Total area (ha)	Width km	Number of Households within 1.5km
Kasyoha-Kitomi-Kalinzu	2,500,000	5.6	182	1.5	200
Kyambura-Kasyoha FR	2,500,000	2.0	575	0.3	250
Mpanga Falls area	1,250,000	2.5	273	0.5	70
West of Lake George	2,000,000	11.0	275	0.6	183
<b>Total</b>		<b>26.8</b>	<b>1,305</b>		<b>703</b>

(The total area is computed using the average land size per household and number of households living in or 3 km radius to the corridors. The price of land per hectare was reported by key informants and local government officials in the different corridor sites).

A 1.5 km distance is large and it is probable that much could be done with a much smaller distance. Table 4.18 estimates crude costs of purchase of land for a 500 metre increase in corridor width on either side of the corridor, a 1km increase and a 1.5 km increase for each corridor separately. These calculations assume a relatively even distribution of households and land and only provide a ball-park estimate of the costs. A more detailed survey would be needed at each site.

Table 4. 18 Estimates of the costs of buying land around the corridors at varying increases in the widths of corridors on both sides

		KKFR-KFR	KWR-KKFR	Mpanga Falls	West of L. George
US\$ per hectare		2,500,000	2,500,000	1,250,000	2,000,000
500 metre	Area	49	28	63	134
	Cost	72,100	41,200	46,300	157,600
1 km	Area (ha)	106	207	195	120
	Cost (\$US)	155,200	304,400	143,400	141,200
1.5 km	Area	159	310	293	180
	Cost	233,800	456,600	215,100	211,800

#### 4.4 Local community economic, benefits, costs and incentives

##### 4.4.1 Local community benefits from protected areas

The costs and benefits that local communities incur during conservation can quickly be revealed by the community's perceived values and threats associated with the natural resources that they rely on. The focus group discussions held in the park corridor sites (Photo 4) helped to identify the benefits from the protected areas (direct and indirect) and the threats to both people and protected areas. The agreed values and threats named were ranked, based on the most important product derived and the greatest problem accruing from the protected area. Ranking was made in order of decreasing importance or priority products derived and the perceived threats to peoples' livelihood. For purposes of clarity, group results from each corridor site are presented in individual tables. Table 4.19 provides a summary of the products derived from KWR-KKFR.



Photo 4: Focus group discussion meetings at Karusandara, Kasese (L) and Ngoma village in Kamwenge district

Table 4. 19 Products harvested from the park/forests Kyambura WR-Kasyoha-Kitomi FR

Products	Women	Men > 40 years	Young adults	Totals of Group Ranking	Final Rank
Firewood	1	2	1	4	1
Fibres/ropes/cords	7	7	6	20	6
Vegetables/Mushrooms	6	8	7	21	7
Water	2	5	4	11	3
Fodder/pasture/Grazing	9	6	5	20	6
Building poles	3	1	3	7	2
Thatching grass	5	3	4	12	4
Medicinal plants/herbs	4	4	7	15	5
Timber	8	1	2	11	3

Rank 1- stands for the most important, 9 – is for the least important , under total group ranking (all rankings per group are summed up) the lowest sum total takes on rank one in that order (Shechambo, 2002).

From the above summary of products derived from the park, it is evident that the main forest products included firewood, building poles, timber, water, thatching grass and medicinal plants. Although, many other products are derived from the protected areas, vegetables/mushrooms were regarded less important. In terms of individual group categories, firewood ranked high among the women and young adults while timber ranked high among men.

In KKFR-KFR corridor, the most important products in order of priority were: firewood, water, timber, building poles and medicinal plants (Table 4.20). In all groups, firewood was ranked first

while water, building poles and timber were the second most important to the women, the men (>40 years) and young adults respectively. Unlike the KWR-KKFR corridor, people in this area also harvest honey, yams and handicraft materials.

Table 4. 20 Direct benefits derived from the park/forest by local people in KKFR-KFR

Products	Women	Men> 40 years	Young adults	Totals of Group Ranking	Final Rank
Firewood	1	1	1	3	1
Charcoal	8	5	5	18	8
Fibres/ropes/cords	5	7	7	19	9
Vegetables/Mushrooms	3	6	7	16	6
Water	2	4	4	10	2
Fodder/pasture/Grazing	4	5	9	18	8
Building poles	7	2	3	12	4
Bee products	10	7	6	23	11
Game/Meat/Hunting	10	7	7	24	12
Fish	9	8	4	21	10
Fruits/roots/leaves	9	10	10	29	15
Medicinal plants/herbs	4	4	6	14	5
Sand/Clay/quarry	11	9	8	28	14
Handcraft raw materials	4	4	9	17	7
Timber	6	3	2	11	3
Yams	6	10	11	27	13

Local people in Mpanga Falls area identified fish, water, firewood, building poles, thatching grass and fibre/ropes/cords as the five most important products among others (Table 4.21). It is important to note that game meat was ranked very low (12) in almost all corridor sites. This could be attributed to presence of substitutes especially fish and also the increased enforcement by UWA management making it very difficult to rely on wild meat for nutritional (protein) needs. However, all game meat is illegal and there may have been a reluctance to admit to obtaining it. It should be noted that charcoal is one of the products that local communities derive for commercial purposes in this area.

Table 4. 21 Direct benefits derived from the park/forest by local people in Mpanga Falls area

Products	Women	Men> 40 years	Young adults	Totals of Group Ranking	Final Rank
Firewood	2	4	3	9	2
Charcoal	11	7	9	27	8
Fibres/ropes/cords	7	5	5	17	5
Vegetables/Mushrooms	8	9	11	28	9
Water	1	2	2	5	1
Fodder/pasture/Grazing	9	5	6	20	6
Building poles	7	3	4	14	3
Bee products	12	11	12	35	12
Game/Meat/Hunting	13	12	15	40	13
Thatching grass	5	3	7	15	4
Fish	3	1	1	5	1
Fruits/roots/leaves	12	6	14	32	10
Medicinal plants/herbs	4	2	8	14	3
Sand/Clay/quarry	10	10	13	33	11
Handcraft raw materials	6	8	10	24	7

Like the other corridors, communities in the West of Lake George indicated that firewood, fish, medicinal plants, building poles and water were the most important products derived from the protected areas (Table 4.22). Equally important products were vegetables/mushrooms, fibres/cords/ropes and sand/clay. Firewood, fish and medicinal plants featured prominently in all

groups, that is, the women, men and the young adults. Unique to this area are salt and sand/quarry mining for both domestic and commercial purposes. These are activities that are mostly dominated by the women.

Table 4. 22 Direct benefits derived from the park/forest by local people West of Lake George

Products	Women	Government workers	Men > 40 years	Young adults	Totals of Group Ranking	Final Rank
Firewood	1	1	2	2	6	1
Fibres/ropes/cords	7	10	7	6	30	7
Vegetables/Mushrooms	5	4	6	9	24	6
Water	4	5	4	5	18	5
Fodder/pasture/Grazing	8	6	9	12	35	10
Building poles	6	3	3	4	16	4
Bee products	10	6	10	7	33	9
Game/Meat/Hunting	11	8	11	8	38	12
Thatching grass	8	9	8	11	36	11
Fish	3	2	1	1	7	2
Medicinal plants/herbs	2	2	5	3	12	3
Sand/Clay/quarry	9	7	6	10	32	8
Salt	10	10	12	13	45	13

Table 4. 23 Site based indirect values as revealed by the communities in the corridors

Corridors	West of L. George	KWR-KKFR	Mpanga Falls Area	Kasyoha-Kitomi FR-Kalinzu FR
<b>(i) Ecological Values (indirect)</b>				
Watershed conservation	+	+	+	+
Rain attraction	+			+
Wildlife habitats	+	+	+	+
Air purification		+	+	
Soil erosion control		+		+
Wind breaker		+		+
<b>(ii) Education/Research (indirect)</b>				
Research education	+	+		+
<b>(iii) Aesthetic (direct)</b>				
Scenic beauty	+	+	+	+
Shade		+		+
Recreation	+	+	+	+
Ecotourism		+	+	+
Employment		+		+
Worship		+		
Decorative ornaments (Flowers, shells, stones)	+	+	+	+
<b>(iv) Historical/Cultural (indirect)</b>				
Shrine				+

An attempt was made to find out whether or not the local people in these corridor sites know and appreciate other services and indirect benefits that the protected areas provide. As such, the participants were asked to list all the indirect values and services provided by the natural habitat (Table 4.23). Protected areas provide a wide range of goods and services, some of which have not been recognised or valued. Indirect benefits are usually in form of services and include soil formation, erosion control, watershed protection and purification, carbon sequestration and air purification among others. Watershed protection, wildlife habitat, scenic beauty, recreation and decorative ornaments (e.g. flowers, shells and precious stones) were common to all sites. Other values noted include erosion control, air purification, windbreakers, research and education, and ecotourism.

However, communities West of Lake George and near Mpanga Falls sites did not perceive the protected areas as a source of employment nor recognise that they provide services such as controlling soil erosion and windbreaks.

#### 4.4.2 Potential economic activities

Many conservation and development organisations have emphasised several approaches to reduce negative human impacts on protected areas. Such approaches include integrated conservation and development (ICD), on-farm substitution, use of economic incentives and enactment of appropriate legislation amongst others. In this study an attempt was made to identify what communities perceived as potential and viable economic activities that could be supported in order to reduce poverty. A number of possible income-generating activities that household could engage in were listed during the focus group discussions (Tables 4.24-4.27). For the benefit of planners, managers and support organisations, potential economic activities that local people are willing to undertake for each area were presented individually. Ranking was made based on what participants perceived as the most viable activity and scores in ascending order were given. Being an agricultural zone, people felt that increased land and livestock productivity, use of high yielding seeds and varieties, access to markets and market information collectively referred to as modernisation of agriculture in this report was given the highest priority by community members (Table 4.24). Other income generating activities that communities are willing to undertake include pig rearing, fish farming, handicrafts, ecotourism, tree planting and irrigation scheme especially using water from the available crater lakes and rain water harvesting.

