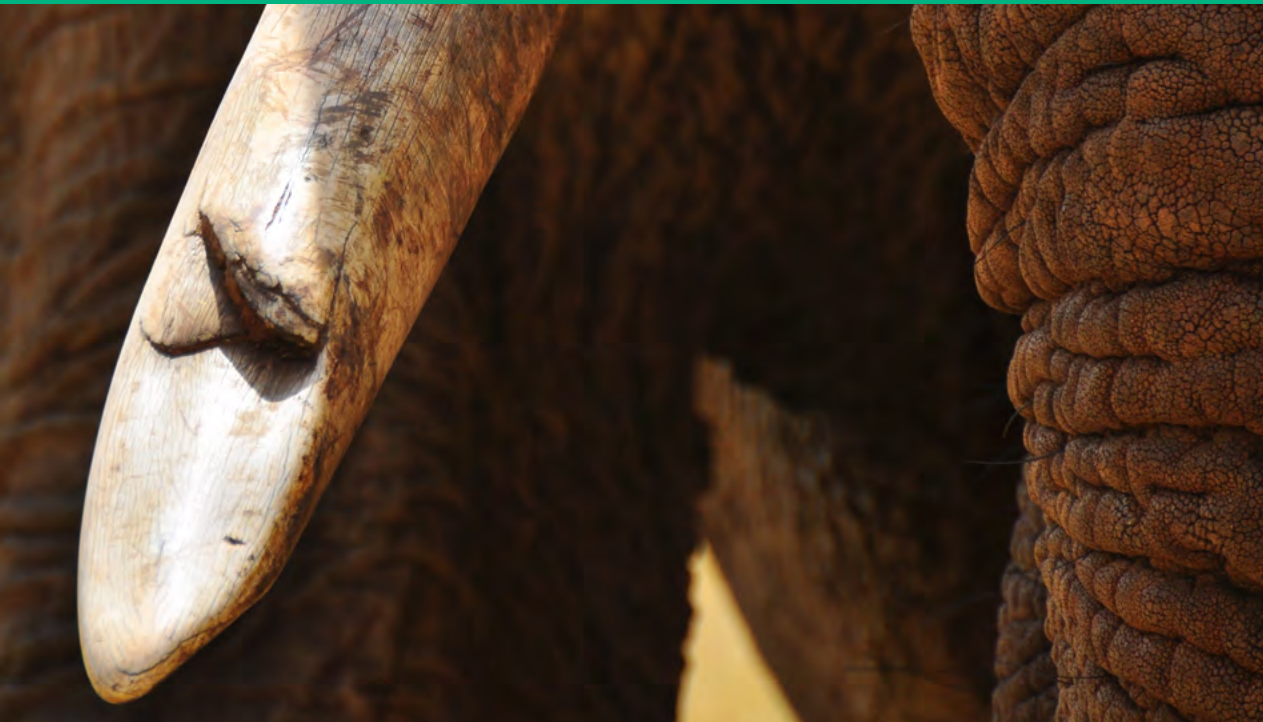


Wildlife crime: a review of the evidence on drivers and impacts in Uganda

Mariel Harrison, Dilys Roe, Julia Baker, Geoffrey Mwedde, Henry Travers, Andy Plumptre, Aggrey Rwetsiba, E.J. Milner-Gulland



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Produced by IIED's Natural Resources Group

The aim of the Natural Resources Group is to build partnerships, capacity and wise decision-making for fair and sustainable use of natural resources. Our priority in pursuing this purpose is on local control and management of natural resources and other ecosystems.

Published by IIED, April 2015

Harrison M *et al.* (2015) *Wildlife crime: a review of the evidence on drivers and impacts in Uganda*. IIED Research Report, London

<http://pubs.iied.org/17576IIED>

ISBN 978-1-78431-179-7

Printed on recycled paper with vegetable-based inks.

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Acknowledgements

We are grateful to the members of the Uganda Poverty and Conservation Learning Group (U-PCLG), who provided thought-provoking discussion at the beginning of this review and who directed us towards helpful grey literature. Thank you to everyone who offered his or her time to be interviewed and for the insights shared, in particular:

- Akankwasah Barirega, Ministry of Tourism, Wildlife and Antiquities
- Edward Asalu, Uganda Wildlife Authority, Kibale Conservation Area Manager
- Chris Bakuneeta, Makerere University
- Adonia Bintooro, Uganda Wildlife Authority, Mt Elgon Conservation Area Manager
- Pontious Ezuma, Uganda Wildlife Authority, Bwindi and Mgahinga Conservation Area Manager
- Nelson Guma, Uganda Wildlife Authority, Queen Elizabeth Conservation Area Manager
- Mark Infield, InField Conservation Consulting
- Johnson Masereka, Uganda Wildlife Authority, Kidepo Valley Conservation Area Manager
- Arthur Mugisha, International Union for the Conservation of Nature
- Tom Okello, Uganda Wildlife Authority, Murchison Falls Conservation Area Manager
- Gerald Tenywa, Environmental journalist, New Vision
- Annet Kandole, CARE
- Moses Olinga, Uganda Wildlife Authority Law Enforcement Division
- Eddie Oketcho, World Wide Fund for Nature
- Agrippinah Namara, Independent consultant
- Andrew Lemieux, Netherlands Institute for the Study of Crime and Law Enforcement

This review was grant funded by the UK government's Illegal Wildlife Trade Challenge Fund, as part of the project 'Building Capacity for Pro-Poor Responses to Wildlife Crime in Uganda'. However, the views expressed are those of the authors and not necessarily those of the UK government or the other institutions involved.

Pro-poor responses to wildlife crime in Uganda, the project

This evidence review is the first output of the project 'Building capacity for pro-poor responses to wildlife crime in Uganda', a collaboration between IIED, Imperial College London, Wildlife Conservation Society and the Uganda Wildlife Authority.

The project builds on previous experience by the partners in researching the socio-economic profiles and motivations of illegal resource users in Bwindi Impenetrable National Park (Twinamatsiko *et al.* 2014). It aims to provide evidence that improves understanding of the interactions between wildlife crime and poverty (in Uganda specifically but with wider lessons internationally), supports Uganda to implement measures that tackle the drivers of wildlife crime while improving the livelihoods of poor people, and generate lessons that can be rolled out from this pilot case to elsewhere.

The project seeks to answer three key questions:

- 1) What are the drivers and impacts of wildlife crime at the local and national level?
- 2) What are the socio-economic profiles and motivations of individuals who participate in wildlife crime?
- 3) In the eyes of local people, government and conservation managers, which interventions are most effective in reducing wildlife crime and contributing towards poverty alleviation?

Other outputs of the project will include:

- A review of existing data and evidence to examine trends in levels of wildlife crime, levels of law enforcement and levels of investment in community development initiatives in Uganda's national parks and wildlife reserves
- A research report summarising our findings with respect to the research questions posed above
- A wildlife crime database for use by UWA to record details of crime incidences in protected areas
- An event at CITES CoP17 highlighting preliminary research findings and policy responses.

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Acronyms

ARU	Authorised Resource User	MoU	Memorandum of Understanding
BMCT	Bwindi Mgahinga Conservation Trust	MUIENR	Makerere University Institute for the Environment and National Resources
CAM	Conservation Area Manager	MUP	Multiple Use Programme
CARE-DTC	CARE Development Through Conservation	MUZ	Multiple Use Zone
CFM	Collaborative Forestry Management	NFA	National Forest Authority
CITES	Convention on the International Trade of Endangered Species	NGO	Non-Governmental Organisation
CoP	Conference of Parties	NP	National Park
CRM	Collaborative Resource Management	OECD	Organisation for Economic Co-operation and Development
DRC	Democratic Republic of the Congo	PA	Protected Area
EIA	Environmental Investigation Agency	RPA	Reformed Poachers' Association
ETIS	Elephant Trade Information System	TRAFFIC	Trade Records Analysis of Flora and Fauna in Commerce (the wildlife trade monitoring network)
FR	Forest Reserve	UCF	Uganda Conservation Foundation
GDP	Gross Domestic Product	U-PCLG	Uganda Poverty and Conservation Learning Group
ICD	Integrated Conservation and Development	UNEP	United Nations Environment Programme
IGCP	International Gorilla Conservation Programme	UNODC	United Nations Office of Drugs and Crime
IUCN	International Union for the Conservation of Nature	UWA	Uganda Wildlife Authority
LC1	Local Council (village)	UWEC	Uganda Wildlife Education Centre
LRA	Lord's Resistance Army	WCS	Wildlife Conservation Society
MFPED	Ministry of Finance, Planning and Economic Development	WR	Wildlife Reserve
MIKE	Monitoring Illegal Killing of Elephants	WWF	World Wide Fund for Nature
MIST	Management Information System		
MoTWA	Ministry of Tourism, Wildlife and Antiquities		

Executive summary

Wildlife crime, by which we mean *any harm to (or intent to harm or subsequent trade of) non-domesticated wild animals, plants and fungi, in contravention of national and international laws and conventions*, is an issue of considerable and growing international concern. This increase in awareness is partly due to the recent and rapid rise in illegal wildlife trade, and partly because of the increasing militarisation with which wildlife crime is carried out in some high profile areas.

While poverty is often cited as a driver of wildlife crime, this is not necessarily true. Additionally, wildlife crime can have negative impacts on poor people, either because their natural resource base is being depleted, or through insecurity introduced by wildlife criminals. Responses to wildlife crime can also have disproportionate impacts on local people, who can be easy targets for law enforcement agencies. However, there is a dearth of evidence in the literature which would enable the relationships between poverty and wildlife crime to be empirically assessed.

The aim of this report is to review the evidence which could be used to address the following questions about the potential linkages between wildlife crime and poverty, with a focus on Uganda:

- Is poverty a driver of wildlife crime?
- What impacts does wildlife crime have on poor people?
- What impacts do responses to wildlife crime have on poor people?

To answer these questions, we gathered evidence in a structured manner from published and grey literature, including NGO reports, MSc and PhD theses, media reports, and interviews with the Uganda Wildlife Authority's (UWA) Conservation Area Managers and other key informants working in environmental, developmental and research positions.

What is the extent of wildlife crime in Uganda?

The evidence suggests that bushmeat hunting, firewood collection and timber harvesting are the most widespread wildlife crimes in Uganda, in terms of the number of protected areas at which they occur. With regard to high profile species, relatively few elephants are poached for ivory in Uganda compared to other countries in Central and Eastern Africa, although these numbers appear to have been increasing over the past few years. In line with trends across the rest of Africa, there have been a number of Ugandan media reports of seizures of pangolins or their scales since 2012, suggesting that this illegal trade to

Asia is also on the rise. Rhinos are only found in one heavily guarded sanctuary and have not been poached to date.

What are the drivers of wildlife crime?

We found evidence for five main drivers of wildlife crime in Uganda:

- To meet basic needs (subsistence)
- To generate income above and beyond basic needs (commercial)
- In response to perceived injustice
- To maintain cultural traditions
- In response to political influence.

The evidence suggests that:

Subsistence-driven wildlife crime is caused by economic poverty, ie a lack of basic necessities or the means to obtain them, and increases in areas of particularly high population density and during times of environmental stress and social conflict. The resources sought to meet subsistence needs include both those which people use directly, such as bushmeat and firewood, and those that they can sell in order to afford basic necessities, such as timber.

Wildlife crime for **commercial** purposes is driven by a desire to attain wealth above and beyond that which meets basic needs and includes creating charcoal, cutting timber, hunting bushmeat and poaching elephant ivory for national and international trade. Commercial wildlife crime is driven by a combination of economic wealth leading to demand from consumers and a lack of legitimate income sources in areas around protected areas.

People living around protected areas **perceive injustice** in the distribution of costs and benefits relating to conservation. The costs mainly consist of the damage caused by protected wild animals to crops and livestock and the lack of response or compensation from authorities. The potential benefits provided by protected areas (from employment, revenue sharing and regulated resource access) are perceived to be inequitably shared, with benefits tending to go to the local elite rather than the poorest people suffering the greatest costs. A combination of these factors lead local people to kill wild animals, either in response to a specific human-wildlife conflict, or indiscriminately.

People in Uganda have a strong historical connection with the land and environment, and a wide variety of **cultures and traditions** supporting this connection. Many culturally important habitats, sites (such as hot springs) and resources (medicinal plants, bushmeat, bamboo) only remain in protected areas, meaning that local people must commit a wildlife crime if they want to access them.

Finally, knowing the extent to which local people want or need access to protected resources, **politicians** promise access in an attempt to gain popularity and votes, leading to encroachment and incursions into protected areas.

What factors enable wildlife crime to occur?

The evidence suggests that wildlife crime in Uganda is enabled by insufficient law enforcement and access to profitable markets for wildlife products. Law enforcement is hampered by inadequate funding for frequent patrols and equipment, and weak laws resulting in low rates of prosecution and penalties that are not deterrents.

What impact does wildlife crime have on poor people?

In Uganda, the evidence suggests that, overall, wildlife crime is likely to have positive impacts on those directly involved, and negative impacts on the nation and wider public.

Positive impacts for the people who are directly involved arise from their access to the resources they need, preventing them from sinking further into poverty, or providing income to escape the poverty cycle. Additionally, crimes committed for traditional purposes strengthen sociocultural bonds within local communities. However, the presence of people involved in the illegal timber trade can cause local insecurity.

Although we could find little evidence of the impact of current levels of wildlife crime on biodiversity, heavy poaching and logging have historically drastically reduced wildlife populations and negatively impacted ecosystem services. A loss of wildlife could reduce Uganda's tourism appeal, resulting in a loss of significant revenue to the country and its people.

What impact do interventions against wildlife crime have on poor people and crime?

The five main types of intervention against wildlife crime employed by the Uganda Wildlife Authority and other organisations in Uganda are:

- Law enforcement
- Regulated resource access
- Revenue sharing from tourism and sport hunting
- Reformed Poachers' Associations
- Conservation education.

The evidence suggests that, overall, state-led **law enforcement** has a negative impact on local people, although those involved in profitable commercial wildlife trade can often afford the penalties or pay bribes to avoid being prosecuted. Additionally, law enforcement can damage relationships between local people and park authorities. There is contradictory evidence for the potential benefits of law enforcement; some indicate that the presence of rangers improves local security, while in other locations misbehaving rangers can cause further problems.

The impact of law enforcement on wildlife crime depends on the offender's perception of and attitude towards risk. In areas where law enforcement is perceived to be ineffective, it does not deter people from engaging in wildlife crime. Similarly, some people are so desperate for a resource or income that their attitude is that the risk of capture is worth taking.

Tourism and sport hunting **revenue has been shared** with communities bordering protected areas since 2000, with the overall goal of ensuring a *“strong partnership between protected area management, local communities and local governments, leading to sustainable management of resources in and around protected areas by enabling people living adjacent to protected areas to obtain financial benefits...”* The aim is therefore to contribute towards local incomes and a reduction in wildlife crime, through improving attitudes towards conservation by strengthening the relationship between protected area managers and the people around them.

However, we could find little evidence to confirm that revenue sharing is meeting these goals, although this is partly due to the lack of monitoring and evaluation of these projects and not necessarily an indication that they have failed. Although some people certainly have benefited from revenue sharing, the evidence suggests that the approach is limited by corruption throughout the process and uneven distribution between protected areas, villages, and people within them. Furthermore, the evidence shows that, at Bwindi Impenetrable National Park, the distribution of revenue is perceived to be so inequitable that it drives some people to engage in further wildlife crime.