Table 4. 24 Potential economic activities in KWR-KKFR corridor

Economic activities	Women	Men 40 years	Young adults	Totals of group Ranking	Final Rank
Modernise agriculture	1	1	1	3	1
Handicraft (clubs)	2	6	4	12	4
Pig rearing	3	2	3	8	2
Fish farming	5	3	2	10	3
Ecotourism	4	4	6	14	5
Tree planting	6	5	5	16	6
Irrigation scheme (crater lakes)	7	7	7	21	7

The people's priority activity in KKFR-KFR site was not any different from the KWR-KKFR corridor. Access to improved livestock (e.g. goats, pigs and cattle) and crop seeds was highly regarded as a potential income generating activity (Table 4.25). Unique to this area was the establishment of a ceramics/clay factory due to the availability of clay and local artisans involved in the activity. In addition, the area is favourable for bee keeping and fish farming and the demand for these products is available. Local people felt that if support with some small loans, they could engage in on-farm bee keeping and fishing.

Table 4. 25 Potential economic activities in KKFR-KFR

Economic activities	Women	Men 40 years	Young adults	Totals of group Ranking	Final Rank
Fish farming	3	3	3	9	2
Bee keeping	4	2	4	10	3
Improved livestock rearing (goats,pigs & cattle)	1	1	1	3	1
Brick making	6	4	2	12	4
Ceramics/clay factory	5	5	5	15	6
Handicrafts shops	2	6	6	14	5

The desire for credit schemes for people to access small loans to start income generating projects such as pig rearing, poultry and fish farming was overwhelmingly considered the most important need for increasing incomes in the Mpanga Falls area (Table 4.26). However, pastoralist cited a desire for a cattle market and dairy plants. Maize is one of the most important food crops to the households in the area and people proposed the idea of an oil powered maize mill (electric power is not available). While the women considered poultry and pig rearing highly, the men and young adults ranked the credit scheme and fish farming more important respectively.

Table 4. 26 Potential economic activities in Mpanga Falls area

Economic activities	Women	Men 40 years	Young adults	Total group Ranking	Final Rank
Poultry	1	4	5	10	2
Credit scheme	3	1	2	6	1
Pig rearing	1	2	3	6	1
Fish farming	4	7	1	12	4
Maize mill	2	5	4	11	3
Business (shop, market vending)	7	9	7	23	7
Bee Keeping	5	6	6	17	5
Cattle market & Dairy plant	6	3	2	11	3
Tree Planting	7	8	7	22	6

The priorities of people in the corridor to the west of Lake George are consistent with those areas already noted. The demand for mechanisation and value addition (e.g. tomato processing plant and milk processing plants) are clear indications of the need to improve production. Equally important in the area is salt mining (Table 4.27). Although government workers highly regarded the fishing business as very important, they also ranked livestock rearing as the second priority.

Table 4. 27 Potential economic activities in West of Lake George corridor

Economic activities	Women	Government workers	Men 40 years	Young adults	Total	Final Rank
Fishing business	7	1	5	2	15	5
Brick making	8	4	4	3	19	6
Handicrafts	3	6	6	6	21	7
Livestock rearing (goats & cattle)	2	2	5	4	13	4
Microfinance	9	4	5	4	22	8
Drama club	5	5	7	7	24	9
Poultry	9	3	4	3	19	6
Tractor for agriculture	1	0	2	1	4	1
Tomato factory	4	0	3	2	9	2
Salt business	6	0	1	5	12	3

## 4.5 Corridors and Wildlife-Human Conflicts

### 4.5.1 Use of the corridors by wild Animals

In an attempt to ascertain whether or not wild animals use the corridors, respondents were asked to name the animals seen using the corridors and the period when they were sighted. Eleven wild animal species were reported by the respondents to use the corridors; including elephants, hippos, chimpanzees, monkeys, baboons and wild pigs (Table 4.28). The corridor to the west of Lake George had more animal species than the other corridors. In all corridors, elephants, monkeys, baboons and wild pigs were the most common species cited. Hippos sightings were reported in all corridors except Kasyoha-Kitomi-Kalinzu FR area. Kasyoha-Kitomi-Kalinzu FR corridor had the lowest (four) animal species citing and the largest percentage (36.2%) of respondents who reported having seen monkeys.

Table 4. 28 Percentage of respondents who reported have seen different animals use the corridors

<b>Animals species</b>	<b>Kasyoha-Kalinzu</b>	<b>Kyambura-Kasyoha-Kitomi</b>	<b>Mpanga Falls</b>	<b>West of L.George</b>
Elephant	6.7	35.0	1.1	21.9
Hippo	0.0	17.0	17.4	4.1
Chimpanzee	0.0	1.5	0.0	7.4
Monkey	36.2	1.5	17.5	3.1
Baboon	37.5	22.0	36.0	17.9
Buffalo	0.0	20.9	0.0	17.6
Bush pig	19.7	2.1	25.8	19.6
Uganda Kob	0.0	0.0	2.2	1.8
Lion	0.0	0.0	0.0	3.8
Hyena	0.0	0.0	0.0	2.0
Leopard	0.0	0.0	0.0	0.8

The highest occurrence of elephants, monkeys, baboons and bushpigs was mostly during the period of March to May (10%) and September to November (13%). The Lion, hyena and leopard occurred only in the West of Lake George corridor (Table 4.29). The sighting of baboons and monkeys was reported to occur throughout the year in all corridors.

The months of March-May and September-December, during which high occurrence of wild animals was reported, correspond with both the rain seasons and planting time. As such, people face severe incidences of crop raiding during this period. However, during the months of June to July, wild animal occurrence was observed to be very low.

At the KWR-KKFR and Mpanga corridor sites respondents all stated that animals used the corridors. At the other two sites respondents noted reasons why animals might not use the corridors as much as in the past (Table 4.30). The majority (68.8%) of respondents in KKFR-KFR attributed the failure of most wild animals to use the corridor to an increase in human settlements while 18.8% reported the main road from Mbarara to Kasese to be a hindrance due to continuous traffic noise along the road (Table 4.30). The West of Lake George corridor was not any different as most respondents stated the increase in human settlement (46.2%) to be the main hindrance to wild animal use of the corridor, although guarding of crop fields (38.5) was reported to be another important cause. The other reason reported was that people hunt or kill the animals while attempting to use the corridors.

Table 4. 29 Percentage household responses to period of animal sighting in each corridor

Corridor	Period of animal citing	Elephant	Hippo	Chimpanzee	Monkey	Baboon	Buffalo	Bush pigs	Uganda Kob	Lion	Hyena	Leopard
KKFR-KFR	Jan				7.4	7.1						
	Feb				7.4	7.1						
	Mar	26.7			9.9	10.7		15.9				
	Apr	20.00			9.9	10.7		15.9				
	May	13.3			9.9	9.5		13.6				
	Jun				7.4	7.1						
	Jul				7.4	7.1						
	Aug	6.7			7.4	7.1		9.1				
	Sep	13.3			8.6	9.5		13.6				
	Oct	6.7			8.6	8.3		11.4				
	Nov	6.7			8.6	8.3		11.4				
	Dec	6.7			7.4	7.1		9.1				
KWR-KKFR	Jan	0.6	1.1			2.7		9.1				
	Feb	0.6	1.1			1.8						
	Mar	15.5	17.0	12.5	12.5	16.8	13.9	27.3				
	Apr	14.4	17.0	12.5	12.5	14.2	13.9	9.1				
	May	14.4	17.0	12.5	12.5	14.2	13.9	9.1				
	June	0.6		12.5	12.5	0.9	0.9					
	July											
	Aug	5.5	5.7	12.5	12.5	4.4	8.3					
	Sep	13.3	10.2	12.5	12.5	13.3	13.0	18.2				
	Oct	12.2	10.2	12.5	12.5	10.6	13.0	9.1				
	Nov	12.2	10.2	12.5	12.5	11.5	13.0	9.1				
	Dec	11.0	10.2			9.7	10.2	9.1				
Mpanga Falls	Jan				6.3	6.5		0.5				
	Feb				6.3	6.5		0.5				
	Mar	12.5	12.6		9.4	9.9		12.8	18.8			
	Apr	12.5	12.6		9.4	9.5		13.3	18.8			
	May	12.5	12.6		9.4	9.5		12.8	25.0			
	Jun				6.3	6.5		0.5				
	Jul				6.3	6.5		0.5				
	Aug	12.5	11.8		8.6	8.4		10.1	6.3			
	Sep	12.5	12.6		10.2	9.1		12.2	6.3			
	Oct	12.5	12.6		9.4	9.5		12.2	6.3			
	Nov	12.5	12.6		9.4	9.1		12.2	12.5			
	Dec	12.5	12.6		9.4	9.1		12.2	6.3			
W. L. George	Jan	3.5			8.3	4.3		5.2				
	Feb	3.5			8.3	4.3		5.2				33.3
	Mar	9.3	12.5	10.3	8.3	8.6	10.1	9.1	28.6	13.3		33.3
	Apr	9.3	12.5	10.3	8.3	8.6	11.6	9.1	28.6	13.3		33.3
	May	9.3	12.5	10.3	8.3	8.6	11.6	9.1	28.6	13.3	12.5	
	Jun	3.5			8.3	4.3	1.4	5.2	14.3		12.5	
	Jul	3.5			8.3	4.3		5.2				
	Aug	11.6	12.5	13.8	8.3	11.4	13.0	10.4		13.3	25.0	
	Sep	11.6	12.5	13.8	8.3	11.4	13.0	10.4		13.3	12.5	
	Oct	11.6	12.5	13.8	8.3	11.4	13.0	10.4		13.3	12.5	
	Nov	11.6	12.5	13.8	8.3	11.4	13.0	10.4		13.3	12.5	
	Dec	11.6	12.5	13.8	8.3	11.4	13.0	10.4		6.7	12.5	

Table 4. 30 Reasons given by the respondents why wild animals do not use the corridors for two of the sites. In the other two sites respondents stated animals did use the corridors.

Why not use corridor	Kasyoha-Kalinzu	West of L.George
Blocked by people guarding crops	0.0	38.5
Increase in human settlement	68.8	46.2
People kill/hunt them	12.5	7.7
Mbarara-Kasese road is a hindrance	18.8	7.7

#### 4.5.2 Problem animals/Crop raiding animals

The species of animals raiding people's crops varied from place to another. Apart from Mpanga Falls area where people suffered only from known vermin species (e.g. baboons, vervet monkeys and bushpigs), the rest of the corridor sites experienced both vermin and other species (Table 4.31). However, the most commonly reported crop raiding animals were the baboons and other monkey species. Villages in both KWR-KKFR and West of Lake George experienced high levels of crop raiding in comparison with the other corridors. These are the same corridors where more wild animal species were seen to use the corridors and where the highest number of people-park conflicts are reported. Eight wild animal species were reported crop raiding including the three vermin species and elephants, buffalos, hippos, chimpanzees and porcupines (*Hystrix africaustralis*).

Table 4. 31 Percentage of respondents citing different species raiding their gardens

Species crop raiding	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Elephant	7.5	34.5	0.0	25.8
Hippo	0.0	15.5	0.0	3.0
Chimpanzee	4.5	2.4	0.0	1.5
Monkeys (Vervets)	32.8	6.0	23.9	13.6
Baboon	32.8	35.7	40.3	25.8
Buffalo	0.0	2.4	0.0	9.1
Bush pig	22.4	3.6	35.8	18.2
Porcupine	0.0	0.0	0.0	3.0

Although several animal species were reported to raid crops, respondents were asked to name the most problematic. It was reported that baboons, elephants and bushpigs were the most problematic animals. Hippos were reported to raid crops commonly in KWR-KKFR, while monkeys were relatively important in both KKFR-KFR and the Mpanga area (Table 4.32). Baboons and other monkeys not only occur in the protected areas but were also reported to be present in the bushland around villages.

Table 4. 32 Most problematic crop raiding animals

Species	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Elephant	15.2	44.2	0.0	41.7
Hippo	0.0	13.5	0.0	0.0
Monkey	18.2	0.0	12.8	0.0
Baboon	66.7	40.4	55.3	44.4
Wild pig	0.0	1.9	31.9	13.9

#### 4.5.3 Problem animal prevention techniques

People manage crop raiding problems differently however, common to all is guarding of crop fields (Table 4.33). Other methods used include beating of objects and scare shooting by UWA staff, killing animals and fencing off gardens. Some households (27.0%) in KWR-KKFR and West of Lake George (5.9%) reported doing nothing about the raiding animals. However, they were quick to add that doing nothing did not imply that the raiding incidence is low but that in some households people are too weak to stay in the fields guarding at night when many of the animals come. In KKFR-KFR (4.0%) and KWR-KKFR (2.7%) some of the households reported killing the animals using spears. The people further reported that of all techniques used, no single method was a hundred percent effective and a combination of methods tended to be used depending on the animal species targeted.

Table 4. 33 Methods used by people to prevent crop raiding animals in each corridor

Method of prevention	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Guarding	88.0	45.9	80.0	94.1
Call UWA staff to scare them	0.0	5.4	0.0	0.0
Beating objects	8.0	16.2	16.7	0.0
Kill/spear them	4.0	2.7	0.0	0.0
Do nothing	0.0	27.0	3.3	5.9
Fencing off gardens	0.0	2.7	0.0	0.0

The strengths and weaknesses of some of the management options for reducing human-wildlife conflicts have been discussed above (chapter 2). An attempt was made to calculate the capital costs for each management intervention based on various studies. Purchase of land in the target corridors is one option but this would increase corridor width rather than tackle the issue of crop raiding directly. It is also the most expensive option. Table 4.34). However, it should be noted that the cost for the latter option only includes maintenance costs for only one year. The cheapest intervention is the planting of Mauritius thorn tree provided the community is committed to maintain it to avoid invasion of the protected area.

Table 4. 34 Estimates of the cost required to install a barrier and maintenance for one year for three different barrier types

Deterrent	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Trench	12,006	3,430	6,432	12,864
Mauritius thorn tree	1,904	544	1,020	2,040
Electric fence	36,714	10,490	19,668	39,336

Electric fence cost=\$3,278/km; Trench=\$1,715/km; Mauritius Thorn hedge=\$170/km (Purna *et al.* 2004, Sam 1998)

Following discussions about crop raiding animals, respondents were asked whether or not they support the idea of fencing off the corridors. If yes, would they be willing to contribute to the maintenance of the fence? The majority (74.3%) of the respondents supported the idea of fencing off the corridors. Of these, 33.3% respondents in KWR-KKFR, Mpanga (32.1%) and West of Lake George (28.4%) supported the idea of erecting a permanent fence. People were willing to contribute to the fence or barrier by guarding, slashing, patrolling and maintaining it (Table 4.35). In all corridors, people were willing to contribute labour but in different forms towards the fence/barrier. In KKFR-KFR, 66.7% and in Mpanga, 48.1% of households were willing to slash the fire lines of the fence/barrier. Fifty percent of the households West of Lake George and 44.1% in KWR-KKFR corridor were willing to maintain the fence.

Table 4. 35 Percentage of households willing to put time into crop raiding deterrence methods

Form of contribution toward fence/barrier	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Guarding	0.0	11.8	7.4	0.0
Patrolling	16.7	2.9	7.4	4.2
Slashing fire lines	66.7	41.2	48.1	45.8
Maintenance of barrier/fence	16.7	44.1	37.0	50.0

Despite the fact that people acknowledge crop raiding as a big problem, 25.7% of the respondents did not accept the idea of fencing (metal or electrical fence) the corridors. An effort was made to establish the reasons for not accepting the proposed intervention and a number of reasons were given (Table 4.36). The majority of households gave reasons such as the protected areas are a source of firewood, water and grazing land as the main reasons for not accepting to fence the corridors. Other reasons given were the restriction of freedom and source of income. On the other hand, 3.6% of the respondents in KKFR-KFR and 33.3% in KWR-KKFR corridors preferred the establishment of a live fence or a trench rather than an electric or wire fence.

Table 4. 36 Reasons for not accepting to fence the corridors

Reason	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls
Source of firewood	50.0	33.3	0.0
Source of water	25.0	33.3	50.0
Grazing land	0.0	0.0	50.0
Restricts freedom of movement	3.6	0.0	0.0
Prefer trench/hedge	3.6	33.3	0.0
Sources of income	17.9	0.0	0.0

The majority (99.1%) of the respondents admitted that the government should maintain the existing corridors for wild animals, however, they were not willing to move to enlarge the corridors. A number of reasons were given for not moving (Table 4.37). The most common reason at three of the sites was the reported failure of government to compensate local people when they have moved in the past. Households around KKFR-KFR indicated that land was very scarce and too expensive to move. Other reasons were that land is very productive while West of Lake George, dependency on the lakes for survival was an important consideration. In addition, concerns specific to corridors were reported such as financial and administrative problems to local government (e.g. low fiscal revenues, people representation on local councils), marginalisation of poor people in resettlement schemes (left out of land allocation, given small plots) and unwillingness to move because it has been their home for some time or they feel to old.

Table 4. 37 The reasons given by the household respondents for not shifting from the areas where they are living

Reason	Kasyoha-Kalinzu	Kyambura-Kasyoha-Kitomi	Mpanga Falls	West of L.George
Government cannot compensate people	14.3	50.0	53.6	45.5
Land is scarce and expensive	57.1	16.7	32.1	31.8
It will present financial & administrative problems to local government	0.0	8.3	0.0	0.0
Marginalisation in resettlement schemes	0.0	0.0	3.6	0.0
Born in the area & cannot abandon relatives	0.0	8.3	3.6	0.0
Victim of evictions from various PA by Gout		16.7	3.6	0.0
Too old to move to another place	7.1	0.0	3.6	0.0
Depend entirely on lakes for survival	0.0	0.0	0.0	22.7
Land is very productive	21.4	0.0	0.0	0.0

#### 4.6 Threats to corridor areas

In the past, management of protected areas had ignored the fact that protected areas cause the communities to incur economic costs. The opportunity costs incurred to the communities are often correlated with the level of resource and land use conflicts and the threats that the protected areas experience usually as a result of local community actions. As such, the participants were challenged to enumerate all the threats and problems the corridor experiences. The most perceived threat to the park was scored with '1' and the least given the highest number. Table 4.38 shows the threats identified for the KWR-KKFR corridor. Park/forest encroachment, fires, illegal timber harvesting and poaching were regarded as the most severe threats to the protected areas. Other threats include livestock grazing, fishing and over-harvesting of medicinal plants coupled with the use of inappropriate techniques. Park encroachment was ranked first by both women and men while the young adults identified fire to be the most severe.