Regulated resource access is the process by which locally elected people are permitted to harvest regulated quantities of certain resources from protected areas. Despite some agreements stating that resources may not be used to generate income, regulated resource access benefits local people by providing resources that they need or desire, as well as giving them a sense of ownership over the protected area. There is contradictory evidence on whether or not regulated resource access reduces wildlife crime. For example, at Kibale National Park authorised resource users apparently report illegal activities to park authorities, but at Bwindi Impenetrable National Park there has been no noticeable overall decline in illegal activity in either the park or the multiple use zones.

Reformed Poachers' Associations (RPAs) are groups established by UWA following periods of intensive sensitisation and a poaching equipment amnesty. Many local people join in the expectation of receiving future benefits or alternative income generating projects, but these do not always materialise. Some RPAs, for example at Rwenzori and Murchison Falls National Parks, have received training in alternative livelihoods, and at Rwenzori National Park this has been shown to increase household incomes. However, other RPAs, such as at Bwindi Impenetrable National Park, have had no follow up and are disillusioned. There is no reliable evidence to suggest that formation of RPAs reduces bushmeat hunting in the long term, although this does not necessarily mean that they are ineffective.

Conservation education seems to improve relations between protected area authorities and local people, and was ranked as the second most important reason that local people did not engage in wildlife crime by community groups around Bwindi Impenetrable National Park.

What are the gaps in the evidence?

Our review was limited by a lack of evidence in a number of areas, but particularly:

- Quantification of multidimensional poverty, as a driver of wildlife crime and following interventions against wildlife crime
- Reliable measures of the prevalence of wildlife crime
- A general lack of evaluation of the outcomes of interventions, both on people and on wildlife crime, using appropriate metrics and with meaningful controls.

Recommendations for policy, implementation and research

The commercial wildlife trade is highly unlikely to be reduced by revenue sharing or regulated resource access, because the benefits they offer are insignificant when compared to the potential profit from the sale of bushmeat, timber or ivory. Instead, the legal system needs to be strengthened to make penalties a greater deterrent. Fortunately, the Ugandan government are currently reviewing the Uganda Wildlife Act for this reason.

Wildlife crime in response to perceived injustice could be reduced by improving the process of revenue sharing to more fairly distribute the benefits to those who suffer the greatest costs of conservation. The revenue sharing guidelines have recently been revised to this effect (2012) but changes are yet to be seen on the ground. Support and capacity building should be offered to the institutions responsible for managing the process.

Subsistence wildlife crime could be reduced by effective revenue sharing and regulated resource access, which is also important for cultural purposes. However, currently there is a lack of evidence on the factors contributing to their effectiveness at either alleviating poverty or reducing wildlife crime. We suggest that monitoring and evaluating the success of these projects should be a priority for future research. We also suggest that consideration could be given to conducting research into the sustainability of including bushmeat in a regulated access programme. There is currently very limited evidence on the impact of low levels of hunting on target species, but the benefits of enabling people to access the resource they most desire for subsistence and cultural purposes could be substantial, both to individuals and to relationships with park authorities. This could then feed through into a reduction in local support for, and engagement in, more damaging wildlife crimes.

In general, evidence for the relationship between wildlife crime and poverty in Uganda is patchy and difficult to interpret. This is likely to hold true in other countries. If wildlife crime is to be effectively tackled, in a way that is sustainable in the long term and supports poverty alleviation, this evidence gap urgently needs to be filled. This will be a challenging task, because the interactions between poverty, different types of wildlife crime, and the interventions put in place to tackle it, are complex, heterogeneous and dynamic. However this study has demonstrated that general lessons can be drawn out from a review such as this, in terms of highlighting both consistencies in the evidence and knowledge gaps.



A view of Queen Elizabeth National Park (Credit: Tiziana Zoccheddu 2010)



1 Introduction

Wildlife crime has become a topic of international attention and concern over recent years. This is partly because of a sudden and rapid increase in elephant and rhino poaching in Africa to meet rising demand for ivory and rhino horn (among other products) in China and Southeast Asia. It is also because of the increasing level of organisation and militarisation of criminal activities, making the current spate of wildlife crime far more than a conservation issue but one that also affects national security and local and national development. However, the term ‘wildlife crime’ covers a wide range of activities. At one end of the spectrum is the high profile international trade in endangered species; while at the other are activities such as entering a protected area to collect firewood or medicinal plants (see Section 2 for our definition of wildlife crime). The illegal wildlife trade is just one aspect of wildlife crime, but is thought to be the fourth most lucrative transnational crime after the trafficking of drugs, people and arms (Haken 2011). While it is elephants and rhinos that most often make the news, a whole range of plant and animal species are illegally traded, including timber species such as rosewood (*Dalbergia* spp.), commercial fish species such as Bluefin tuna, and pets including birds, apes and reptiles.

A conference on illegal wildlife trade hosted by HRH Prince Charles and the UK government in May 2013 suggested that poverty was a key driver of illegal wildlife trade (Benyon 2013). This is not, however, a self-evident truth. Indeed, a report commissioned by the UK Department for International Development (DFID) highlighted that poaching and trafficking of elephant ivory and rhino horn are ultimately driven by wealth and not by poverty per se (Duffy and St John 2013). Poor people are involved in the illegal wildlife trade but they tend not to be the major drivers or beneficiaries. Indeed, poor people can often suffer as a result of wildlife crime, either because their natural resource base is being depleted or because they are at the receiving end of penalties meted out by law enforcement agencies and conservation officials.

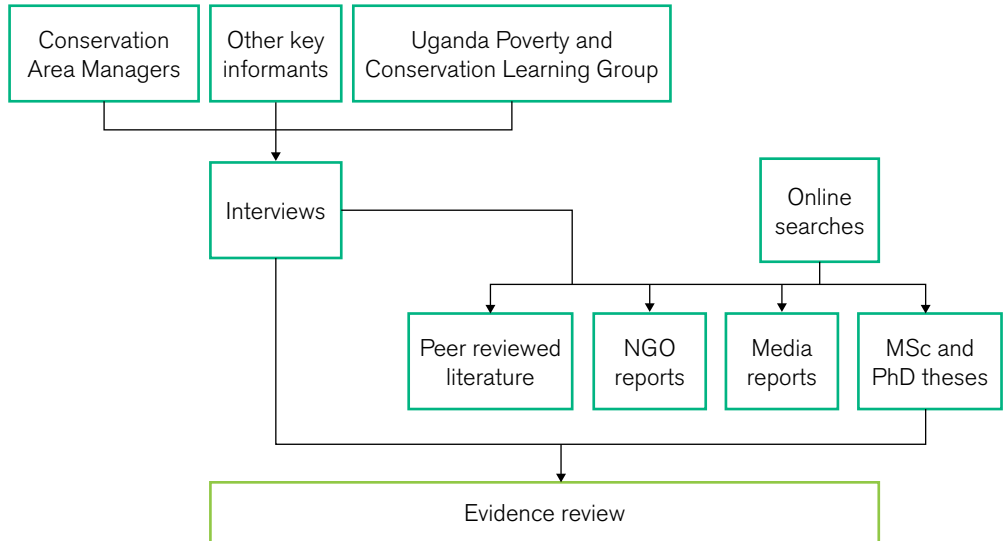
Other types of wildlife crime, such as bushmeat hunting or forest clearance for agriculture, are also often associated in the literature with poverty. This may appear superficially to be more likely to be true than ivory poaching, but there is limited evidence on whether it is the very poorest people who are most engaged in these activities, nor is it universally clear that the people who gain or lose from these activities are the same as those who are affected by subsequent interventions by conservationists or wildlife authorities.

One key issue is that several different types of wildlife crime, committed by different people for different reasons, are likely to be taking place in a given protected area. Both the activities themselves, and particularly the actions taken by the authorities and by conservationists to deter these activities, are likely to interact in complex ways to affect poor people. For example, it may be that ivory poaching is taking place in an area alongside bushmeat hunting, but that law enforcement authorities are more likely to be able to apprehend bushmeat hunters than ivory poachers. It may also be that the conservation and development interventions that are put in place as positive incentives to change livelihoods away from wildlife crime, benefit different demographic groups to those committing the crimes. There is a lack of evidence in the literature providing insights into these interactions and their effects on wildlife crime and poor people.

The aim of this report, therefore, is to review the evidence for each of these different links between wildlife crime and poverty: poverty as a driver of wildlife crime, wildlife crime's impacts on poor people, and impacts of responses to wildlife crime on poor people. The report focuses on Uganda but draws in experiences from other countries and contexts where relevant and appropriate.

The report is based on evidence gathered from published and grey literature, including MSc and PhD theses and media reports and from interviews with Uganda Wildlife Authority (UWA) Conservation Area Managers (CAMs) and other key informants working environmental, developmental and research positions in Uganda (Figure 1). Full details of the methodology employed are provided in Appendix 1.

Figure 1: Sources used in the evidence review, showing the range of published and grey literature and the people in Uganda who gave us their insights and directed us towards relevant literature



The next section of this report (**Section 2**) provides definitions of the key concepts that this review addresses: wildlife crime and poverty. **Section 3** provides a brief overview of the policy and institutional framework for conservation and wildlife crime measures in Uganda. **Section 4** summarises evidence on the extent of wildlife crime in Uganda and highlights the most widespread crimes and their purpose for the resource user.

In **Section 5**, we discuss the overall drivers of wildlife crimes, taking particular consideration of the aspects of poverty that could be involved. **Section 6** presents the various conditions that enable the crimes to occur.

In **Section 7**, we consider the evidence for the impact of wildlife crime on poor people, and in **Section 8** we examine the different interventions for reducing wildlife crime, their effectiveness in doing so and their impact on poor people.

Finally, in **Section 9** and accompanying appendices, we describe case studies of the five resources for which we could find the most evidence: bushmeat, ivory, timber, firewood and medicinal plants.

Our findings are based on the evidence that exists; in some cases it is very limited and in other cases it may be biased. For example, if researchers focus on charismatic species such as elephants and other large mammals then crimes such as ivory and bushmeat poaching may appear to be the most prevalent. We finish by highlighting some of these potential biases and recommending for improving the evidence on the links between wildlife crime and poverty in the future.



Uganda kob at Murchison Falls National Park (Credit: Tiziana Zoccheddu 2010)

2

Defining wildlife crime and poverty in a Ugandan context

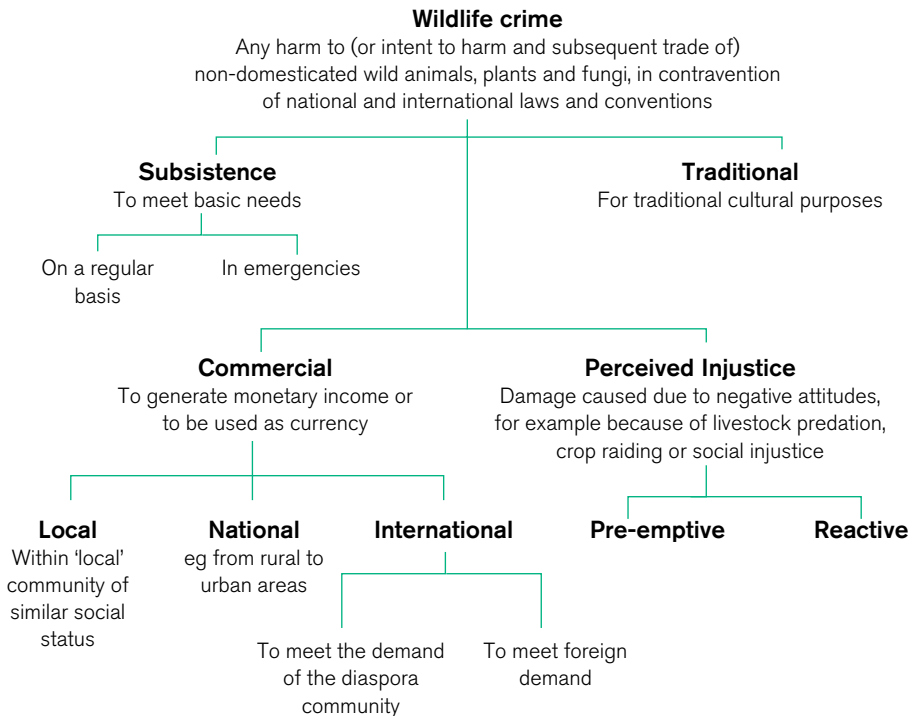
Wildlife crime

For the purposes of this review, we define wildlife crime as *any harm to (or intent to harm or subsequent trade of) non-domesticated wild animals, plants and fungi, in contravention of national and international laws and conventions (Figure 2).*

We decided on this definition having considered the range of illegal activities likely to occur in Uganda, involving animals from elephants to birds, and plants ranging from medicinal plants to timber. Fungi were included because our previous research had shown that mushrooms were collected illegally from Bwindi Impenetrable National Park for food (Harrison 2013). Previous research had also shown that wildlife crimes are connected. For example, someone entering a protected area to collect firewood might spear an antelope opportunistically for food. Another reason for including plants and fungi was that the wildlife crime database that this project is supporting includes all variety of wildlife crimes, not just the commercial trade. This definition was discussed and refined with members of the Uganda Poverty and Conservation Learning Group (U-PCLG), to ensure that it was appropriate.

While we define wildlife crime as an infringement of Uganda’s criminal law concerning the use of wild resources, we make no judgement on the legitimacy of particular actions. When we refer to ‘offenders’ in this report, we mean anyone who has broken such a law, whether they have been detected or not, or are suspected of having done so.

Figure 2: A diagrammatic definition of wildlife crime, illustrating the range of activities and drivers it may encompass. Note that drivers of wildlife crime are often overlapping, so these categories should not be seen as mutually exclusive



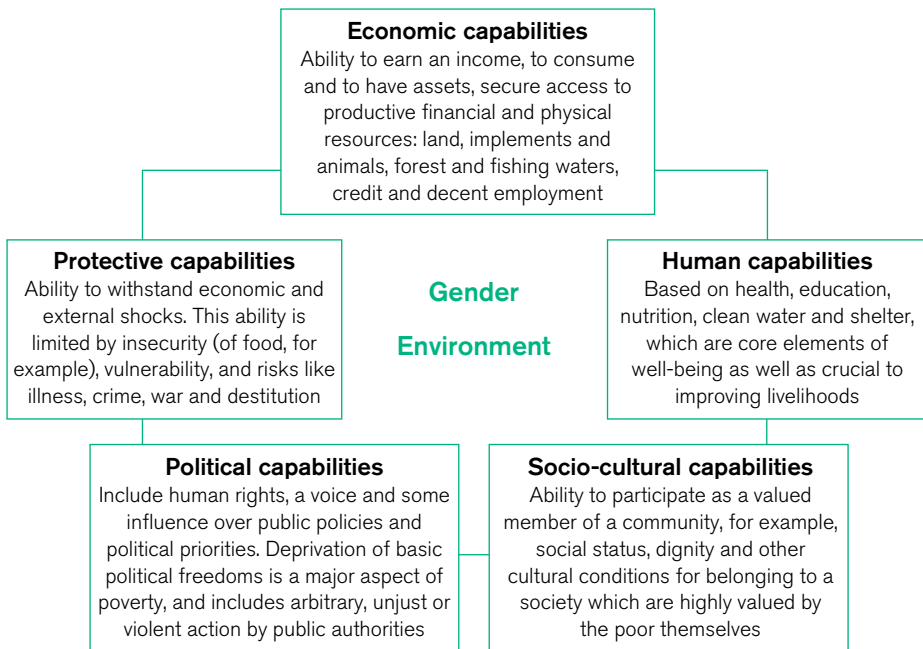
Poverty

We consider poverty to be a multidimensional concept, not confined to economic measures, but including all aspects of wellbeing. The OECD describes poverty as follows:

“Poverty encompasses different dimensions of deprivation that relate to human capabilities including consumption and food security, health, education, rights, voice, security, dignity and decent work. Poverty must be reduced in the context of environmental sustainability. Reducing gender inequality is key to all dimensions of poverty.” (OECD 2001)

The OECD defines poverty as having five core dimensions, which all interact with each of the others but remain distinct, and are all influenced by the state of the environment and gender inequality (Figure 3).