Table 4. 38 Threats to the KWR-KKFR corridor

Threat	Women	Men 40 years	Young adults	Totals of group Ranking	Final Rank
Forest/park fires	4	1	1	6	2
Illegal timber harvesting	2	4	2	8	3
Park/forest encroachment	1	1	2	4	1
Livestock grazing	5	5	5	15	5
Fishing	6	6	6	18	6
Capture of live animals/ Poaching	3	3	2	8	3
Over harvesting of medicinal plants	7	7	6	20	7

In KKFR=KFR corridor, fires, park encroachment and poaching were regarded as the most severe threats to the forest reserves. All groups ranked forest fires as the most severe threat (Table 4.39). Although the area is known by NFA staff for to contain illegal forest product harvesting, illegal timber harvesting and over harvesting of medicinal plants were not considered to be very serious threats to the reserves by the local people.

Table 4. 39 Threats to KKFR-KFR corridor

Threat	Women	Men 40 years	Young adults	Totals of group Ranking	Final Rank
Forest/park fires	1	1	1	3	1
Illegal timber harvesting	6	6	5	17	6
Park/forest encroachment	2	2	2	6	2
Livestock grazing	4	4	4	12	4
Fishing (in crater lakes)	4	5	6	15	5
Capture of live animals/ Poaching	2	3	2	7	3
Over harvesting of medicinal plants	7	7	7	21	7

Unlike KWR-KKFR and KKFR-KFR corridors, in Mpanga Falls area livestock grazing, fires and fishing were considered the most important threats to the protected areas while poaching and over-harvesting of medicinal plants were thought to be minimal (Table 4.40).

Table 4. 40 Threats to the Mpganga Falls area identified by the focus group participants

Threat	Women	Men 40 years	Young adults	Totals of group Ranking	Final Rank
Forest/park fires	3	3	1	7	2
Park/forest encroachment	4	4	3	11	4
Livestock grazing	1	1	2	4	1
Fishing	2	2	4	8	3
Capture of live animals/ Poaching	4	5	4	13	5
Over harvesting of medicinal plants	6	6	6	18	6

West of Lake George fires, poaching and encroachment were identified as the most important threats to the protected area. However, fishing and over-harvesting of medicinal plants were regarded less severe (Table 4.41). Government employees identified over-harvesting of medicinal plants as the third most severe threat in addition to poaching and fires. The young adults ranked encroachment and poaching as the most important threats. Invasive species were not regarded as a threat in any of the corridors probably because people are not educated about these species.

Table 4. 41 Threats to protected area in the West of Lake George identified by the focus group

Threat	Women	Government worker	Men 40 years	Young adults	Totals of group Ranking	Final Rank
Forest/park fires	1	1	1	3	6	1
Illegal timber harvesting	2	4	6	7	19	5
Park/forest encroachment	2	5	5	1	13	3
Livestock grazing	4	6	3	4	17	4
Fishing	6	7	4	5	22	6
Capture of live animals/ Poaching	5	2	2	2	11	2
Over harvesting of medicinal plants	7	3	7	6	23	7

#### 4.7 Problems faced by the local communities

During the focus group meeting, participants were engaged in very intensive dialogue to present all problems they face as people living in or adjacent to protected areas. In addition, the same members were challenged to propose possible solutions or means of managing the stated problems. As a result of the exercises held in the four corridors, a number of problems and possible solutions are presented below. It should be noted that the number of problems mentioned cut across all corridors such as crop raiding, diseases and pests from the park transmitted by wild animals, denial of access to protected area resources, poor relationships between protected area authorities and the local people, poverty, and lack of access to agricultural and grazing land. Other constraints to people's livelihoods included poor roads, inadequate markets and low prices, lack of access to credit, lack of alternative sources of income outside protected areas, poor quality water and inequitable distribution of national resources. Summaries of the listed problems and remedial measures are present for each of the study sites.

#### KWR-KKFR

##### *Problems due to the KWR-KKFR Corridor*

1. Crop raiding/problem animals;
2. School children drop-out as a result of guarding problem animals against crop damage
3. Poor quality water (water is sourced from the forest and shared with wild animals);
4. Poor feeder roads making access to markets almost impossible;
5. Denial of access to forest products (e.g. poles, timber, vegetables);

6. Diseases and pests attack from the forest/park (e.g. tsetse flies, ticks, insect bites, mosquitoes);
7. Inadequate land for agriculture and grazing;
8. Land slides especially at the escarpment;
9. Flooding;
10. Arrests and harassment by the NFA and UWA staff;

*Proposed solutions to these problems around the KWR-KKFR corridor*

1. Recruit village vermin guards or plant a Mauritius thorn (*Ceasalpanea decapitate*) tree hedge;
2. Compensation from government for crop damage due to problem animals (create economic incentives such as community forest management, revenue sharing, regulated access to forest products for domestic use);
3. Government should provide good quality piped water from the crater lakes (e.g. Kabarogi crater lake) in Munyonyi Parish, Katerera Subcounty;
4. Road rehabilitation and grading so that people are able to market their agricultural products;
5. Government should provide drugs in the already existing clinics;
6. Provide hybrid seeds or high yielding seeds and livestock to improve production on the small areas and reduce expansion into natural habitats and marginal lands;
7. Provide tree seedlings at subsidised costs for soil conservation and firewood sources;
8. Sensitise local people about their rights, responsibilities and values of protected areas;
9. Government or credit institutions should provide loans to support community club activities.

## **KKFR-KFR**

*Problems around KKFR-KFR Corridor*

1. Problem animals/crop raiding;
2. Diseases and pests (e.g. River blindness, malaria, ticks, tsetse flies, insect bites);
3. Poor relationships between local people and protected area authorities. Method of handling people found in the protected areas by UWA/NFA staff compared to how they are treated when the problem animals destroy the crops is inappropriate;
4. Increased poverty due to crop loss and lack of access to forest/park resources;
5. School dropout due to poverty and domestic work (e.g. guarding gardens);
6. Arrests and harassment from NFA/UWA (sometimes leading into imprisonment).
7. Inadequate knowledge about the laws and regulations regarding resource use from Protected Areas including trees on farm. Local people in Ryeru subcounty claimed that they are not allowed to cut the indigenous on-farm trees such as *Kigelia africana*, *Markhemia*, *Albizia*, *Prunus Africana*, *Ficus natalensis*, *Polysias fluva*, *Funtumia elasstica*, *Antiaris toxicaria* and *Zanthoxylum gilletti*.

*Proposed solutions to the problems around KKFR-KFR corridor*

1. Government should fence off the protected areas and leave gates for access to natural resources (e.g. water, firewood, medicinal plants and poles);
2. UWA/NFA management should sensitise people about the benefits of wildlife conservation and education about the laws and regulations concerning Protected Areas;
3. UWA/NFA staff should conduct regular meetings with the community members on how to resolve resource and land use conflicts rather than arrest and imprison people;
4. Government should provide alternative projects in order to reduce reliance on natural resources from forest reserves, wetlands and parks;
5. Community members should be provided with forest reserve land and tree seedlings for woodlot/tree establishment;
6. Government should provide drugs in the health centres and veterinary services;
7. Government should provide the people with loans for business and agricultural modernisation;
8. Improve the roads so that people are able to access markets for the agricultural produce.
9. Implement the incentives such as revenue sharing and regulated access to resources from the protected areas.

## **Mpanga Falls**

### *Community problems around Mpanga Falls Area*

1. Problem animals;
2. Diseases and pests from the park that infect people and domestic livestock;
3. Poor quality water;
4. Poor roads;
5. Decline in soil fertility resulting in very low crop yields;
6. Low prices for the agricultural products;
7. Unavailability of livestock (esp. cattle) and products marketing centres;
8. Failure by Government to grant Rwenshama and Nyakera as formal fish landing sites on Lake George yet the lower local governments consider it a potential source of fiscal revenue and employment for the local people has led to “sanctioned” illegal fishing;
9. Denial of access to park resources including livestock grazing
10. Tree seedlings are not easily available and very expensive
11. Termites are a major challenge to tree/woodlot establishment

### *Proposed solutions to the mentioned problems*

1. Fencing off the park (e.g. planting Mauritius thorn tree, wire fence, trench);
2. Provide good quality water (e.g. piped water, borehole);
3. Provide drugs in the available health centres;
4. Improve on the feeder, trunk roads and allow local people from Kamwenge district to access Kasese via the railway through the park;
5. Provide improved and high quality yielding seeds;
6. Grant Rwenshama and Nyakera as formal fish landing sites in order to reduce illegal fishing;
7. Government should construct a dairy and cattle marketing centre;
8. Local people should be allowed to access some park resources under UWA and community agreement arrangements, stating clearly the community rights, roles, responsibilities and guidelines for access and regulation of resource harvesting;
9. Government should encourage people to plant trees on-farm through provision of cheap and termite resistant tree seedlings to farmers.

## **West of Lake George**

### *Community problems West of Lake George*

1. Problem animals
2. Denial of access to park resources (particularly access to the Kazinga channel for fishing).
3. Diseases and pests
4. Inadequate enforcement of appropriate fishing standards on Lake Edward by the Congo administration leading to over fishing due to use of undersize nets
5. Harassment by UWA officials
6. Inadequate land for agriculture, livestock rearing and settlement
7. Inadequate knowledge about the wildlife laws and regulations and peoples rights in protected area management
8. Poverty
9. Lack of alternative sources of income
10. Charging of entry fees to local residents in the park

### *Proposed solutions to the problems*

1. Fencing off the park to eliminate problem animals and shooting of the vermin (baboons, vervet monkeys and wild pigs) by park authorities;
2. Sensitization of communities by UWA staff about the values of wildlife conservation;
3. Levy heavy taxes on law breakers as a disincentive to discourage other people from committing similar offences;
4. Implement and strengthen the 20% revenue sharing incentive as a means of compensation for the crop damage and loss of agricultural land;

5. Hold regular joint meetings between community members and park authorities regarding park-people related conflicts (at least once after three months);
6. People should be allowed to access some of the park resources under supervision by the park authorities;
7. Strengthen the CPIs and commit local government and UWA to make budgetary allocations towards their activities, build community capacity negotiation skills, manage and develop appropriate community development plans;
8. There should be both formal collaboration between the government agencies of Uganda and Congo over the management of Lake Edward (esp. enforcement of fishing standards, use of recommended nets and control over the political water boundaries);
9. UWA should provide fishermen with affordable licences to access the Ambatch tree (*Aeschynomene elaphroxylon* Guill and Perr (Taub)) used for anchoring boats and floats for fishing nets
10. Remove entry fees for resident people living inside the park and also provide for a community visitation to Mweya once a year.

## CHAPTER FIVE

### 5.0 DISCUSSION AND CONCLUSIONS

#### 5.1 Discussion

##### *5.1.1. Socio-economic status of communities in the corridors*

Queen Elizabeth is surrounded by a dense human population largely due to migration of people from southern Uganda and high human fertility rates. The indigenous tribes include the Banyankole, Basongora, Batoro, Bakonjo and Banyaruguru. However, other ethnic groups such as Baganda, Bakiga, Bafumbira have moved to and settled in the area. The population increase in the region could be attributed to high birth rates, migration of people from other places in search of agricultural land, grazing and employment, and a reduction in child mortality rates. For example, increases in population in the fishing villages of QENP between 1970 and 1990 was mainly due to in-migration of people looking for employment such as fishing (CARE, 1999; Risby, 1999) and from government evictions from protected areas (Kamugisha, 1997; Lamprey *et al.*, 2004). The people are primarily subsistence farmers who grow mainly food crops and a few cash crops for sale. Land pressure varies around the park, such that in the areas of Bushenyi and Kasese which have a high population density, about 0.9 - 1.5 ha is available for an average family of six people. However, in the Mpanga Falls area some families can occupy close to 4 ha. Livestock rearing occurred in all areas although it was more common in the Mpanga Falls area. However, the production is low and people lack access to markets for the products. Additional sources of income include fishing, retail trade in small shops and employment on tea plantations and in town centres.

Agriculture, being the main economic activity at the household level, presents a number of challenges to the developers and conservation organisations. However, in itself as a practice, subsistence farming can no longer sustain the growing population needs for food. The yields realised by households are low, land is heavily fragmented and this constrains the household labour budget. This is because a lot of time is wasted before accessing the scattered plots and households cannot afford inputs and improved seed varieties to increase yields. This implies that the farmer has to recycle the seeds on the same plot, which makes them more vulnerable to pests and diseases. Even households that are capable of managing their land have limited access to land due to the land tenure system. What does this scenario mean for conservation? The households are forced to move into protected areas to access both land for agriculture and natural resource products to supplement their family needs. As a result, poaching, degradation of protected areas and over-fishing (both legal and illegal) have increased.

Because household incomes are very low, children are poorly educated and house structures are basic (particularly Mpanga Falls area). It is important to note that Mpanga area is dominated by pastoralists, who by the nature of their activities rarely establish permanent structures. In addition, most households are located in the swamp networked with tributaries of Mpanga River such as Karubuguma (Photo 5). West of Lake George, some households rent or are squatters on public land making it difficult to construct permanent houses even if they could afford it. The results showed that the highest education level attained is secondary school level. In the Mpanga area, the highest form of education acquired was primary school level.

Following the focus group discussions, many people cited the high school drop out to a failure by government to prevent the problem animals leading to heavy crop losses and hence low incomes from agriculture. As such the children are retained at home to guard crops and do other house related work. According to the World Bank study report of 2003 on the challenges of Universal Primary Education (UPE) implementation in Uganda, a number of causes of school drop-out were cited. Of these causes, lack of interest accounted for 43.1%, family responsibility (14.6%), jobs (4.6%) and marriage (3.5%) among others (Kasozi-Mulindwa, 2004). Since attitude change is closely linked to the literacy rate, communities with very low levels of literacy make access to capital very limited, and sensitisation and

enforcement of economic and conservation values difficult to implement. As a result, family dependency on protected areas for livelihoods increases.



Photo 5. River Karubuguma in Mpanga Falls area passing through peoples gardens

In general, households around the KWR-KKFR and KKFR-KFR corridors were relatively wealthier than the people living around the other corridors. The house structures were made of bricks and roofed using corrugated iron sheets. In addition, households own radios and bicycles, which make information and market access relatively easier. Importantly, such households also earn more income from the land resources and can afford secondary school fees for their children. However, there are other factors that contribute to the imbalance in household resource entitlements and material possessions such as the terrain for mechanised or animal traction agriculture, cultural beliefs, inadequate markets, poor roads to access services and inadequate central government resource allocation.

#### *5.1.2. Sources of revenue for the households*

The study was conducted in villages located in or adjacent to the corridors where most households are very poor and have limited access to opportunities to improve their livelihood. In addition, these families have very small land holdings, which have been heavily cultivated resulting in low soil fertility. Analysis of the sources of income to households showed clearly that access to natural resources such as forests, water, fisheries, pasture and game meat provided an important percentage of the annual household income. However, the most important sources of income for the households in Mpanga and KKFR-KFR corridors were from agriculture contributing 41.4% and 62.7% respectively (Table 4.14). Analysis of crop and livestock gross returns from other studies shows that crop production gives higher returns per ha per year than livestock (Table 4.16). It is not surprising though that farmers diversify their income sources by keeping livestock as well as engaging in crop production. It is a strategy that reduces risks in case of crop failure or low livestock sales especially in the dry periods.

Households around the KWR-KKFR corridor were found to be much wealthier than those in other corridors and the greatest revenue sources were from small businesses/retail trading and agricultural products. People in this region were involved in cash crop production especially cotton, coffee, and other saleable food crops such bananas and onions. In addition, they had access to markets such as the central market of Katerera and were closer to trading centres where they could earn relatively better prices. The second richest households are located West of Lake George with a greater proportion of

revenues accruing from fishing and retail trade and the proximity to Kasese town. Although the proximity to Kasese helps in terms of the markets the productivity of the land west of Lake George is not high and hence households cannot earn as much. On the other hand, households near KKFR-KFR with relatively low revenues, depended heavily on agriculture as the major source of income and traded in protected area products contributed the largest percentage (17.4%) of annual household income compared to other corridors. Households in the corridor to the West of Lake George and Mpanga area where fishing contributed 49.2% and 31.2% to the total revenues, received only 2.7% and 9.8% from trade of protected area products respectively.

### *5.1.3 Potential alternative sources of revenue*

Promotion of coffee and tea as buffer crops, fruit trees, bee keeping (for medicine, nutrition and income) and pig rearing as alternative sources of income could be encouraged. The advantage is that these interventions are not entirely new and can easily be adapted to the local situation and have a market potential. Near the corridor areas facilitation of local government councils at parish and subcounty level and private individuals to establish tree nurseries with technical assistance from NFA could be initiated so that farmers are able to access tree seedlings at very low prices. However, experiences from Kibale-Semuliki Community Development Project regarding tree planting as an intervention towards creating new sources of fuelwood, poles, timber, fodder, addressing food security and soil fertility improvement showed that their success demands intense and committed extension agents and complete loss of access to natural resources by the community (Tumwesigye, 2004). It was also noted that promotion of indigenous tree species is difficult where people prefer quick maturing tree species and have only small land holdings. In this study the promotion of community nurseries failed because of the difficulties in sharing the meagre profits as well as the conflicts arising out of the benefit-sharing from the nurseries (Tumwesigye, 2004). Private nurseries were more productive and efficient than group nurseries.

### *5.1.4 Conflicts generated due to limited access to natural resources*

Protected areas play a central role in maintaining the well being of rural communities in Uganda. Their contribution to poverty reduction at local levels is significant as it offers several benefits as indicated in the results. The economic contribution of protected areas to both local communities and national revenues has been measured and discussed extensively by several authors (Howard, 1995; Emerton and Muramira, 1999; Moyini *et al.*, 2001; Bush *et al.*, 2004; Purna *et al.*, 2004). Some communities depend entirely on forest products for their livelihood, shelter and habitation. Historically local communities considered the access to natural resources worth more than their conservation.

Local communities continue to enjoy a number of products from the protected areas such as firewood, timber, fibres/ropes/cords, vegetables/mushrooms, water, pasture, building poles, bee products, game meat, thatching grass, fish, fruits, medicinal plants, sand/clay/quarry, handcraft raw materials and salt. Since most protected area benefits accrue to the local communities, it follows that they often suffer most when these benefits are lost. In this regard, it is the local communities who should have the greatest incentive to conserve the protected area resources. However, due to outside political and economic forces and government policies, the potential of the local communities' management is rarely realised. As such illegal harvest of natural resources, protected area encroachment, poaching and illegal fires will continue to present a challenge to conservationists and protected area managers.