Figure 3: The five dimensions of poverty, as defined by the OECD (adapted from The DAC Poverty Reduction Guidelines, OECD 2001)



Uganda's definition of poverty has been derived with input from the poor themselves. It is: *“a lack of means to satisfy basic material and social needs, as well as feelings of powerlessness, social exclusion and lack of knowledge”* (MFPED 2000). Basic material and social needs include food, clothing, shelter, basic health care and education, and productive assets such as land.



Silverback gorilla at Bwindi Impenetrable National Park (Credit: Mariel Harrison 2013)



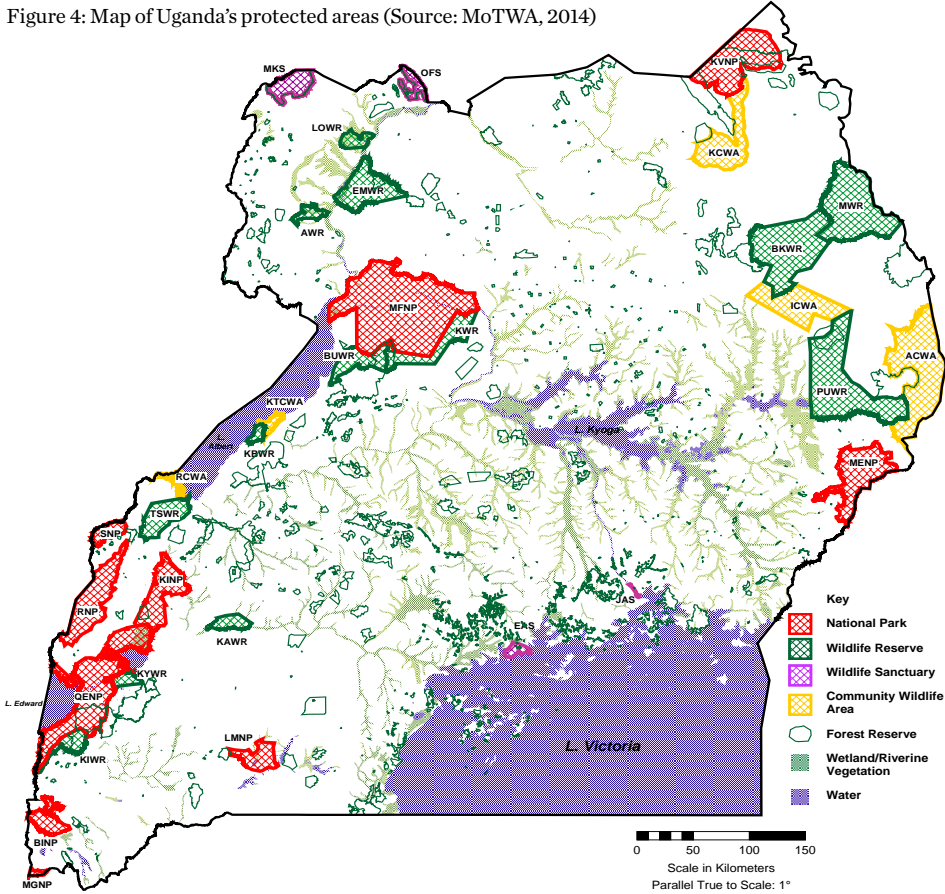
3

The policy and institutional framework for conservation and wildlife crime in Uganda

Uganda contains a diverse range of landscapes, from lakes and wetlands, to savannahs and bushland, to the afro-montane forests of the Albertine Rift and glacier-topped Rwenzori mountains. The variation in geography and climate provides habitat for very high levels of biodiversity. With as many as 18,783 species of fauna and flora, Uganda is among the top ten most biodiverse countries in the world (MoTWA 2014b). The Albertine Rift in particular is host to many species endemic to that region, with more endemic vertebrates than any other ecoregion in Africa.

Over ten per cent of Uganda's 241,551 square kilometres of land and water is gazetted as wildlife conservation areas, including ten National Parks, twelve Wildlife Reserves, ten wildlife sanctuaries, five community wildlife areas, 506 central forest reserves and 191 local forest reserves (Figure 4, MoTWA 2014).

Figure 4: Map of Uganda's protected areas (Source: MoTWA, 2014)



National Parks (10)		Wildlife Reserves (12)		Community Wildlife Areas (5)		Wildlife Sanctuaries (10)	
1. BINP	Bwindi Impenetrable	1. AWR	Ajais	1. ACWA	Amudat	1. EAS	Entebbe
2. KINP	Kibale	2. BKWR	Bokora Corridor	2. ICWA	Irimi	2. JAS	Jinja
3. KVNP	Kidepo Valley	3. BUWR	Bugungu	3. KCWA	Karenga	3. MKS	Mt. Kei
4. LMNP	Lake Mburo	4. EMWR	East Madi	4. KTCWA	Kaiso-Tonya	4. OFS	Otze Forest
5. MENP	Mount. Elgon	5. KAWR	Katonga	5. RCWA	Rwengara	Sanctuaries in QENP/Kyambura	
6. MFNP	Murchison Falls	6. KBWR	Kabwoya			5. KHAS	Kahendero
7. QENP	Queen Elizabeth	7. KWR	Karuma			6. KSAS	Kashaka
8. RNP	Rwenzori Mountains	8. KIWR	Kigezi			7. KYAS	Kayanja
9. SNP	Semliki	9. KYWR	Kyambura			8. KZAS	Kazinga
10. MGNP	Mgahinga Gorilla	10. MWR	Matheniko			9. KIAS	Kisenyi
		11. PUWR	Pian-Upe			10. RWAS	Rwenshama
		12. TSWR	Toro -Semliki				

These protected areas are managed by the Uganda Wildlife Authority (UWA), the Uganda Wildlife Education Centre (UWEC) and the National Forestry Authority (NFA), under the supervision of the Ministry of Tourism, Wildlife and Antiquities (MoTWA) and Ministry of Water and the Environment, and in collaboration with the ministries responsible for wetlands, and oil and gas development, and other government agencies, NGOs, universities and research institutions. These organisations have evolved from those put in place by the colonial government (Figure 5).

Figure 5: Timeline of conservation in Uganda (Adapted from MoTWA, 2014)

Pre 1880s	Local Kingdoms regulate and control of use of all wildlife resources under guidance of culture and traditional way of life
1880s-1902	Colonial government set aside major ecosystems and wildlife communities for conservation and sustainable use
1902-1923	Introduction of sport hunting, ban of traditional hunting methods and tools. Limitations and difficulties to continued use of wildlife resources by local communities
1923	Colonial government establishes the Game Elephant Control Unit
1925-6	The Game Elephant Control Unit turns into the Game Department, set up to mitigate against potential depletion of large game species including elephants, rhinos, lions and hippos
1926	First Game Reserves created
1930s	First Forest Reserves created
1952	Some Game Reserves are combined and turned into National Parks (Queen Elizabeth, Murchison Falls). Uganda National Parks is created as a separate and fully autonomous institution. The Game Department continues to exist and is responsible for management of wildlife outside National Parks
1959-1962	Identification of important areas for a) protection of wildlife and b) human-wildlife conflict, with special reference to elephants. Creation of Controlled Hunting Areas and Wildlife Sanctuaries
1962	Independence from British colonial government
Late 1970s-early 1980s	Civil instability leads to uncontrolled poaching of wildlife in protected areas, resulting in drastic population declines
1994	New Wildlife Policy gives recognition to community participation in wildlife management, indicating a paradigm shift away from preservation towards utilisation and involvement, with opportunities for local people to directly engage and benefit from wildlife conservation. Uganda National Parks and partners start the Multiple Use Programme at Bwindi Impenetrable National Park
1996	Uganda National Parks and the Game Department merge to form Uganda Wildlife Authority. Legislation for tourism revenue sharing put in place
2002	Uganda Forestry and Nature Conservation Masterplan published, designating nature reserves for conservation of wildlife within Forest Reserves
2003	Formation of the National Forest Authority from the Forest Department
2014	Uganda Wildlife Policy revised

The Uganda Wildlife Authority and the National Forestry Authority are guided by a number of national policies (Box 1).

Box 1: National policies guiding the Uganda Wildlife Authority and the National Forestry Authority*The National Environment Act, Cap 153 of 2000*

The act provides for wildlife protection and contains provisions which can be applied to the protection and sustainable use of wildlife. It includes provisions for the conservation of biological resources in situ, and the selection and management of protected and buffer areas. The act also provides a basis for environmental impact assessment.

The Uganda Wildlife Act, Cap 200 of 2000

This Act provides for conservation and management of Wildlife and wildlife protected areas in Uganda. It creates the Uganda Wildlife Authority and charges it with management of wildlife in and outside protected areas. The Act under S.4 (3) puts the Uganda Wildlife Authority under overall supervision of the ministry responsible for wildlife. The legislation establishes wildlife use rights regime and creates various offences relating to wildlife.

The Forestry and Tree Planting Act, 2003

The Act provides for the protection of forests through the creation of forest reserves in which human activity is strictly controlled. It seeks to control commercial harvesting of forest products through the use of licenses and promotes afforestation.

The Fish Act, Cap 197 of 2000

This law regulates the fisheries sector. It imposes restrictions on fishing gears, waters among others. This law is very useful in regulating activities in waters especially that fall under wildlife protected areas and or have wildlife.

Source: MoTWA, 2014

In addition to national policies, Uganda is signatory to a number of international treaties and conventions (Box 2).

Box 2: International treaties and conventions applicable to wildlife conservation in Uganda

Convention on Biological Diversity (CBD), 1992

The CBD requires each nation to, among other duties, promote sustainable use of natural resources and both in situ and ex situ conservation, using economically and socially sound incentives.

African Convention on the Conservation of Nature and Natural Resources, 1968

This Convention is the primary Pan-African legal instrument for the conservation of the environment in general and biological diversity in particular. Parties to the Convention undertake to establish and manage protected areas, and to protect certain species. The Convention obligates the parties to prohibit and regulate trade in specimens and trophies of protected species.

The Ramsar Convention, 1971

The Ramsar Convention provides for the protection of biological diversity in wetlands. Wetlands, under the Convention, have a wide coverage and cater for all watercourses and lakes in Uganda.

Convention on International Trade in Endangered Species of Fauna and Flora (CITES), 1973

The main objective of CITES is to control and regulate international trade in wildlife species through species classification and the use of permits.

East African Community Protocol on Environment and Natural Resources

This protocol obligates Uganda to sustainably conserve wildlife resources in partnership with the local communities. The protocol requires Uganda to cooperate in management of transboundary wildlife resources, promoting of social and economic incentives for conservation and to conclude agreements aimed at conserving transboundary wildlife resources.

Source: MoTWA, 2014



The boundary of Bwindi Impenetrable National Park (Credit: Mariel Harrison 2013)

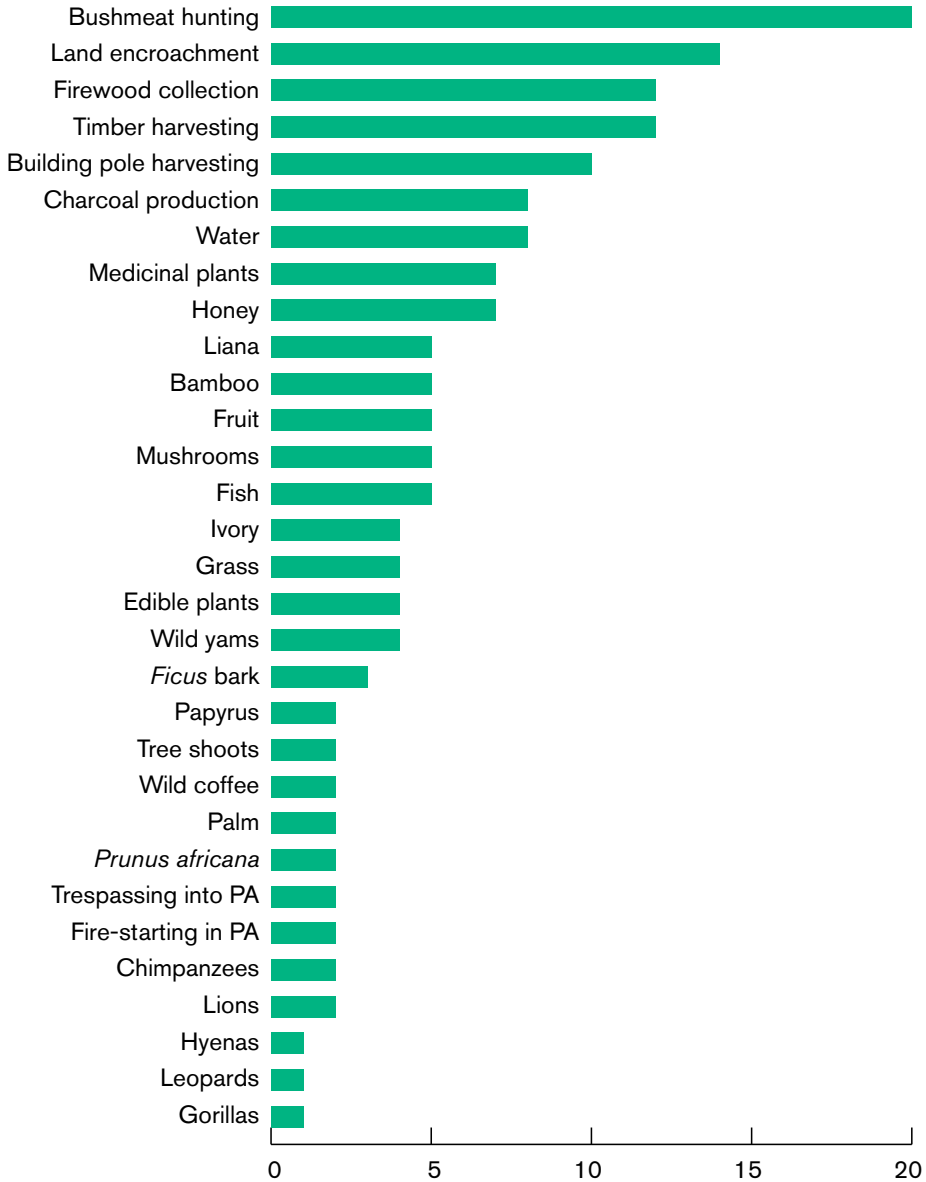
4

Extent of wildlife crime in Uganda



The types of wildlife crimes occurring in Uganda are diverse. We found evidence for 31 different resources being illegally harvested, some of which comprise multiple species. According to the available evidence, bushmeat hunting is the most widespread type of wildlife crime in Uganda, occurring in at least 20 of the 23 protected areas for which we obtained any evidence (Figure 6). Plant or land related crimes follow, with land encroachment (particularly for grazing), firewood collection, timber harvesting, building poles and charcoal occurring at between eight and 12 different protected areas each. Ivory has reportedly been poached at four national parks; Kibale, Kidepo Valley, Queen Elizabeth and Murchison Falls, although two elephants have been killed at Bwindi (in 2004 and 2012), and one at Semuliki in 2010, possibly all for ivory as well.

Figure 6: The number of protected areas (PAs) for which there is evidence of different types of wildlife crime occurring in the past 20 years. The data in this figure are based on only incidences documented in the evidence. We found evidence for all ten National Parks, eight of the 12 Wildlife Reserves, and five of the many Forest Reserves. A full table showing where each crime occurs is shown in Appendix 2



In addition to the resources shown in Figure 6, we found evidence for other types of wildlife crime that could not be traced to specific protected areas. Key informants suggested that beetles, butterflies, birds, chameleons and snakes were exported to meet demand in Europe, Japan, the USA and Asia. Some of these species can be exported under licence and are recorded by CITES, but exporters hide other species in with those for which they have permits, or export more than they are allowed to. Key informants suggested that customs officials often have limited knowledge of the species being exported so cannot identify what is legal or illegal.

CITES records for Uganda between 2002 and 2013 contain no beetles or butterflies, but show that birds and reptiles have been exported regularly, with 114 and 404 records respectively. Most items were exported under licence, although there are 43 records of confiscated or seized items (from a total of 841 records; Table 1).

Table 1: Records of confiscations or seizures of goods exported from Uganda under CITES between 2002 and 2013

Taxonomic Group	Records	Dates	Destination country	Details
Chimpanzee	1	2010	USA	Specimens exported for scientific purposes
Big cats (leopard, caracal and serval)	6	2004-5, 2008	USA	Skins, skin pieces and teeth exported for trade
Chameleons	14	2002-3	GB, USA	Exported live for trade
Civet	1	2005	USA	Skin pieces exported for trade
Elephants	5	2002, 2004-5, 2007	USA, UAE, GB	Ivory carvings, tusks and bone carvings, exported for trade (or unknown purposes)
Hippo	1	2008	USA	Ivory carvings exported for trade
Monitor lizards	4	2005-6, 2008-9	USA	Skins and leather products exported for trade
Monkeys (colobus, baboon)	4	2005, 2008-10	USA	Skin pieces and hair exported for trade, hunting trophies, and specimens for scientific purposes
Giant clams	1	2008	Austria	Shells exported for unknown purposes
Pangolin	1	2009	USA	Scales exported for trade
Python	1	2005	USA	Skin pieces exported for trade
Tortoises	1	2002	GB	Exported live for trade
Birds (Turaco)	1	2009	USA	Feathers exported for trade

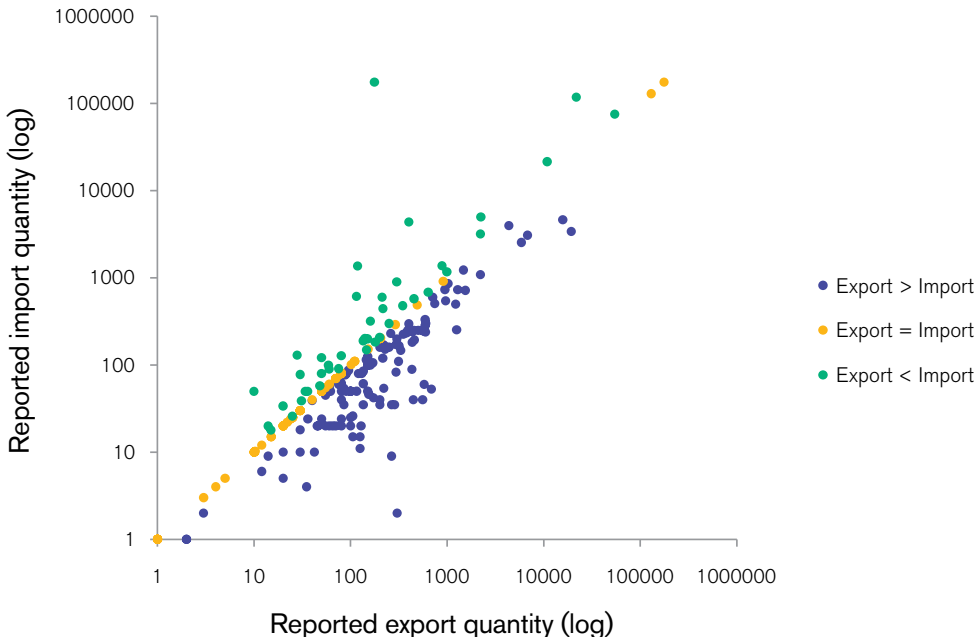
Source: CITES Trade Database, downloaded January 2015 from trade.cites.org

Notes: USA: United States of America, GB: United Kingdom of Great Britain and Northern Ireland, UAE: United Arab Emirates

Most seizures are made in the USA, a country with very strong importation controls and checks (Underwood *et al.* 2013). CITES data are dependent on frequency and stringency of customs checks, and accuracy and efficiency of reporting. Therefore this table is very unlikely to provide an accurate reflection of all wildlife illegally exported from Uganda between 2002 and 2013. We know for instance of several ivory seizures in recent years that are not recorded here but which came through or were seized in Uganda (eg New Vision 2014, see ivory case study in Appendix 4 for more).

CITES requires documentation of both exports and imports. Comparing these two data sets suggests that, for some species, people export more than they have a licence to, ie the data show higher levels of imports than exports. Of the 841 records, only 226 have both imported and exported quantities reported, but they often do not add up (Figure 7). There are 117 records in which fewer individuals or lower quantities were reported imported than were apparently exported, of which 107 were records of live animals. There are 66 records which directly match imports and exports records, 18 of which are trophies, scientific specimens or *Prunus africana* bark for trade. The records for which more appear to be imported than exported are mostly live chameleons (31 of the 43 records), all between 2002 and 2003 and all destined for the USA, Japan, Germany and the Netherlands.

Figure 7. A comparison of reported exported and imported quantities of CITES products from Uganda between 2002 and 2013. None of these records are reported to be from confiscations or seizures



Ugandan wildlife crime in an international context

Although the illegal wildlife trade threatens many different species of wild animals and plants, there is a particular current concern internationally about African rhinos and elephants. Other species of current concern to the international conservation community, which feature in Uganda's illegal wildlife trade records, include pangolins, great apes, and pet birds.

Elephants and rhinos

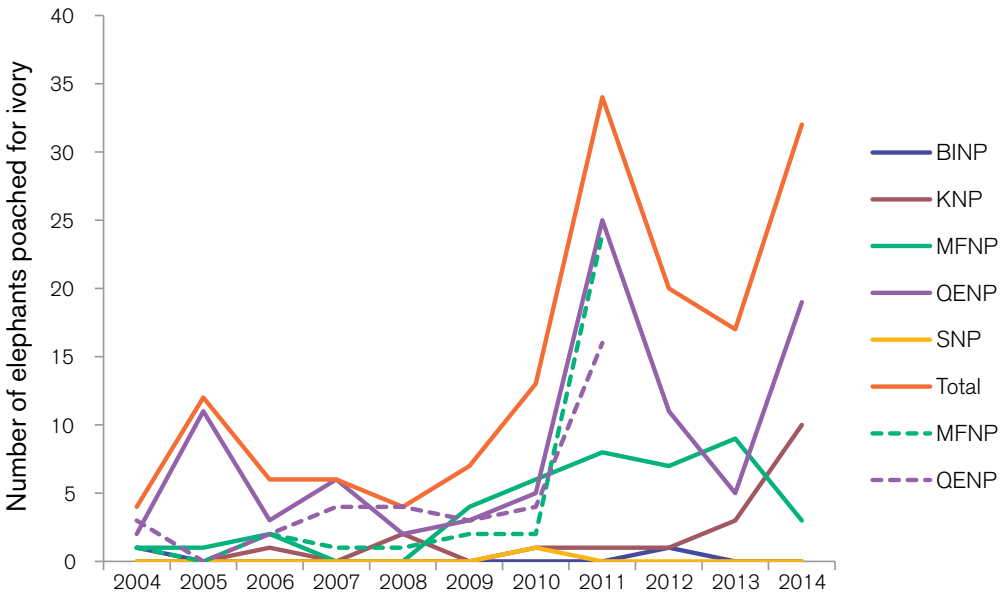
Elephant poaching is closely monitored under CITES. Monitoring the illegal killing of elephants and illegal trade in elephant products was mandated at CITES CoP10 in 1997 and the Monitoring of Illegal Killing of Elephants (MIKE) system and Elephant Trade Information System (ETIS) were established shortly after. The MIKE report to CoP16 in 2013 highlights an on-going increase in levels of illegal killing of elephants since 2006, with 2011 levels being the highest since MIKE records began in 2002 (CITES 2013b). ETIS data similarly shows that the frequency of illegal ivory trade transactions in 2011 was roughly three times greater than the level of illegal trade activity found in 1998 (CITES 2013a). Milliken (2014) highlights even higher levels of illicit trade in 2013.

Uganda is named as a country of concern by ETIS (UNEP *et al.* 2013). However, ivory poaching in Uganda is currently at a significantly lower level than it was during the years of civil unrest and insecurity during the late 1970s and early 1980s, and is very low compared to current levels in Tanzania, for example, where approximately 57,000 elephants are estimated to have been killed between 2006 and 2013 at Selous Reserve alone, amounting to 80 per cent of the population there (EIA 2014).

Data direct from UWA Conservation Area Managers (CAMs) and MIKE shows that while the actual numbers of elephants killed in Uganda is low and uncertain (the numbers from each source do not match), an upward trend can still be detected (Figure 8).

Figure 8: Number of elephants killed for ivory at five National Parks in Uganda over the past decade

Notes: Solid lines show data received directly by the authors from UWA Conservation Area Managers (CAMs). Data for 2014 is numbers up to September of that year. Data from Kidepo Valley NP was unavailable, so the total shown is for the five national parks shown, not for all of Uganda. Dashed lines are calculated from MIKE data available online (CITES 2013a; <http://www.cites.org/eng/cop/16/doc/E-CoP16-53-01.pdf>)



A report to CITES on ETIS data notes that “Uganda, Ethiopia and Nigeria rarely supply ivory from local elephant populations, but frequently function as entrepôt and/or exit countries for ivory sourced elsewhere” (CITES 2013a). Ivory traded through Uganda tends to originate in the Democratic Republic of the Congo and other neighbouring countries along Uganda’s long and porous border, and is destined for Kenya’s ports where it is containerised and sent onwards to Asia. There have been allegations that the Ugandan military are involved in the ivory trade (Gettleman 2012), after a military helicopter was seen near Garamba National Park in 2012 during a period when 22 elephants were shot from the air. Ugandan authorities denied any involvement in ivory poaching, despite admitting that the aircraft was theirs (Vira and Ewing 2014).

Uganda has a small population of 15 white rhinos in Ziwa Rhino Sanctuary, a 7,000 hectare area patrolled by 80 armed rangers 24 hours a day. The population consists of six rhinos that were introduced in 2005-6 by Rhino Fund Uganda, and the nine calves that they have produced since then. Despite the growing levels of rhino poaching elsewhere (for example, poaching of rhinos in South Africa increased from 13 in 2007 to over 1200 in 2014 (Save the Rhino 2014), none of Uganda’s rhinos have yet been poached. One key informant revealed that UWA had received intelligence that poachers were planning to poach the rhinos, but that their attempt had either been foiled or the situation was being closely monitored.

Pangolins

Pangolins are one of the most trafficked mammals in Asia and increasingly in Africa (TRAFFIC 2013). We found evidence of a growing trade in pangolins in Uganda, first from CITES data and then from recent media reports. Although there are only two CITES records of pangolin exports between 2002 and 2013 (one in 2009 of 50 scales to the USA, which was seized, and one in 2012 of 70 kilograms of scales to Vietnam which was licensed), there have been a number of media reports of seizures of illegal exports (Table 2). Pangolins have traditionally been hunted for meat and use in traditional medicine in Africa, but at the international level are increasingly being exported to Asia, also for meat and medicine but additionally to turn scales into jewellery. All species of pangolin are listed on Appendix II of CITES, but Asian pangolins have had a zero trade quota in place since 2000, leading traders to turn to Africa to meet Asian demand (Challender and Hywood 2012).

Table 2: Media reports of seizures of pangolin scales and trade in Uganda. This information does not appear in the CITES database, possibly due to incomplete or delayed reporting

Date	Details	Reference
April 2012	A man was arrested with hippo teeth, ivory and 4kg of pangolin scales near the bus park in Kampala.	Daily Monitor 27th April 2012
July 2012	115kg of pangolin scales confiscated from a trader who claimed to have many suppliers across Uganda and in DRC, and always exports to China. These scales were held as court exhibits but later went missing.	New Vision 11th July 2012; New Vision 3rd Jan 2013
October 2013	One and a half cups of pangolin scales found stuffed into the socks of a suspected Chinese trafficker at Entebbe airport. The pair of suspects was also carrying ivory carved into bangles, necklaces and decorations.	New Vision 1st October 2013
October 2013	116kg of ivory and 2.5kg of pangolin scales impounded at Entebbe airport. (Note that this could be a later reporting of the above incident).	New Vision 23rd October 2013
January 2015	Uganda Wildlife Authority clears the export of seven tonnes of pangolin scales, collected from UWA stores and 'old trophies' held by communities across the country. The NGO Greenwatch later sued UWA for refusing or failing to fulfil their mandate to protect the environment. Ugandan High Courts have since issued a temporary injunction restraining anybody from exporting pangolin scales.	New Vision 21st January 2015; Daily Monitor 29th January 2015; RedPepper 5th March 2015
January 2015	2029kg of pangolin scales seized at Entebbe airport along with 791kg of ivory	New Vision 27th January 2015

Great apes

Stiles *et al.* (2013) suggest that as many as 22,000 great apes were illegally traded internationally between 2005 and 2011. A report by the CITES Secretariat of a technical mission to Uganda, however, noted, that "All available information suggests that illegal trade in gorillas and other great ape species is limited in Uganda" (CITES 2013d). Plumptre *et al.* (2004) reported "two households around Bwindi mentioned that they had hunted gorilla and they were probably aware of the trade in gorilla infants that has been taking place over the past 2-3 years in this region". However, gorillas and chimpanzees are more likely to be accidentally injured in snares or traps intended for bushmeat (such as duikers) or crop raiding vermin (such as bush pigs and baboons) than to be intentionally hunted for trade.

Birds

There is a relatively strong legal trade in wild birds in Uganda. For example, CITES data shows 37 records of Grey parrots being legally traded between 2002 and 2012, as well as 24 records of finches and weavers, and more. There is only one reported instance of the illegal trade in the CITES database from Uganda (Table 1), although the World Parrot Trust has reported on two seizures of 250 Grey parrots (World Parrot Trust 2013).



Giraffe in Murchison Falls National Park (Credit: Tiziana Zoccheddu 2010)



5

Drivers of wildlife crime

International context

The drivers of wildlife crime are likely to vary according to the type of crime and the type of resources or commodities involved. The International Consortium for Combatting Wildlife Crime (ICCWC) lists rural poverty, food insecurity, unequal distribution of available agricultural lands, economic interests, legal markets of timber and non-timber products, as well as social upheavals such as war and famine as potential drivers of wildlife crime (UNODC 2012).