Access to cultivatable land is the most important natural resource for household development and determines the livelihood strategies of the rural poor. The ownership, management and productive use of cultivatable land are key variables of economic growth and have a direct, though complex effect on how other natural resources such as water, forests, pasture and biodiversity are used. Despite diversification in livelihood strategies, access to cultivatable land and agricultural development is still the main factor affecting rural livelihoods and also one of the principal determinants of natural resource management and degradation. Traditional land use systems are determined to a large extent

by climatic conditions especially rainfall. The rainfall pattern and amounts received between years determine the type and organisation of land use systems. For example, pastoralists rely heavily on availability of pastures and water. As a strategy, pastoralists move around extensively with their herds in search for water and pasture. However, with the increasing human populations that have led to conversion of pastures and transhumance corridors into agricultural lands, such opportunities for herders to move around with their livestock have decreased. As such, conflicts between local farmers (residents) and foreign herders emerge and put pressure on the local leadership resulting in bitter disputes. Cattle herding by pastoralists requires a lot of land, which could explain the high occurrence of pastoralists in Mpanga area where land is still available and less expensive. Thus, in designing the incentives to promote conservation in the corridors, the values and threats must be taken into account.

#### *5.1.5 Corridors and wild animal species*

The existing corridors are important routes for animals to move from one protected area to another however, their effectiveness is currently being reduced through encroachment or reduced size. According to the results presented in chapter 4, increased human settlement, poaching or hunting of animals, protected area encroachment for subsistence agriculture continue to reduce the size of the corridors and animal populations within them. As mentioned in the introduction, the road network and other access routes, coupled with communities living inside the protected areas make it impossible to completely exclude people from the protected areas. It is important to note that in the corridors such as to the West of George and KWR-KKFR where enforcement of laws and regular monitoring of park boundaries have been intensive, wild animal species occurrence is higher than in other corridors. In addition, animal occurrence in the corridors is consistent with the crop growing seasons in the area and periods when wild animal fodder and water are scarce or grasslands have been burnt. Therefore, crop field guarding is intensified making it difficult for the animals to cross to other protected areas especially the forest reserves. It is worth noting that at present there is little coordination between patrols of forest reserves and adjacent parks/wildlife reserves by UWA and NFA.

#### *5.1.6 Problem animals*

Some species, such as elephants, range over large areas and frequently cross beyond protected area boundaries. Access to critical areas at certain times of the year for adequate food, water, shelter and breeding sites in the range of a species is essential for their survival. However, as a result of increased human population demanding more land for agriculture, cultivation now occurs along the protected area boundaries where animals often raid the fields. In addition, the desire to have access to protected area resources attracts poor households to protected area corridors or boundaries of protected areas. Efforts to manage problem animals and vermin continue to be part of the protected area management plans of UWA and trenches have been dug along much of the boundary of Queen Elizabeth park in areas of conflict.

Problem animal management is hindered by inadequate implementation of the legal provisions provided for in the Wildlife Statute, 1996 and Local government Act, 1997. The legislation is clear on the roles and responsibilities of UWA and Local government concerning problem animals and vermin management. The Local government Act, 1997 in the Second Schedule Part I section 5(1) provides that local governments shall be responsible for entomological services and vermin control. In Part 4 of the same Act, under the functions and services of lower local government councils, they are mandated to control vermin (vervet monkeys, baboons and wild pigs) with technical assistance from UWA. On the other hand, the Wildlife statute mandates the control of problem animals to UWA. The recent UWA strategic plan of 2001 provides for the formation of problem animal control units to address this issue. Similarly, UWA recommended that local governments form wildlife committees to address vermin concerns. UWA has set up Community Protected Area Institutions (CPIs) to address park-people related conflicts but because of unclear roles and responsibilities of key players, implementation remains a challenge. On the other hand, the continuous migration of people in or adjacent to protected areas mainly in search of land for agricultural land and employment, creates more pressure on the park resources and restricts animal movements.

### *5.1.7 Management of threats to protected area*

In addressing threats to protected areas, the Local government Act, 1997 Section 5 and 6 provided that control, prohibition, restriction, abatement of grass, forest or bush fires, control of local hunting and fishing shall be a responsibility of the local government councils in consultation with the line ministries or government agencies. Important legislation has also been made for the protection and sustainable management of wetlands. Among these, the National Environment Wetlands, River Banks and Lakeshores Management Regulations (2000) have been published and are instrumental for wetland management. In addition, the Wetland Sector Strategic Plan for 2001-2010 (MWLE, 2001) calls for the implementation of several strategic objectives which include the gazettement and management of critical and vital wetlands throughout the country.

Resettlement of people outside protected areas provides a short-term solution to alleviating the pressure on natural resources. It can also present legal and institutional complications, for example, the land act, 1998 recognises *bonafide* occupants<sup>4</sup> and in cases of relocation, the responsible party should find alternative land, service it with the minimum required social services needed for human survival before resettlement. The Government supported the contention of both Forest and Game Departments that encroaching residents had broken the law knowingly and that compensating them would promote further encroachment (Purna *et al.*, 2004). Based on that reasoning, people were evicted from protected areas in 1992 by the Uganda government without compensation or provision of alternative land outside protected areas. Therefore, many are sceptical about any resettlement and compensation schemes. However, in a case of such an intervention, the project proposal should be very clear about the nature of compensation to land owners where applicable. Those affected should be compensated on time to avoid the scenarios where the government dragged on exceeding the five years provided for in the Land Act of 1998. It should be timely and conducted transparently in order not to detract willing landowners from releasing the land. In cases of relocation, areas for resettlement should be identified, cleared and serviced with minimum social amenities and the distribution of land conducted transparently in partnership with the local leadership and the resident communities.

## **5.2 Opportunities for strengthening the corridors**

The challenges of community based natural resource management are failure to adhere to the guiding principles particularly efficiency, equity and sustainability in pursuit of building a shared responsibility towards the resources. However, a number of opportunities do exist that could be used to strengthen the corridors such as purchase of land adjacent to the corridors, explore the legal framework where human settlement is on gazetted land, use of *incentives to maintain the corridors, provide alternative sources of income, use of buffer crops and fencing.*

### *5.2.1. Moving people and buying land*

It was made clear that people are not ready to move because land elsewhere is scarce and very expensive while others depended on forest and lake resources. In addition, concerns over financial and administrative distortions, loss of revenue, inability to visit relatives and loss of an extended family, and weaknesses in the compensation schemes makes it difficult to relocate people. Also many of the households in these corridor areas are victims of previous evictions from the protected areas, which make relocation of people very difficult unless land is purchased and shown to people. In Mpanga area, however, there is a possibility of acquiring land through purchase so that the area is expanded to protect the falls and the cycad plant community. Communities living West of Lake George could be moved closer to the main road and thereby the shape of Muhokya village changed but this is an area where people grow crops that they cannot grow elsewhere in the region and whether the land along the road can support these crops would need investigating.

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<sup>4</sup> Bonafide occupant refers to a person who has stayed on land and used it or made improvements on the land for at least twelve years before 8<sup>th</sup> October 1995, without being questioned or challenged by the registered owner of the land or his agent.

There is a need to apply the law to remove people living on the Forest Reserve land in KWR-KKFR. At the narrowest parts of this corridor there are no houses and the agricultural land might be purchased at a price to widen the linkages. Around KKFR-KFR corridor, it is unlikely that people would be willing to sell their land because it is very scarce as a result of high population density.



Photo 6: *Degraded areas of Mpanga, Nyakera Village (L) and Kyambura escarpment, Munyonyi I (R)*

### *5.2.2 Incentives to maintain the corridors*

Emphasis on the provision of alternative sources of income and social capital accumulation might help alleviate poverty and reduce pressure on protected areas. In all these communities, what is clear is that people consider improvement of agriculture and livestock production very important. In an area with an increasing population and further fragmentation of the already small land holdings, use of high quality seeds, hybrid livestock and soil improvement are necessary. Incentives that encourage farmers to associate and market their products directly to the exporters and manufacturers without necessarily going through the middle persons are very much appreciated. Value addition to agricultural products through supporting provision of machines that remove coffee husks, tomato processing plants, milk freezing plants and improvement in storage facilities so that people are able to reduce post harvest losses and sell at the time of high prices might be viable ways of increasing incomes without necessarily expanding the land size. If this was linked to the need to protect the corridors then this may help them. Other potential income generating activities include ecotourism in the Mpanga area, bee keeping, fish farming, handicrafts and promotion of tree planting to rehabilitate degraded forest reserve and private land such as on the Mpanga and Kyambura escarpment (Photo 6). The carbon trade initiatives by ECOTRUST could be investigated to provide alternative sources of income while promoting marginal land rehabilitation and the incentives for tree planting that NFA is establishing might be used to encourage tree planting at the edges of the corridors. *Prunus africana* is also a potential buffer crop that might provide reasonable income to farmers (see below).

Ecotourism development in most of these areas could be considered for income generation. It is one of the economic activities that could support conservation directly but also allow participation of marginalised groups through camp site management, trail guides and sale of locally made products to tourists. Mpanga Falls provides an opportunity for the development of ecotourism (Photo 7) and other associated enterprises. A study by Gus Le Breton (1999) who made an assessment of financial viability of micro-enterprise opportunities for rural households in and around the QENP recommended that community managed trails and boats could be established so that local people can earn some income from guided tours and use of transport services. Around the KKFR-KFR corridor ecotourism has been initiated but lacks proper management and financial inputs to attract many tourists.