As an example, the MIKE report to CITES CoP16 lists poverty, poor law enforcement, weak governance and the demand for illegal ivory as the key factors associated with elephant poaching (CITES 2013b). The report suggests that the first three of these probably reflect 'background levels' of poaching, while increasing demand accounts for much of the recent escalation. The report reveals that sites suffering from higher levels of poverty experience higher levels of elephant poaching and, further, that poaching decreases as food security increases. In Tanzania, TRAFFIC highlight how a considerable increase in bushmeat hunting was associated with the presence of refugee camps, as bushmeat hunting was a means to meet protein requirements and also an opportunity to generate income (Jambiya *et al.* 2007). Poverty and lack of alternative sources of income were also cited as primary reasons motivating illegal hunting of elephants in the Central African region but again noting that demand from wealthier people was a key stimulus for illegal hunting (Stiles 2011). Poor people's motivation to poach may not be just to earn income or reduce food insecurity. The Global Tiger Recover Programme notes, for example, that tigers are often killed by local people in revenge for livestock depredations (Global Tiger Initiative 2011).

The United Nations Office on Drugs and Crime (UNODC) summarises a wide range of motivations for wildlife crime including (UNODC 2012):

- **Subsistence:** The lack of alternative sources of food and income, and in a broader sense, the lack of rural and economic development force vulnerable groups to rely on wildlife and forest resources for their existence.
- **Income generation/commercial use:** Gains made through participation in illegal wildlife and forest activities vary. In some cases they serve as a regular source of income, and in other cases they provide occasional sources of income or safety nets in times of hardship. Illegal activities in wildlife and forest activities can also be lucrative and generate large profits.
- **Enjoyment, leisure and tourism:** Some wildlife crime can be associated with recreational use and tourism – sometimes intentionally but at other times as an unintended side effect (for example, through the collection of corals while diving or the disturbance of nesting sites while hiking or climbing).
- **Culture and tradition:** Cultural uses of wildlife and forest products include medicinal and ceremonial uses. Such consumption can also be based on certain beliefs in the product's effect on one's power and strength.
- **Human-wildlife conflict:** Overgrazing by domestic livestock can lead to a reduction or loss of the predator's prey source, and as a consequence the predators are forced to attack domestic livestock as prey. As a result, the predator puts itself at risk of being killed – in retaliation or prevention – by the herders.

Drivers of wildlife crime in Uganda

The evidence reviewed revealed five main drivers of — or motivations for — wildlife crime in Uganda, resonating with the international context described above:

- a) To meet basic needs (subsistence)
- b) To generate income above and beyond basic needs (commercial)
- c) In response to perceived injustice
- d) Cultural traditions
- e) Political influence.

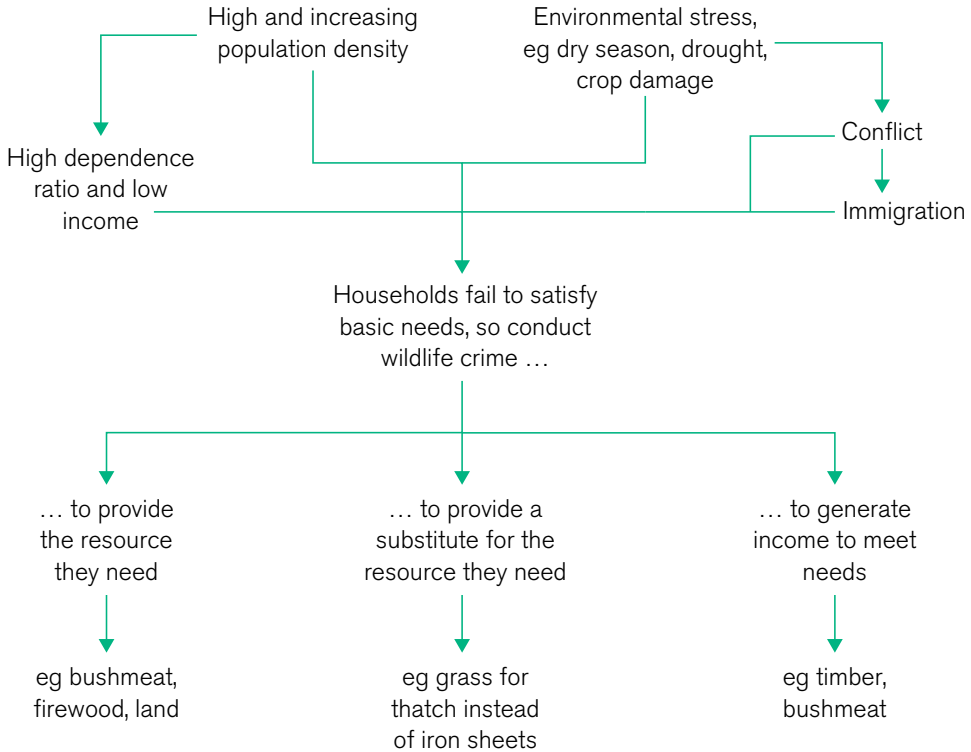
These five drivers are discussed in turn below and the evidence for their importance presented.

Subsistence

Many people in Uganda struggle or fail to meet their household's basic needs. The latest poverty status report (MFPED 2014) shows that although poverty levels are declining in Uganda, 19.7 per cent remain below the poverty line (consumption aggregate based on equivalent to USD one per person per day), and 43 per cent are at risk of falling back into poverty in the event of a shock. In rural areas surrounding protected areas, poverty levels are often higher than the national average. For example, in Karamoja region surrounding Kidepo Valley NP, almost 80 per cent of people live below the poverty line (Care4Karamoja 2015).

The evidence shows that many people are lacking the resources they need, and the money with which to buy them, so may have little or no option but to resort to illegally harvesting resources from protected areas. These resources can either be used directly to meet household needs, or be sold to generate income with which to pay for resources or services (Figure 9).

Figure 9: Drivers and examples of subsistence wildlife crime in Uganda, based on analysis of available evidence



The evidence we identified revealed that the resources that rural Ugandans obtain from protected areas to directly meet their needs include bushmeat (Olupot, McNeilage, *et al.* 2009; Tumusiime *et al.* 2010; Twinamatsiko *et al.* 2014) and fish (Kapiriri 1997; Twinamatsiko *et al.* 2014), both to provide dietary protein and to treat severe childhood malnutrition. Firewood is also a crucial basic need for cooking, which can be obtained from protected areas (Aine-omucunguzi *et al.* 2009; Kabagumya 2001; Twinamatsiko *et al.* 2014). People also collect honey, which is highly valued as both a food and medicine for treating coughs and ulcers (Kabagumya 2001; Twinamatsiko *et al.* 2014). Building poles are an important construction material for low-income households in rural areas, which are often not legitimately available to people without tree plantations of their own or money to buy them from others (Kabagumya 2001; Twinamatsiko *et al.* 2014).

Land is another resource that people require from protected areas, especially when the population density is particularly high. Protected areas are encroached for livestock grazing, agriculture and settlement (eg Asio 2014; Mugisha 2002).

Some resources are harvested when people cannot afford manufactured substitutes. For example, grass is collected from some protected areas by households that cannot afford iron sheets, to use as thatch (Kabagumya 2001). Medicinal plants are sometimes collected by those who cannot afford to travel to health centres or pay their fees (Aine-omucunguzi *et al.* 2009; Kamatenesi 1997; Kabagumya 2001; Kipiriri 1997). Lianas are used as substitutes for wire and sisal rope, which are unaffordable (Kabagumya 2001), or to make traditional baskets, trays and mats (Twinamatsiko *et al.* 2014).

Bushmeat and timber are occasionally harvested by people who need to make money to meet their basic needs, such as paying school fees or for medical treatment, or at times such as Christmas and Easter when money is needed for gifts and meat for celebrations (Moreto 2013; Twinamatsiko *et al.* 2014; WCS and MUIENR 2008). Charcoal is made usually by households with low agricultural, physical and human capacity, as a means of generating income (Khundi *et al.* 2011). Honey and lianas are also collected to generate low levels of income in some areas (Twinamatsiko *et al.* 2014).

There are certain scenarios in which increased pressure is placed upon households struggling to meet their basic needs, and during which subsistence wildlife crime increases (top of Figure 4). For example, there is more competition for limited resources in areas with particularly high population densities. Nkonya *et al.* (2008) found that rural communities living at high density were less likely to comply with natural resource management legislation. There is not enough land to produce food for the number of people living around parks such as Mount Elgon National Park, and the existing land is becoming infertile, leading local people to encroach into the protected area for food (Asio 2014; MoTWA n.d.; WCS and MUIENR 2008). A scarcity of land also prevents people from being able to plant trees to meet their fuel and construction needs, forcing them to harvest from forests (Twinamatsiko *et al.* 2014). As populations rise, these problems become more acute.

Households with more dependents (children or elderly) per person of working age and low incomes are also more reliant on natural resources (Tumusiime *et al.* 2011; Collins 2001).

Environmental stressors such as drought, which may occur more severely and more frequently with climate change, also put pressure on struggling households. A lack of water and pasture can lead livestock herders to graze their cattle inside protected areas (WCS and MUIENR 2008). For example, droughts in 2007 caused Basongora herdsman, already displaced from DRC by insecurity and temporarily settled in Queen Elizabeth National Park, to spread further into the park. Not only was this a crime in itself, but the herdsman then reportedly poisoned lions, leopards and hyenas in response to the loss

of their livestock to the wild animals. A substantial proportion of the park's hyenas were killed, along with all the leopards along the Nyamusagani river and at least 11 lions (Anon 2009). At Mount Elgon National Park, over half of households were reported to experience food shortages every year between March and July due to land scarcity and an increasingly hostile climate, causing them to collect forest foods from the park to survive (Kigozi 2008). Crop damage and livestock loss due to wild animals or disease are environmental shocks that can rapidly reduce household wealth and productivity, giving them no choice but to depend on the natural environment to survive (WCS and MUIENR 2008).

Environmental stress also increases the risk of local conflict, which puts further strain on households. Mount Elgon National Park in particular has suffered from local conflict. After the civil war, the Sabei people returned from Amin's forces armed and experienced in violent conflict, and pushed the Bagishu people off their land and into the forest (Petursson *et al.* 2013). Later, the Sabinu people were forced up the mountain and into the forest by persistent raiding by the Pian-Karimojong (Kaggwa *et al.* 2009; Asio 2014).

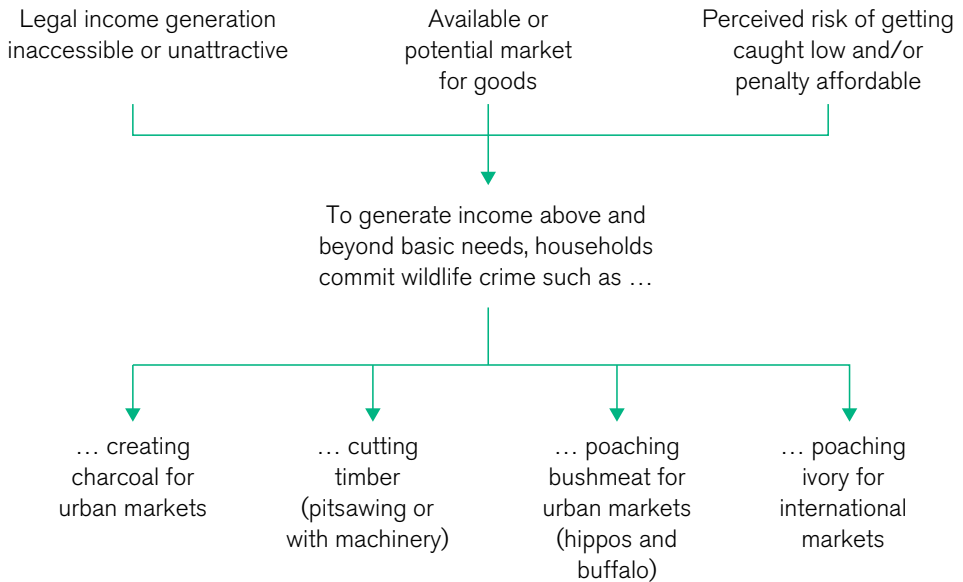
Regional conflict also increases the tendency for people to engage in wildlife crime by creating more struggling households. People escaping conflict leave behind their land and property as well as the social networks they would usually use for support, leaving them dependent on the natural environment (Anon 2008). At Queen Elizabeth National Park, illegal resource use was found to be higher in a parish where there were more immigrants following an earlier political insurgency (Kairu 2005). The northern region of Uganda has suffered from long-term insecurity due to the presence of the Lord's Resistance Army, and due to the border with the South Sudan. However, we could only anecdotal reports of wildlife crime from this region, perhaps because the insecurity prevents researchers from visiting. There are reports of armed poachers entering Kidepo Valley National Park from South Sudan and Kenya, hunting both bushmeat and ivory (Anon 2014a), as well as armed pastoralists herding their livestock within the national park (H. Travers, pers. obs.)

Commercial

Commercial wildlife crime is driven by a desire to “attain wealth above and beyond basic necessities” (Moreto 2013). Not everyone who wishes to attain this level of wealth gets involved in wildlife crime though; some may turn to wildlife crime because they feel unable to access legitimate or high-paying employment, a ‘push factor’ (A. Lemieux, pers. com.). There is also the ‘pull factor’ of the profitability of illegal activities such as trading bushmeat, ivory and timber to urban centres or beyond (Figure 10). As will be detailed in the case studies, there is a market for bushmeat in Kampala and other urban centres (New Vision 2012c; MacKenzie and Hartter 2013). With a kilo of raw ivory now selling for \$2,100 on the black market (Vigne and Martin 2014), up from \$150 in 2002 and continuing to rise (Havocscope 2012), elephant poaching is potentially the most profitable

wildlife crime in Uganda at the moment, but locally hired poachers will see only a very small proportion of that money despite taking most of the risk (A. Lemieux, pers. com.). Charcoal may be used to attain wealth, as its production has been increasing significantly since the 1990s (CARE International 2012).