Photo 7: Mpanga Falls and river draining into Lake George

### 5.2.3 Legal framework

The legal framework for the conservation and management of natural habitats at local and national level do exist such as the National Environment Statute, 1995, Uganda Constitution, 1995, Wildlife Statute, 1996, Wetlands Statute, 1997, Local government Act, 1997 and Land Act, 1998. In addition, a number of formal regional and global agreements and conventions that contain sections calling for the protection of habitats of high biodiversity value and ecological importance are in place. For example, the African Convention on the Conservation of Nature and Natural Resources (Algiers) signed in 1968, Ramsar Convention concerning wetlands of international importance especially as waterfowl habitat, 1971 and the Convention on International Trade in Endangered Species (CITES), 1973. Other conventions include the Convention on the Conservation of Migratory Species (Bonn Convention, 1979) calling for the protection of obstacles to migration, coordination of anti-poaching efforts and exchange of information. Therefore, legal interventions to stop people from encroaching on sensitive habitats such as wetlands, protected areas, lakes and rivers could be used to reduce degradation and also protect the corridors. Under the national Forest and Tree Planting Act, 2001 there are laws that encourage land owners to invest in tree plantations which could be encouraged in the areas adjacent to the corridor areas.

### 5.2.4 Buffer crops

In order to reduce the problem animal conflicts and also increase the benefits from agricultural on land adjacent to protected areas, it would be advisable to consider the encouragement of planting buffer crops such as tea, coffee, vanilla and cotton where there are low incidences of elephant damage. Tea provides very sound opportunity for a buffer crop around the KKFR-KFR corridor because it is not destroyed by wild animals and has a ready market from the tea companies nearby (e.g. James Finelay and Igara Tea companies). Tea could be promoted by branding the finished product with an animal species or the protected area name, raising the prices of the product to provide a fund so that consumers contribute towards conservation.

Another buffer that would strengthen the corridors would be the planting of trees, either exotic or native. Carbon trading and the the harvesting of bark of species such as *Prunus africana* have the potential to increase income to farmers in these marginal areas while at the same time contributing to conservation by increasing the width of the corridors. However, many of these people have small plots of land and are dependent on these for food. Encouraging tree plantations is difficult if they have no land for crops elsewhere.

### 5.2.5 Fencing

Electric fencing of the corridors is another effective intervention that could help strengthen the corridors. Around the West of Lake George and KWR-KKFR corridors, people were very supportive of the idea provided water is availed to them. Electric fencing could be very effective and helps to

build public relations, however, it is expensive to manage and elsewhere people have used the wire to make snares. Unlike the purchase of land, fencing is relatively cheap and does not present political and social distortions.

Trenches have been dug along much of the Kyambura Wildlife Reserve (7km already dug) and this might also be an option along the corridor areas. There have been some problems with local people driving animals into the trench to kill them for meat but there may be ways of redesigning the trenches to avoid this. There is a need to plant trees along the edges of the trenches to stop the soil from refilling the trench with heavy rainfall. The experience of the trenches so far is that the people do not spend time maintaining them and there is a need to make this responsibility very clear before the trench is dug.

Planting Mauritius thorn is the cheapest option but it requires a lot of maintenance to stop it invading either the protected area or the farmer's land. It also takes some time before it becomes dense enough to stop animals. Its advantage, however, is that it does stop baboons and other primates.

### **5.3 Conclusion**

Strengthening of the corridors is very much needed and the communities are willing to participate through contribution of labour towards the establishment of barriers especially in the West of Lake George and KWR-KKFR corridors but very unwilling to move to other land. In the KWR-KKFR corridor, shifting of people in part of the corridor where the wildlife reserve touches the forest reserve could be done because the area is part of the gazetted forest reserve and people have encroached, however the corridor as gazetted at this point is very narrow. Land that is not part of the reserve could be purchased particularly on the side of the escarpment since the area seemed to be less fertile and steep for viable crop growing. It is also one area where elephants pass and raid crops as well as an area that experiences occasional land slides, which constitutes strong arguments for relocation of a few households. Fencing of the area might be a viable intervention to reduce encroachment, prevent problem animals raiding crops and serve as a corridor for the wild animals particularly the elephants. The area is already mapped as a suitable for coffee growing and vanilla. The provision of drinking water for the communities and improved access roads to markets were desired by these communities and might be part of an incentive package.

In the KKFR-KFR corridor, fencing of the area may not be a viable intervention since communities still enjoy the regulated access to the resources under the Collaborative Forest Management programme (CFM). The eucalyptus plantations in this corridor have a very open canopy and are liable to be harvested anytime which might reduce the ability of the area to act as a corridor. However, the plantation owners, James Finlay Tea Company (formerly Rwenzori Highlands) and the NFA management supported the idea of the corridor management as an additional effort to control illegal resource use and encroachment on the forest reserves. In addition, the area is heavily populated and land is fertile which makes it difficult to find willing households to sell land. In Kasyoha-Kitomi – Kalinzu, ecotourism development is on-going except that it suffers from poor management and inadequate funding to become economically self sustaining. As such, efforts could be made to strengthen it and encourage local people to set up tourism related investments such as camp sites, craft shops and tour guides.

West of Lake George the Muhokya village, could be modified in shape to relocate households closer to the road, changing the shape of the existing enclave to widen the corridor but maintaining the same area available to people to cultivate. However, this would involve UWA accepting loss of existing parkland and accepting the restoration of some existing cultivated land. This idea may be constrained by the heavy metal pollution from Kilembe mine but should be investigated further. The corridor is very narrow (0.6km wide) and the existing enclave is heavily cultivated by people from the mountains (Bakonjo) and Basongora. Importantly, such an intervention needs to be carefully implemented, because the same ethnic groups have been identified by operating NGOs in the area as marginalised and vulnerable. The other possible option is fencing the corridor such that people can no longer

encroach on the park and suffer from problem animals. The scheme could include fencing the fishing villages to block the possibility of further encroachment on park land (already expanding beyond the beacons). The people are very supportive of the idea because they suffer heavy crop losses particularly from elephants and bushpigs. A combination of changing the enclave shape and fencing its boundaries could also be considered.

In the Mpanga area, land acquisition is possible particularly Nyakera parish where 60 households are living in the swamp networked by river tributaries from Mpanga river. The area is highly regarded as a fish breeding zone, the fish landing site present is illegal and households have mainly makeshift houses which may require less funds for compensation. Along the marked park boundary, there are three farmers rearing cattle and goats, covering 300 ha. However, other pastoralists without land who normally illegally graze within the park could be prevented by fencing off the area and an option supported by the resident subsistence farmers. The legislation in place could be evoked particularly the Wildlife statute, 1996, Land Act, 1998 and the National Environment Statute, 1995 and Wetland statute, 1997. The area could later be developed for ecotourism (e.g. construction of a jetty for boats, support communities to establish craft centres) given the potential of Mpanga falls available. The area is serviced with two feeder roads often used by cotton and fish buyers, which only require improvement. In addition, it could stimulate enterprise development as the area lacks cattle and milk buying centres, maize mills and other social services (e.g. schools, health centres).

The success of these interventions will depend heavily on a thorough stakeholder analysis, commitment and ownership of the project by key players (e.g. district authorities, local communities, UWA, NFA, and Conservation NGOs). There should be a memorandum of understanding between these parties and government agencies with clearly detailed roles, responsibilities, rights and revenues but also regulatory mechanisms on how to co-manage the protected areas. In addition, given the multiple use and interests of stakeholders in the protected areas, numerous parties are likely to be involved for different reasons (e.g. ecological, social, economic, political and institutional). As such, the objectives to be achieved must be well negotiated, agreed by and to the benefit of both the local community and conservation.

Since each corridor has its own specific mix of issues to be addressed, complementary strategies depending on type of land use, juridical and tenure arrangements and the different actors involved, a continuum of management and conservation approaches, economic development plans that integrate natural resource management and conservation of biological, ecosystems and landscape should be adopted. For example, the interventions and incentives design should form clear linkages between economic aspects of community involvement and conservation benefits. It is necessary to trace and understand existing linkages between protected area values, economic policies, protected area management systems and incentives for community involvement in sustainable protected area management.

In addition, it is important to collaborate with other sectors of the economy that interact directly with the protected area. Services and goods produced such as energy (fuelwood, electricity, water), housing, timber, climate and sectors such as tourism, health, and agriculture among others could contribute effectively towards conservation goals through well negotiated policies, and economic incentives such as taxes, (e.g. user pay principles, pollution taxes) and subsidies and coordination of interventions. For example, if UWA is to erect a deterrent (e.g. a fence or trench), which may eventually limit access to water sources, the water department should provide water outside the protected areas. Importantly, there is need to improve institutional collaboration between UWA, NFA and the Local government to effectively enforce, monitor and create community awareness of the benefits of conservation.