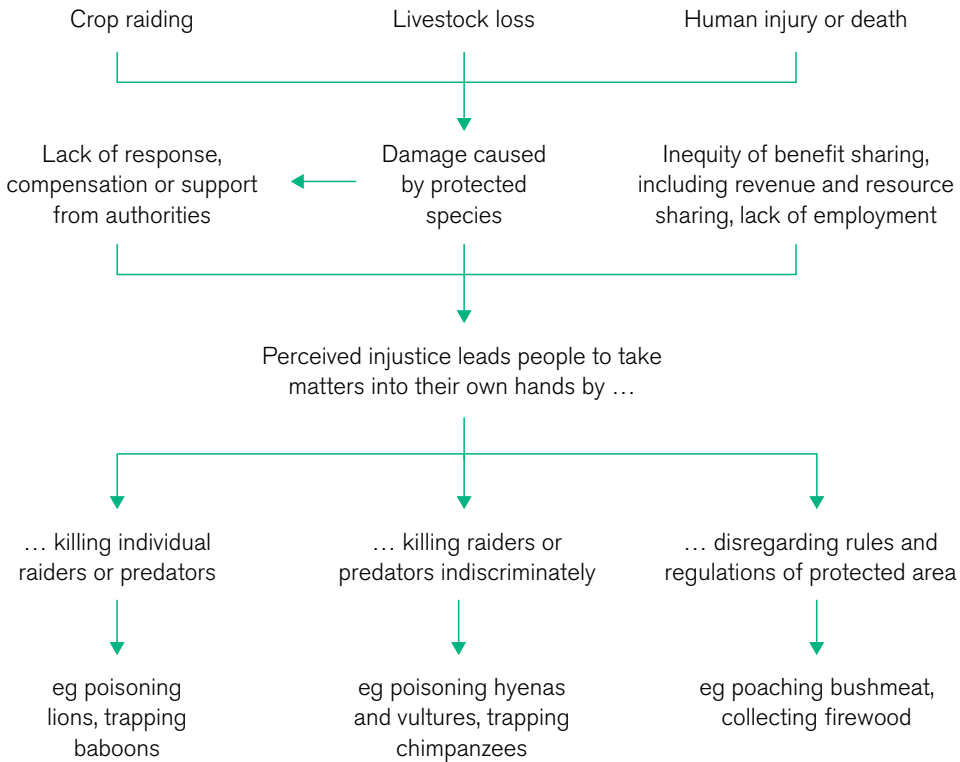
Figure 10: Drivers of the main types of commercial wildlife crime in Uganda, based on available evidence



Perceived injustice

There are a number of ways in which local people perceive themselves to be unjustly treated by protected area authorities. Their responses to this injustice may include targeted retaliation at individual animals or species, and general disregard for protected area rules and regulations (Mugisha and Jacobson 2004) (Figure 11).

Figure 11. The drivers and types of wildlife crime caused by perceived injustice, as determined from available evidence



Crop and livestock raiding by wild animals in community land around protected areas is a long-standing problem in Uganda, as with many other African countries. It is particularly an issue in areas of high population density, which forces people to farm right up to the boundary of national parks. Addressing crop raiding is difficult because while the Uganda Wildlife Authority is responsible for preventing protected species from raiding crops and livestock, local government is mandated with responsibility for species classed as vermin (eg baboons, bushpigs and vervet monkeys). However, local government claim not to have the resources or expertise to do so. But more than that, the historical context is most important to Uganda. The British Colonial government hired local vermin guards for each protected area to protect farms from raids by wild animals. They also gave meat of shot 'problem animals' to local communities, and noted the importance of controlling raids by wild animals to maintaining good relations with local people. However, when UWA was formed after the civil unrest, it was under-resourced and operating on restricted budgets.

Rangers were ordered not to scare-shoot wild animals in community land so they could focus on law enforcement. But for local people, this was a dramatic change in the level of support received from the authorities over raids by wild animals and the expectation of support remains. For example, at Bwindi Impenetrable National Park, local people reported that the rangers did not respond to their calls for help until it was too late, if at all (Harrison 2013).

UWA and some NGOs have invested substantial amounts of money into crop raiding mitigation measures, with varying degrees of success. For example, elephant trenches dug with tourism revenue at Kibale National Park have had some success (MacKenzie 2012b), while living fences of Mauritius thorn have had limited success at Bwindi Impenetrable NP due to lack of maintenance support (Harrison 2013). The Uganda Wildlife Authority has a principle of not giving financial compensation for crop damage. Anger at crop raiding and the injustice of wild animals being allowed to encroach on local people's gardens when people are punished for entering the protected area leads people not just to kill raiding animals but also conduct other illegal activities in the parks (Twinamatsiko *et al.* 2014). Farmers around Budongo Forest Reserve are reported to place snares and illegal man-traps in their fields officially aimed at vermin species but probably also intended for chimpanzees (Tumusiime *et al.* 2010; McLennan *et al.* 2012). At Ajai Wildlife Reserve, local people poisoned hippos to try to stop them raiding their crops (Kepo 2011).

Livestock loss and human injury are similar problems, with local people perceiving little support from authorities. In response to cattle loss at Queen Elizabeth National Park, herders poisoned their remaining carcasses, aiming to kill the guilty predator but often killing scavengers such as hyenas and vultures in the process (Oboya 2009).

The perceived inequity of benefit sharing is also a problem in Uganda. The main ways in which benefits are shared are through tourism and sport hunting revenue, giving local people employment, and access to protected resources. The revenue sharing system is hampered by corruption, meaning that as little as 50 per cent of the intended money reaches local communities (Harrison 2013; Archabald and Naughton-Treves 2001; Tumusiime and Vedeld 2012). The benefits from revenue sharing that do reach local people are often captured by the local elite, worsening local economic inequality and breeding disenchantment and resentment. Local people at some protected areas reported that revenue had never been shared with them at all, for example at Ajai Wildlife Reserve (Kepo 2011). Local people also perceive that most jobs with UWA go to people from distant parts of the country or related to current employees (Twinamatsiko *et al.* 2014; Kepo 2011; Moreto 2013). These perceived injustices encourage local people to disobey the rules and regulations of protected areas, for example by hunting bushmeat, grazing their livestock, or cutting timber (Twinamatsiko *et al.* 2014; Kairu 2005).

Cultural traditions

There are a variety of cultural traditions surrounding resource use (Figure 12). Many of Uganda's protected areas are the traditional homelands of various tribes, such as the Batwa in Bwindi Impenetrable National Park and the Batooro of Katonga Wildlife Reserve (Mugisha 2002).

Figure 12: Cultural and traditional drivers of wildlife crime in Uganda as determined from available evidence



Because people have traditionally lived in certain areas, they have traditional uses for the resources found there, some of which can no longer be found outside the protected areas. For example, people living around Mgahinga National Park have historically used bamboo for crafts, fuel and construction material (Sheil *et al.* 2012). The Batwa of Bwindi Impenetrable National Park have traditionally supplemented their diet with wild yams, particularly in times of famine, but they only grow within the protected area (Byarugaba *et al.* 2006). Medicinal plants have historically been used for treatment across Uganda, and many people believe that they are more effective than modern medicines (Eilu *et al.* 2007; Twinamatsiko *et al.* 2014; Ssegawa and Kasenene 2007). Many of the plants used only grow in certain environments that can no longer be found outside protected areas.

As well as resources, some protected areas contain cultural sites that local people would like to visit, such as the hot springs in Bwindi Impenetrable National Park (Twinamatsiko *et al.* 2014) and Rwenzori National Park (Kizza 2014).

For many people, there is a culture of hunting and eating bushmeat; it is associated with becoming a man and appeasing ancestors (Moreto 2013; Kairu 2005; Kabagumya 2001; Twinamatsiko *et al.* 2014). It is not just edible meat that is hunted; other animal parts are used in traditional medicine and witchcraft, or as status symbols. The oil from a lion is used for medicinal purposes, while the nails give the wearer protection at night (Moreto 2013). The skins of lions and leopards are given to kings to wear (Moreto 2013).

Political influence

Politicians have long influenced wildlife crime in Uganda. During his reign, Idi Amin announced that he would give back to the people the forest the “British had stolen from them”, causing deforestation and settlement in Mount Elgon National Park (Petursson *et al.* 2013). More recently, politicians trying to gain votes have told local people that protected areas are rightfully theirs, leading to encroachment at Mount Elgon, Queen Elizabeth and Murchison Falls National Parks (A. Barirega, pers. com.), and widespread clearing of forest reserves for agriculture.



Hippo at Queen Elizabeth National Park (Credit: Tiziana Zoccheddu 2010)



6

Conditions enabling wildlife crime

International context

An enabling condition is a factor that does not drive or motivate crime directly, but without which the crime would be impossible, not profitable or too risky. For example, an accessible or profitable market is an enabling condition; the driver is a desire for money, but a person would not illegally harvest a resource if no one would buy it from them. Another enabling condition is insufficient law enforcement (for example, too few staff and not enough equipment); regardless of the driver, people are highly unlikely to undertake an illegal activity if law enforcement is 100 per cent effective and they are certain to be caught and punished, and if the resulting penalty is greater than the potential profit.

The distinction between enabling conditions and drivers is fuzzy. For example UNODC (2012) mixes in markets and prices alongside food security, poverty, legislation and so on. Nevertheless some clear factors stand out that facilitate wildlife crime. Transparency International (2013) reports that corruption is perhaps one of the most critical enabling conditions for wildlife crime. There is increasing evidence that organised crime syndicates are heavily involved in wildlife crime (Milliken and Shaw 2012; Scanlon 2012). Such illegal networks fuel and are fuelled by corruption particularly in terms of facilitating illegal trade (EIA 2008). Transparency International (2013) notes “Corruption is not the only means used by criminal groups to poach and trade wildlife. These groups also take advantage of the economic situation in source countries to pay villagers to poach animals, or of the lack of technical knowledge of custom officials.”

Corruption is strongly linked to weak law enforcement. Ononino (2011) notes that corruption is the main obstacle to effective law enforcement in Central Africa for example. Peh and Drori (2010) observe “one of the striking features of sub-Saharan Africa is a weak ability of states to impose their legislation, even if governments are aware of the need to protect their natural environment.”

A study by TRAFFIC (2008) to understand the drivers of illegal and unsustainable wildlife trade in Southeast Asia explored the relative importance of poverty, livelihoods, resource management, awareness, legislation, and markets as possible drivers. The authors reported that both experts and literature consulted for the study considered rising affluence and increasing disposable income in consumer countries to be a major driver of demand for wildlife. They also noted that a variety of factors associated with economic growth, trade expansion and the development of infrastructure were believed to be the primary factors influencing the market availability of wildlife. The study noted, for example, the influence of the economic growth of India and China both in terms of their growing domination of regional markets — and the knock-on expansion of industry, trade and investment in Southeast Asia — and the changing demands, aspirations and purchasing power of increasingly affluent sectors of the population. Indeed, overall the study notes that wealth appears to be a stronger driver of illegal and unsustainable wildlife trade in Southeast Asia than poverty.

A review of evidence looking specifically at trafficking of ivory and rhino horn (Duffy and St John 2013) also concluded that wealth rather than poverty was the ultimate driver, in that individuals from poor communities would not engage in the poaching of commercially valuable species unless there was demand from wealthier communities. Analysis for the African Elephant Summit in December 2013 highlights the interplay of poverty, weak governance and consumer demands as the strongest factors associated with the escalation of elephant poaching (CITES Secretariat *et al.* 2013).

The case of illegal abalone harvesting in South Africa provides an excellent example of the mix of drivers and enabling factors that contribute to wildlife crime. In this case, abalone poaching has filled a socio-economic void left behind by apartheid, offering historically disadvantaged small-scale fishers a hugely profitable opportunity. The illegal trade is driven by a combination of poverty and lack of alternative livelihoods, political disenfranchisement, increasing levels of demand for high end goods as a result of economic growth in East Asia, and a resource that is easy to harvest and transport (De Greef and Raemaekers 2014).

Ivory poaching in Uganda is arguably enabled by the availability of weapons, remaining from the civil war or loaned or stolen from security officials (Kato and Okumu n.d.; Moreto 2013; New Vision 2008a), although elephants can be (and are) killed by other slower and less reliable methods such as pit fall traps and poisoning.

Conditions enabling wildlife crime in Uganda

In Uganda, the main conditions enabling wildlife crime include weak law enforcement, the existence of accessible markets (particularly for bushmeat, timber and ivory), and, to a certain extent, lack of awareness of the laws and consequences of wildlife crime (Kepo 2011; WCS and MUIENR 2008, C. Bakuneeta, pers. com.).

Law enforcement is often hampered by lack of funding, meaning that there are too few staff, who are often underpaid and lack the equipment they need to do their job, such as vehicles, fuel and arms (Mugisha 2002; Turyahabwe *et al.* 2013; UCF 2014; MoTWA n.d.; OAG 2011). With over 28,000 square kilometres of protected areas and around 1,300 rangers, Uganda has on average one ranger per 22 square kilometers, significantly fewer than the IUCN recommendation of one for every six square kilometers (MoTWA n.d.). Law enforcement is also limited in times of insecurity and war, when it can be too dangerous to patrol certain areas, or rangers are preoccupied with fighting (Mugisha 2002; Plumptre *et al.* 2014).

Some rangers and officials are aiding wildlife crime by taking bribes to allow local people to harvest resources illegally (Moreto 2013; New Vision 2007), or for people to export species for which they do not have permits (C. Bakuneeta, pers. com.). Moreto (2013) reported a number of reasons why a law enforcement ranger can be corrupt: personal (familiarity, compassion, greed), organisational (low pay, over work, poor facilitation and supervision) and contextual (encouraged by the involvement of other service personnel). The Uganda Wildlife Authority, however, claims that the weak laws and penalties related to wildlife crime are more of a problem enabling people to reoffend than the lack of rangers, equipment or patrols, or corruption within the organisation (UWA 2012b).



Children of south-west Uganda, near Bwindi Impenetrable National Park (Credit Mariel Harrison, 2013)



7

Impacts of wildlife crime on poor people and countries

International context

The impacts of wildlife crime on specific wildlife populations and on biodiversity in general are well documented (eg CITES Secretariat *et al.* 2013; Felbab-Brown 2011; Maisels *et al.* 2013). But wildlife crime has much broader impact on poor people and poor countries – both positive and negative.

When thinking about the impacts of wildlife crime on poor people, distinguishing between different types of crime is important. Illegal trade in some high value wildlife species and products – including elephant ivory, rhino horn, timber, fisheries – can be a lucrative business, forming a source of significant income for some people. One horn or tusk may be worth more than some poor people can expect to earn in years (Gettleman 2012; Serino 2015). It is worth remembering, however, that not all wildlife crime is focussed on high value commodities. Many so-called ‘crimes’ are committed by poor people struggling to meet subsistence needs. Here access to critical resources through incursions into protected areas, unauthorised hunting, fishing or fuelwood collection makes a positive contribution to their livelihoods. Roe *et al.* (2014) provide an overview of the evidence on use of natural resources by poor people and highlight the vast majority of studies which point to subsistence use as the key driver of harvesting and consumption of wildlife species - whether obtained illegally or not. TRAFFIC (2008) reminds us that wildlife crime provides different levels of economic benefit to different individuals, households and communities: a source of regular income for some, a safety net for many, a profitable business for a few.

While access to, use and sale of wildlife resources obtained illegally can provide immediate benefits to many poor people, when wildlife crime occurs at a large scale and at unsustainable levels it can have much broader and longer-term negative impacts on poor people and poor countries. Among the direct recipients of negative impacts are those individuals on the frontline of trying to prevent wildlife crime. This includes law enforcement officials and park rangers, but also local communities who are often engaged in supporting law enforcement efforts. In the Ruvuma Elephant Project in Tanzania, for example, community game guards have been shot and had their homes destroyed by fire (Jenes and Lotter 2015). Similarly, in the Andes where community management of vicuna is regularly held up as a conservation success story, local people fear armed poachers and often fail to report incidences of crime for fear of reprisals (Lichtenstein 2015).

Beyond the frontline, wildlife crime can undermine the long-term sustainability of the natural resource base on which the majority of the rural poor depend, sometimes with unexpected social consequences. Brashares *et al.* (2014) for example highlight how wildlife declines in West Africa have led to exploitative child labour practices. A decline in fish stock as a result of unsustainable harvesting has led to an increased reliance on terrestrial wildlife. They note that “cheap child labour enables hunters to extract wildlife from areas that would otherwise be too costly to harvest” (Brashares *et al.* 2014, p376). At the level of poor countries, Rosen and Smith (2010) note that the illegal wildlife trade undermines the efforts of developing nations to manage their natural resources. Wildlife can be a key asset for rural communities in Africa and elsewhere, providing a foundation for investment and economic development – for example through tourism or timber trade. Depletion of this asset as a result of poaching can undermine this foundation – limiting options for local and national sustainable development (Warchol 2004). Duffy and St John (2013) draw attention to the opportunity cost of tourism foregone as a result of illegal wildlife trafficking - not just as a result of depletion of wildlife assets but also as a result of the insecurity associated with organised wildlife trafficking. Lawson and Vines (2014) provide an overview of evidence confirming that illegal wildlife trade erodes state authority and fuels civil conflict, threatening national stability and provoking substantial economic losses.

The text of the Declaration from the London Conference on Illegal Wildlife Trade in 2014 sums up the different impacts of wildlife crime on poor people and poor countries: “The illegal wildlife trade robs States and communities of their natural capital and cultural heritage, with serious economic and social consequences. It undermines the livelihoods of natural resource dependent communities. It damages the health of the ecosystems they depend on, undermining sustainable economic development. The criminal activity and corruption associated with trafficking restricts the potential for sustainable investment and development which is needed in new economic activities and enterprises” (Anon 2014b).

Impacts of wildlife crime in Uganda

In Uganda, the evidence reviewed confirms the international patterns described above and suggests that wildlife crime has a net positive short-term impact on individuals (Figure 13a), and a net negative long-term impact on communities and Uganda as a whole (Figure 13b).

Figure 13a: Impacts of wildlife crime on individuals in Uganda



Figure 13b: Impacts of wildlife crime on communities and Uganda as a whole



Assuming they are not caught and punished, individuals who engage in wildlife crime receive the benefit of having access to the resources they need or desire, or the ability to renew their sociocultural bonds with each other and the environment. This is particularly important for the poorest of the poor, who are engaging in wildlife crime because they have no other option. Subsistence use of forest resources is reported to prevent extreme impoverishment of households around Kibale National Park, particularly during or following periods of stress or shock (Naughton-Treves *et al.* 2011). Similarly, Tumusiime *et al.* (2011) showed that resources from Rwenzori National Park had a significant impact on reducing income inequality in local communities, noting that while “forest resources may not be a reliable pathway out of poverty... [they] have a significant impact on helping to make the poor less poor.” Sale of timber was found to be a major source of income to communities adjacent to forest reserves, although this money was more likely to be captured by the relatively less poor members of society who were involved than the poorest (Tumusiime *et al.* 2011). However, it is possible that wildlife crime can be used to break the poverty cycle in the long term, for example if poorly educated people use the profits to pay for their children's education, who can then go on to gain employment (G. Mwedde, pers. obs.).

Local people can be negatively impacted by wildlife crime too. For example, Ugandan children have reportedly been encouraged to leave school by the opportunity to engage in profitable illegal activities such as pilsawing (New Vision 2009a). People involved in commercial wildlife crime are often guilty of other crimes too, such as harassment and intimidation, causing local insecurity and fear (New Vision 2013c). Rangers, some of whom are locally employed, are also put at risk by wildlife crime, for example from violent confrontations with offenders they arrest or from revenge attacks by offenders or their community (eg Baker *et al.* 2011; Moreto 2013). In 2012, a Ugandan soldier and a wildlife ranger were killed in a firefight with Sudanese poachers, crossing the border into northern Uganda (Vira and Ewing 2014).

The longer-term negative impact of wildlife crime is loss of biodiversity and environmental degradation. This is a particularly significant problem in Uganda, where up to 7.9 per cent of GDP is currently earned from tourism (MoTWA n.d.). A decline in the fauna and flora or quality of the environment may deter tourists from visiting and significantly reduce national income and development. However, we found limited documentation of the impact of wildlife crime on biodiversity. An additional literature search (Appendix 1) indicated that the majority of the evidence is for the impact of logging at Kibale National Park and Budongo Forest Reserve, where field research stations have long been established, on trees, birds and insects (eg Chapman *et al.* 2005; Struhsaker 1998). Overall, forests

appear able to recover from light logging, which can even benefit some species (eg Plumptre and Reynolds 1994), while heavy logging can prevent or reduce regeneration of trees (Kasenene and Murphy 1991) and is thought to be incompatible with primate conservation (Chapman *et al.* 2000). Conversion of wetlands and forests has been held responsible for a decline in water quality and quantity in regions of Uganda (WCS and MUIENR 2008).

The impact of poaching at the levels witnessed during the civil insecurity during the late 1970s and early 1980s was extreme and led to the nationwide extinction of the rhino and oryx, as well as severe declines in elephants, buffaloes (up to 90 per cent of each species; Habati 2012; Kato and Okumu n.d.) and other large mammals (Azakozu 2009). However, we could find only seven studies examining the impact of current levels of hunting on the target species in Uganda, only four of which found a negative impact:

- Duiker abundance was found to be lower in an area of Kibale National Park with higher hunting pressure, suggesting that poaching impacts the population size (Lwanga 2006)
- Heavy poaching of warthog in the unprotected Luwero area is thought to have led to a breakdown in social structure, although the protected populations in Queen Elizabeth, Murchison Falls, Lake Mburo and Kidepo Valley National Parks appear to be unaffected by the light poaching pressure they are likely to face (Muwanika *et al.* 2006)
- Fewer juvenile impala outside Lake Mburo National Park compared to inside suggests that the high hunting pressure outside the park might be reducing fitness (Averbeck *et al.* 2009)
- Three decades of poaching for ivory is thought to have led to a breakdown of social structure among the elephants in Queen Elizabeth National Park, based on analysis of mitochondrial DNA (Nyakaana *et al.* 2001).

The remaining three studies found no significant impact of hunting on population size:

- Hunting is thought to alter ungulate herd size and composition at Lake Mburo National Park, but due to behaviour changes (eg for improved vigilance) rather than because of population changes (Averbeck *et al.* 2012)
- Human nuisance (including poaching) was found to have no impact on bushbuck groups at Queen Elizabeth and Lake Mburo National Parks (Wronski *et al.* 2009)
- Poaching and drought have skewed the sex ratio and age structure of elephants at Kidepo Valley National Park, but not enough to impact the growth of the population (Aleper and Moe 2006).

Hunting can also negatively impact other, non-target species, for example through injury or death caused by accidental capture in snares (eg chimpanzees, Waller and Reynolds 2001; African Golden Cats, Bahaa-el-din *et al.* 2015). On the other hand, chimpanzees at Budongo Forest Reserve have been observed benefitting from snares by scavenging and eating the duiker trapped in them (Brand *et al.* 2014).



A woman and her family guarding her fields on the boundary of Bwindi Impenetrable National Park (Credit: Mariel Harrison 2013)



8

Impacts of interventions against wildlife crime on poor people

International context

It is well recognised that there is no simple solution to tackling wildlife crime (Box 3). In the context of illegal wildlife trade of high profile species, a variety of different initiatives have emerged, which can broadly be classified into three types:

- 1) Increase law enforcement and strengthen criminal justice systems
- 2) Reduce demand for illegal commodities
- 3) Engage communities in conservation and support sustainable livelihoods and local economic development.

Box 3: Solutions to tackling wildlife crime as proposed by United for Wildlife

United for Wildlife, a coalition of international conservation organisations convened by the Royal Foundation, proposed a set of five responses to wildlife crime at its launch in 2014 including:

- 1) To **strengthen site protection** on areas that contain target species with the roll out of SMART technology (Spatial Monitoring and Reporting Tool) such as satellite nodes, ground sensors, GPS trackers and drones
- 2) To **reduce the demand of illegal trade products** by working with Governments and other organisations, such as marketing experts and youth leaders, to encourage appropriate consumer messaging to those who buy rhino horn, ivory, tiger and pangolin parts and products
- 3) To **engage with the private sector** to encourage a 'zero-tolerance' approach towards the illegal wildlife trade. This may include working with businesses that may be unwittingly drawn into the trade chain
- 4) To **support the judiciary and local authorities** in their efforts to fight wildlife crime
- 5) To **support local communities** whose livelihoods are directly affected by the illegal wildlife trade.

Source: <http://www.zsl.org/conservation/news/united-for-wildlife-commits-to-tackle-the-illegal-wildlife-trade>

More broadly — beyond illegal wildlife trade — responses to wildlife crime can be categorised into three main types — disincentives, incentives and alternatives. There is no comprehensive review of evidence exploring the efficacy of these three types of responses — different types of crime and different contexts will require different combinations of the three types of responses. Neither is there a comprehensive review of the impacts of any of these interventions on poor people — or on conservation. The third strategy — the promotion of ‘alternative’ livelihoods to reduce dependence on wildlife resources — is currently the subject of an evidence review itself given the disenchantment among conservation practitioners as to its effectiveness (Roe *et al* 2014).

However, concerns have been raised about the disincentives strategy which — to date — has largely revolved around strengthened, state-led law enforcement. Duffy (2010), for example highlights how local communities can inadvertently get caught in the cross-fire as both poachers and park rangers become increasingly militarised. Efforts to combat rhino poaching in the Zambezi valley in the 1990s, for example, inadvertently targeted local people who may have been committing ‘wildlife crimes’ — collecting non-timber forest products or hunting small game — but were not involved in commercial rhino poaching (Duffy 1999). In October 2013, for example, Tanzania’s President Jakaya Kikwete ordered a military approach to enforcing a ban on elephant and rhinoceros poaching. Only a month later the campaign was stopped following heavy criticism that security forces committed rape, murder, torture and extortion of locals (Makoye 2014). A parliamentary inquiry found 13 people were murdered and thousands of livestock — the livelihood of many — were maimed or killed, leading to the resignation of four Ministers. In other cases, however, enforcement can have positive impacts on poor people. In Kenya, for example, communities are reported to appreciate the improved security that has arisen as a result of increased presence of armed wildlife guards (King and Craig 2015). Local people can also engage in law enforcement activities themselves, and secure employment as eco-guards — although there are considerable risks as well as rewards from engaging in law enforcement efforts (Wilkie and Painter in prep).

Incentive strategies build on a long history of community based natural resources management (CBNRM) and community-based conservation. These approaches are based on the simple philosophy that if local people have rights over, and can benefit from, wildlife species or other natural resources then they will have a strong incentive to conserve them and to manage them sustainably. There are examples of successful community based wildlife management schemes all over the world, but in the context of wildlife crime some of the best known are perhaps black rhinos in Namibia and vicuna in the Andes. In Namibia, a policy change in the mid-1990s, which let local people use and benefit from wildlife on their land, transformed attitudes to conservation. Under the previous State control, poaching was common. Local people got no benefits from wildlife and saw it as competition for livestock grazing. Now, communities increasingly see wildlife as a valuable asset, intensifying local social pressure against poaching. Namibia's communal conservancy programme is widely viewed as a conservation and rural development success story, with trophy hunting playing a central role (Weaver *et al* 2011). The recent spike in poaching has not bypassed Namibia but none of the poaching incidents has occurred in communal conservancies (Stuart Hill pers. com. 2015).¹ In the case of vicuna, the ability to earn income from trade in vicuna fibre has provided Andean communities with the necessary incentive to share their grazing land with this threatened camelid. Vicuña have recovered from 10,000 in 1965 to around 500,000 today (Lichtenstein 2015).

Interventions based on community engagement can generate significant benefits for poor people — in the form of employment opportunities; conservation-linked revenue (for example from tourism and hunting); performance-based payments linked to survival of key wildlife populations in specific areas; and revitalisation of traditional resource management institutions. Roe (2015) provides a compilation of case studies of different forms of community engagement, the most common of which is employment as eco-guards or intelligence providers. The summary conclusions from the 'Beyond Enforcement'² symposium in February 2015 highlight the interlinkages between effective enforcement and community engagement, noting that both are critical in tackling wildlife crime.

1. Panel discussion at the symposium 'Beyond enforcement: communities, governance, incentives and sustainable use in combating wildlife crime' held in South Africa, 26-28 February 2015

2. <http://www.iied.org/community-led-solutions-key-force-tackling-wildlife-crime>

Impacts of interventions in Uganda

In Uganda, the main types of intervention against wildlife crime employed by UWA and other organisations, are law enforcement, regulated resource access, revenue sharing (and other developmental projects), Reformed Poachers Associations (RPAs) and conservation education and sensitisation (Table 3). Development projects led by other organisations are grouped in with revenue sharing (led by UWA). This is for a number of reasons. Firstly, they use a similar pathway for achieving conservation; both are incentive based and aim to ‘decouple’ people from dependence on protected natural resources. Secondly, local people often do not know the origin of a project, and finally, very few projects are monitored or evaluated after implementation, meaning that there is limited evidence on the impact of such interventions. Despite this grouping, we do recognise that there is a wide variation of development projects and that impacts from one type might be very different to another. However, lessons learnt should be applicable to all.

Table 3: Types of intervention in place to reduce wildlife crime in Uganda

Intervention	Implementing Body	Incentive / Disincentive / Alternative	Target
Law enforcement	UWA or NFA	Disincentive	Individual
Revenue sharing	UWA (with other developmental projects by NGOs)	Incentive / Alternative	Individual (eg provision of goats; on-farm tree planting) and community (eg building new schools)
Regulated resource access	UWA	Incentive	Individual (direct) and often the community (indirect), for example a traditional medicine herbalist will usually serve his or her community
Reformed Poachers Associations	UWA	Incentive / Alternative	Individually targeted, although community might benefit from development projects in the long run (eg alternative livelihoods and improved income in the community)
Conservation education and sensitisation	UWA and NGOs	Incentive	Community

Law enforcement

Law enforcement is led by UWA's law enforcement department, with at least one warden and a number of rangers usually based at each national park or wildlife reserve. Forest reserves are under the control of the National Forest Authority (NFA) instead, with their own rangers patrolling the reserves. People arrested on suspicion of involvement in wildlife crime are sometimes given just a warning before being released, or might be charged. Not everyone who is charged is prosecuted, due to lack of evidence (UCF 2014). If prosecuted, offenders are often given the choice between a fine or imprisonment.

CARE has established a mobile alert system, allowing local people to anonymously report illegal activities in forest reserves, in an attempt to increase the proportion of offenders getting apprehended and then prosecuted (Esipisu 2014). The alerts are sent to a central database, then out to the relevant local authorities, including police and National Forest Authority rangers, allowing them to respond immediately (A. Kandole, pers. com.).

Impacts of law enforcement on people

Overall, the evidence reveals that law enforcement has a net negative impact on offenders and other community members (Table 4). While the presence of law enforcement rangers can sometimes improve local security, it can also cause more problems in local communities if rangers take advantage of their positions of power. Penalties subsequent to law enforcement are more likely to significantly impact on the livelihoods of people involved in subsistence-driven crimes, while commercially-driven offenders might be able to afford to pay the relatively low fines or bribe their way out of being charged or prosecuted. However, commercially-driven offenders can also be poor, rural people employed by town traders, or those in rebel militia outfits, who are unable to pay fines or bribes.

Impacts of law enforcement on wildlife crime

The impact of law enforcement on wildlife crime depends on the offender's perception of and attitude to risk. However, overall, law enforcement deters people who can just about afford their basic needs, but who cannot afford to pay fines or be imprisoned. People who cannot afford their basic needs or penalties have no option but to break the law and risk getting caught. Many of those involved in commercial crime can afford to pay the low fines, so are not greatly deterred; at least 29 per cent of convicts in protected areas in Uganda are reportedly habitual offenders (Habati 2012).