## 5.4 Recommendations

Based on the results, several recommendations are suggested as follows:

### 5.4.1 Development recommendations

- a) **Supply good quality water to communities around the corridors.** Most of the communities enter the protected areas to collect water and watering of livestock in the process illegally graze and harvest resources. Provision of water outside the corridors will help reduce access to the protected area, and at the same time prevent water related diseases which require treatment using herbal medicines from the protected area
- b) **Improve access to markets and promote value addition to the products.** People expressed poor roads as a hindrance to access better prices for their agricultural products. The available market centres are Kasese town for the corridor West of Lake George and Katerera Subcounty market for the other corridors whose access routes become impassable during the rain season. Mpanga Falls area lacks a cattle and milk buying centre, and maize mills to convert the maize into flour since the farmers fetch very low prices from sale of corn.
- c) **Improve access to micro-credits.** Capital is necessary for enterprise development. Access to small credit schemes is a major barrier for communities to add value to their products, let alone secure transport facilities to market centres. Most people cannot afford to secure loans from formal banking institutions because of lack of collateral, securities and fear by the commercial banks and there is a need access to informal credit services such as microfinance with low interest rates.
- d) **Support alternative income generating activities.** People in the area are very poor with limited access to investment opportunities. They also lack the initial investment capital to start up small scale projects. Helping local communities to identify potential revenue earning possibilities and linking them to markets would provide alternative means for generating income and potentially less reliance on the protected areas. Any such projects should be linked to an education programme to highlight that they are being helped provided the corridor is managed for conservation purposes.
- e) **Increased support to local Community-Based Organisation (CBOs).** Local CBOs play a critical role in providing a forum for crafting by-laws and implementing local development programmes. Unfortunately, they lack the much-needed capacity to effectively address community concerns. For example, UWA demands that local communities at the parish level initiate projects that could be funded out of the 20% revenue sharing scheme given to local governments. However, due to a lack of technical capacity to develop proposals, most decisions are made from the sub county level either in agreement with, or sometimes against the community needs. This has generated a lot of tension between the aggrieved communities, the local government and UWA as the communities don't perceive their problems are being addressed. Support to local CBOs would be a means of developing community capacity to harness the available resources and also to manage conflicts. It will also enable the local people to build the social capital and responsibility where direct financial returns are limited, because they can analyse and understand the issues.

### 5.4.2 Conservation and Management recommendations

- a) **Improvement of relationships between local people and park/forest authorities.** It was clear from the focus group discussions that people were not happy with the way park/forest officials react when people are found in the protected areas as opposed to when they report the incursions by the wild animals in their fields. Local people made accusations of harassment, beating (sometimes killing), bribery and refusal of park/forest authorities to respond to their grievances. Some places have never been visited by community conservation wardens to address their concerns and sensitise them about the value of conservation and how to handle conflicts.
- b) **There is need for both park and forest authorities to educate people about the laws and regulations** in regard to protected area management. Local people are not aware of the laws

and regulations (e.g. how far should the gardens be from the park boundary, problem animals, their roles and rights etc).

- c) ***There is need to strengthen the economic incentives.*** One of the big challenges of protected area management, particularly the community-based approaches, is to ensure that local communities are provided with sufficient economic incentives to become involved in sustainable management and also link such incentives to the value of conserving the natural resources. Guidelines for regulated access to resources by the local communities need to be speeded up and the revenue sharing scheme revised so that UWA has a big stake and follow-up on the developments initiated by the communities and how the funds are used.

## CHAPTER SIX

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## APPENDIX 1

Household questionnaire for Socio-economic assessment of community livelihoods in QENP corridors in Western Uganda.

Household questionnaire

<b>Interviewer:</b>	<b>Date:</b>	<b>Time:</b>
<b>Checked by:</b>	<b>Check Date:</b>	
<b>Village (LC1):</b>		
<b>Parish (LC2):</b>	<b>Respondent Age:</b>	
<b>Sub-county</b>	<b>Respondent Sex:</b>	
<b>Forest:</b>		

### 1. Household Composition

How many people are in the household?

Status	Description	Age	Education level	Occupation
Head of Household				

*Description* 1) Male 2) Female

*Education Level* – 0) no formal education, 2 )Primary, 3) , secondary )4) College/University education

*Occupation* – 0) no work 1) Farming-including subsistence 2)Own business 3) wage labour 4) Salaried employee 5) Fishing 6) Pastoralist

2. How many years has your family been in this village/location?.....

1) Less than 1 year 2) 1-5 years 3)5-10years 4)10years or more

2b Where did you come from in order to settle here.....

3. Assets

House Materials for Main Dwelling (try to make discreet observations on approach)

#### Walls

1) Timber/poles 2) Brick 3) Mud 4) Iron 5) Plastic Sheeting

#### Door/Window Frame

1) Timber/poles 2) Brick 3) Other-specify

#### Floor

1) Timber/poles 2) Mud 3) Cement 4) Tiles/bricks

#### Roof

1) Thatch 2) Tiles 3) Iron Sheets 4) Plastic Sheeting

3.1 Do you own a Bicycle? How about any of the other things below?

1) Radio 2) Television  
3) Bicycle 4 Motorcycle 5) Pickup truck or car 6) None

3.2. Livestock Assets

Do you have any animals amongst your household assets?

Livestock Item	Number
Goats/	
Sheep	
Pigs	
Chickens /ducks/ pigeons	
Rabbits	
Cows	
Dogs	

4.0. Landholding

Land size (ha)	Period of possession (yrs)	Form of acquisition	Tenure system	Land use	Amount (US\$)
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**Codes for acquisition**

1. Inherited
2. Bought
3. Rented
4. Given
5. Squatter/open public land
6. Other (specify).....

**Codes for land tenure system**

- 1) Customary land
- 2) Leasehold
- 3) Freehold
- 4) Mailo

**Land use** – 1)Natural forest/woodland, 2)Woodlot, 3)Arable, 4)Wetland, 5) Grassland Pasture  
6)Woodland/forest pasture 7)Cash crop plantation

4.2 Do you own land elsewhere? 1)yes 2)No What is the size .....ha

4.3 How do you rate the fertility of your land 1) Very fertile 2) Moderately fertile 3) Not fertile

4.4 If not fertile would you be willing to exchange it with a more fertile land elsewhere?

1 Yes 2) No

5.1 What are the sources of income for your family

Source of income	Average income per month	Total Annual income (US\$)
Agricultural enterprise (Crop sales and Livestock products)		
Fishing		
Business/Trade		
Salaried employment		
Casual labour		
Trade in Forest products (Timber, Charcoal, Game meat, Firewood, Carpentry, Basketry etc)		

What is your source of water 1) river/Lake 2)Borehole 3)spring/protected well 4) dam/pond

7a. Do animals use this route/corridor ? 1) Yes 2)No

What species of animals do you normally see in the area?

.....  
7b) During which months/period of the year to see animals use the corridor?.....

7.1 Do you have any problems with crop raiding animals from the forest/park? 1)Yes 2)No

7.1b Which Species?

1)Buffalo 2)Antelopes 3) Chimpanzee 4)Monkeys 5)Baboons 6)Porcupines 7)Wild pigs

8.Elephants

9)Other ( Specify).....

7.2a Which species is most problematic?

7.2b Do you ever trap some of these problem animals?

7.3. In your own opinion would you accept the idea of fencing off part of the park to stop crop raiding animals? 1 Yes 2)No

7.4. If yes would you accept to contribute towards maintaining the fence/barrier? 1) Yes 2)No

In what form 1) Guarding 2) Patrolling 3) Slashing fire lines 4) Maintenance of the barrier/fence

7.5. How often do you see UWA staff in this area? 1) Once a week 2) once a month 3) Once a year 4) Never seen one

7.6. Do you know where the park/forest boundaries are? Yes/No

If yes, are the boundaries marked? Yes/No

## APPENDIX II

### Focused Group discussion checklist

1.0 What products do you derive from the forest/park?

Values of park/forest resources in the study areas

RANK BY GROUPS						
Value	Women	Government workers	Men > 40 years	Young adults	Totals of Group Ranking	Rank
Firewood/Charcoal						
Fibres/ropes/cords						
Vegetables/Mushrooms						
Forest/Compost manure						
Forest/Compost manure						
Water						
Fodder/pasture/Grazing						
Building poles						
Bee products						
Minerals						
Game/Meat/Hunting						
Thatching grass						
Fish						
Forest seeds/seedlings						
Fruits/roots/leaves						
Medicine						
Sand/Clay/quarry						
Building poles						
Honey						
Handcraft raw materials						
Timber						
Salt						

Rank them in order of decreasing importance

2.0 Is this Protected Area(s) of any value to you?

Site based biodiversity values

Value	West of Lake George	KWR KKFR	Park and Mpanga Falls	Kasyoha-Kitomi-Kalinzu-Maramagambo FR
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#### (i) Ecological (indirect)

Watershed conservation  
 Rain attraction  
 Wildlife habitats  
 Air purification  
 Soil erosion control  
 Regulation of weather  
 Rain indicators  
 Wind breaker

#### (iii) Education/Research (indirect)

Research education  
 Employment

#### (iv) Aesthetic (direct)

Scenic beauty  
 Psychological healing

Shade  
 Ecotourism  
 Worship  
 Ornaments  
 (Flowers, shells, stones)  
 Recreation

**(v) Historical/Cultural (indirect)**

Heritage  
 Shrine  
 Historical site

Kasyoha-Kitomi Forest Reserve (KKFR)  
 Kyambura Wildlife Reserve (KWR)

**3.0 Do you know of any threats to the forest/park**

Threat	Rank by Groups					Total Summary of groups	Rank
	Women	Government worker	Men 40 years	Young adults			
Forest fires							
Illegal timber harvesting							
Park encroachment							
Livestock grazing							
Fishing							
Capture of live animals/ Poaching							
Invasive species							
Over harvesting of medicinal plants							
Crop raiding							
Diseases/pests							

Rank the threats in order of decreasing severity

**4.0 Potential economic activities as suggested by the community members**

Economic activities	Rank by group					Total summary of groups	Rank
	Women	Government workers	Men 40 years	Young adults			

Rank them in order of decreasing priority

5.0 Tourists are interested in coming to view the animals but the human settlements seem to be a hindrance to the movement of these animals. Also the area is important for biodiversity conservation and could attract tourism developers. How do you feel about maintaining the corridors or even expanding them? Are people willing to relocate? If not why?

6.0 What could be the possible ways of solving the land use conflicts?