At Bwindi Impenetrable National Park, where there is relatively little large scale commercial activity, law enforcement and the associated fear of being fined or imprisoned was ranked by local people as the top deterrent against illegal activity in the park (Twinamatsiko *et al.* 2014). In other locations, increased law enforcement has been reported to reduce threats and conflicts (WCS and MUIENR 2008; Koojo 1998; New Vision 2010), although no solid evidence was presented to confirm these trends.

The mobile-alert system put in place by CARE has been successful in catching a number of timber trading groups (Esipisu 2014). However, due to the status of the people involved, there is often little serious response to the alerts (A. Kandole, pers. com.).

How to improve law enforcement

The evidence reviewed suggests that one way to reduce commercially-driven wildlife crime would be to increase the expected penalties (a function of both the perceived probability of receiving a penalty and the penalty itself) (CITES 2013c), as the current penalties are not a deterrent. The Uganda Wildlife Act is currently under review, in order to provide for greater and more stringent penalties (CITES 2013c). However, there is a risk that these penalties would be applied to subsistence crimes as well, having a disproportionately negative impact on the poor. There is also evidence from criminology and conservation that the perceived probability of capture is a far more effective deterrent to crime than the penalty (Leader-Williams and Milner-Gulland 1993).

Bearing this in mind, increasing the capacity of protected area managers to detect wildlife crime is likely to be a more effective approach than focussing on penalties alone. As law enforcement is impaired by a lack of staff, funding and capacity, this would entail hiring more rangers, paying them better and providing them with the equipment they need to do their jobs (Mugisha 2002; Namara 2006; OAG 2011). This might reduce the temptation for rangers to take bribes or get involved in illegal activity themselves, although corruption needs to be tackled at higher levels to eliminate an environment where bribery is acceptable.

Table 4: A summary of the available evidence for the impacts of law enforcement related to wildlife crime on local people in Uganda

Negative impacts of law enforcement on local people	Category	Positive impacts of law enforcement on local people
<p>Misbehaving rangers can cause local insecurity:</p> <ul style="list-style-type: none"> ● Rangers at Queen Elizabeth NP are reported to sometimes get drunk on duty and discharge their weapons in public (Moreto 2013) ● NFA officials at Kasokwa Central FR have been reported to harass women when they enter the forest to collect water or firewood, both of which are permitted (Watkins 2009). <p>Law enforcement can be dangerous for the rangers as well as local inhabitants. Rangers face intimidation, injury and even death from offenders they have reported or the communities they come from:</p> <ul style="list-style-type: none"> ● In the period following gazettement of Bwindi Impenetrable NP, local chiefs attacked rangers to free offenders of commercial (but not subsistence) crimes (Baker <i>et al.</i> 2011) ● NFA rangers, some employed from local villages, have been murdered by loggers (New Vision 2009b) 	Security	<p>Presence of law enforcement rangers can improve local security, by deterring or dealing with other types of illegal activity:</p> <ul style="list-style-type: none"> ● Rangers at Bwindi Impenetrable NP provide security against rebels from the Democratic Republic of Congo (Tumusiime and Sjaastad 2014)
<p>Local people who report members of their community to the authorities face social exclusion and can become a target for abuse (Moreto 2013; Namara 2006).</p> <p>People who are caught and punished might be socially ostracised:</p> <ul style="list-style-type: none"> ● At Bwindi Impenetrable NP, local informal institutions known as stretcher groups report that members who commit serious crimes in the park would be fined and sometimes expelled from the group, resulting in loss of a social and economic support network (Harrison 2013) 	Social	<p>Arrest could strengthen sociocultural bonds:</p> <ul style="list-style-type: none"> ● An arrested hunter might be supported by the group of people with whom he had shared bushmeat (A. Mugisha, pers. com.)

Negative impacts of law enforcement on local people	Category	Positive impacts of law enforcement on local people
<p>Convicted offenders are currently fined between 100,000 and 1 million Ugandan shillings, or three to 18 months imprisonment (Habati 2012):</p> <ul style="list-style-type: none"> ● Penalties have little or no impact on commercially-driven offenders, for whom the profits of wildlife crime are greater than the potential penalties, and who often bribe officials so that they do not get charged at all (Habati 2012; C. Bakuneeta, A. Lemieux pers. com.) ● People involved in subsistence-driven wildlife crime cannot afford to pay fines without selling property or land (Harrison 2013) ● People who cannot afford fines are imprisoned, which negatively impacts household productivity (A. Lemieux pers. com.) 	Wealth	
<p>Law enforcement often leads to poor relationships between park authorities and local people, because authorities are considered insensitive to community needs (T. Okello pers. com.)</p> <ul style="list-style-type: none"> ● Law enforcement undermines positive attitudes from community benefits at Lake Mburo NP (Infield and Namara 2009) 	Attitudes and relationships	

Employing local people as law enforcement rangers might increase local support for conservation and compliance with rules and regulations, as well as increase local income (Moreto 2013; Harrison 2013). However, local rangers might be more sympathetic to their community's needs or not want to report family or friends, and allow illegal activities to continue. One solution to this would be to employ local people from one park at another park, for example people from Bwindi Impenetrable National Park at Queen Elizabeth National Park (A. Barirega pers. com.).

Revenue sharing and development projects

Integrated Conservation and Development (ICD) projects are implemented across Uganda by very many different organisations. UWA funds such projects through tourism and sport hunting revenue sharing (Box 4). Not all ICD projects are specifically aimed at directly reducing wildlife crime. However, as successful conservation implies the absence of wildlife crime, ICD projects are included in this section as one type of intervention against wildlife crime, despite often working indirectly.

Examples of ICD projects implemented in Uganda, both as part of revenue sharing and otherwise, include provision of schools, health centres and roads; provision of protected water sources; support for livestock rearing; human-wildlife conflict mitigation (eg digging elephant trenches); tree planting; income improvement schemes (eg tea and coffee growing), agricultural support (eg providing potato seedlings), and village savings and loans associations (VSLAs).

Box 4: Background of revenue sharing in Uganda

Since 2000, 20 per cent of park entrance fees paid by tourists to Uganda have been shared with communities in parishes (administration areas within districts) bordering protected areas (known as frontline communities) (UWA 2012a). At Bwindi and Mgahinga NPs, an additional \$5 from the permit fee (currently \$600 for foreign tourists) people pay to track gorillas is shared with local people in what is known as the 'gorilla levy' (UWA 2012a), because tourists to the parks are limited to eight people per habituated group of gorillas per day, and the majority of their revenue comes from the permits and not the entrance fees. At Lake Mburo NP and some WRs, revenue from sport hunting is also shared with local people (Lamprey and Mugisha 2009).

According to the most recent revenue sharing guidelines (UWA 2012a), the overall goal of revenue sharing is *"to ensure strong partnership between protected area management, local communities and local governments leading to sustainable management of resources in and around protected areas by enabling people living adjacent to protected areas to obtain financial benefits derived from the existence of these areas that contribute to improvements in their welfare and help gain their support for protected areas conservation."*

UWA also states the following specific objectives:

- a) To provide an enabling environment for establishing good relations between the protected areas and their neighbouring local communities
- b) To demonstrate the economic value of protected areas and conservation in general to communities neighbouring protected areas
- c) To strengthen the support and acceptance for protected areas and conservation activities from communities living adjacent to these areas.

While reducing wildlife crime and alleviating poverty do not appear explicitly in the objectives, the overall goal is that revenue sharing will lead to sustainable management of natural resources, implying that wildlife crime no longer occurs. Additionally, the guidelines for projects monitoring and evaluation state that a meeting must be held with the local community before any project commences to determine:

- the current status of illegal activities in the PA attributed to individuals and households in the Frontline LC1,
- the current levels of poaching and technologies used in poaching,
- the current levels of crop raiding and/or damage due to crop raiding,
- poverty levels among individuals and households in the frontline LC1, and
- PA related knowledge, attitudes and practices among individuals and households in the frontline LC1.

Another meeting should then be held at the end of the project to assess, among other things “*community benefits*” and “*the contribution of the project to ... conservation of PA resources/reduction in illegal activities in the PA.*”

There is a suggestion that revenue sharing should contribute towards poverty alleviation in the monitoring of ‘*community benefits*’, and the funding criteria. Projects proposed by frontline communities are selected for funding depending on how well they fit the criteria of *i) contribution to reduction of human-wildlife conflict* and *ii) contribution to improvement of livelihoods of households in frontline LC1s* (villages).

The organisations implementing ICD projects across Uganda are too numerous to list, but include a combination of conservation and development NGOs, such as the Bwindi Mgahinga Conservation Trust (BMCT, Box 5), International Gorilla Conservation Programme (IGCP), CARE-DTC (Development Through Conservation), Conservation Through Public Health (CTPH), Uganda Conservation Foundation (UCF) and many more (Smith 2012).

Impact of revenue sharing on local people

Considering the amount of money invested and the number of projects funded, there are very few studies of the impacts of revenue sharing on either people or conservation. A specific Web of Knowledge search for [Uganda AND “revenue sharing”] yielded only 13 results, one of which was not relevant and two of which were duplicates. All studies had been conducted at Bwindi, Mgahinga or Kibale National Parks.

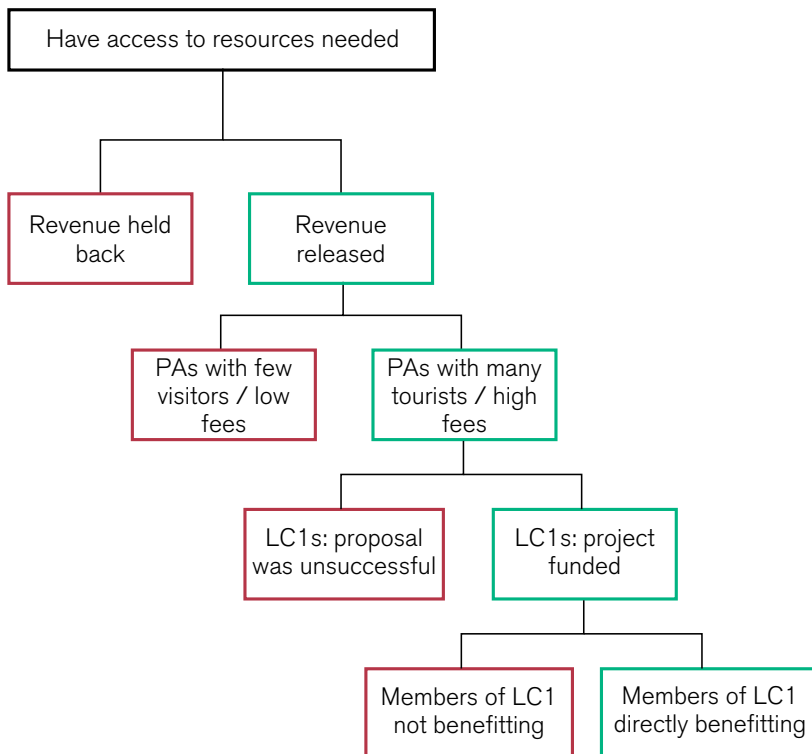
Overall, the evidence suggests that although revenue sharing has the potential to positively influence many people’s lives, in terms of both wealth and relationships with protected area authorities, the process is often hampered by corruption and inequity, leading to worsening economic inequality and resentment (Table 5).

Table 5: A summary of the evidence available for the positive and negative impacts of revenue sharing on local people

Positive impacts of revenue sharing on people	Negative impacts of revenue sharing on people
Villages around Kibale NP receive up to \$457 per year (MacKenzie 2012a) But some villages get nothing (MacKenzie 2012a)
At Bwindi Impenetrable NP, 82 per cent of respondents said they were benefitting as a result of revenue sharing (Blomley <i>et al.</i> 2010) But it was more likely to benefit relatively wealthy people (Blomley <i>et al.</i> 2010)
The average annual benefit from revenue sharing at Bwindi Impenetrable NP is \$12 per household per year (1.2 per cent of the average household income) (Tumusiime 2012). The schools, hospitals and roads are beneficial to those who use them (Sandbrook and Adams 2012) But the effect is reduced by institutional problems and nepotism (Sandbrook and Adams 2012; Tumusiime 2012). Local people report that those responsible for distributing revenue use it for their own benefit instead (Tumusiime and Vedeld 2012). This could be partly because local elites know how to access the funds and can take advantage over the majority (Ahebwa 2012)
Funding of school classrooms was popular at Mgahinga NP in the first years of revenue sharing (Adams and Infield n.d.) But at other PAs, local people complain that a school is worthless if their children cannot attend because they are guarding the families crops against wild animals from the Park (Bwindi Impenetrable NP: Archabald and Naughton-Treves 2001; Queen Elizabeth NP: Manyindo and Makumbi 2005)
At Kibale NP, money is invested in schools, council facilities, health clinics, crop raiding defences and income generation projects. Villagers benefit in particular from projects dealing with crop raiding (MacKenzie 2012b) But local people at Queen Elizabeth NP claim that when they submitted a proposal for a crop raiding mitigation project, they were given a school instead which their children could not attend (Manyindo and Makumbi 2005)
Projects are appreciated by communities. For example, road built around Bwindi Impenetrable NP opened up access to town councils and markets for agricultural produce (Ahebwa 2012) But revenue sharing remains inadequate compensation for the costs of conservation at Bwindi Impenetrable NP (Ahebwa 2012) and Queen Elizabeth NP (Manyindo and Makumbi 2005)
In the early years, revenue sharing improved the attitudes of local people towards PAs (Archabald and Naughton-Treves 2001; Blomley <i>et al.</i> 2010), through friendlier relations between the parks and people, and greater participation by local people in park meetings and projects But more recent research at Bwindi Impenetrable NP showed that the frustration at continuing corruption in the revenue sharing process and resulting inequity caused strong resentment towards the park (Twinamatsiko <i>et al.</i> 2014)

As indicated by the evidence in Table 5 and illustrated in Figure 14, the benefits of revenue sharing are not equally shared between all 600,000 people living in parishes bordering Uganda's protected areas (Kaggwa *et al.* 2009). First, there is often a delay in sharing revenue; in 2009, it was reported that only \$896,000 of the \$1.7 million available for disbursement between 2000 and 2009 had yet been released (Kaggwa *et al.* 2009). Second, protected areas with more visitors and charging higher entrance fees generate more revenue, and therefore communities neighbouring those parks receive more than communities at protected areas off the standard tourist trail. Third, not all communities around protected areas benefit from projects funded by revenue sharing; LC1s (villages) must propose projects, not all of which can be funded. Finally, even within LC1s receiving revenue, there are people who sometimes do not benefit. For example, revenue at Bwindi Impenetrable National Park has been shared as goats in recent years, but many people complain that the goats go to people who already own livestock, and that the poorest people living closest to the park boundary and suffering crop raiding do not get any (Harrison 2013).

Figure 14: Illustration of the uneven distribution of revenue to households, communities and protected areas in Uganda. A green box indicates that more / any revenue is shared, while a red box indicates that less or no revenue is shared



There is also limited evidence available on the impact of other ICD projects implemented around Uganda's protected areas. For example, the Mount Elgon Regional Ecosystem Conservation Programme (MERECP) is suggested to have improved household incomes through the use of a Community Revolving Fund (Anon 2012). A community development project at Kibale National Park (KSCDP, Kibale and Semliki Conservation and Development Programme) in which local people have been given assistance to build beehives was reported to have generated good income through the sale of honey (Kabagumya 2001), although we could find no more recent updates.

Some projects, such as CARE-DTC's agricultural support programme and BMCT's educational support programmes are considered to be reducing income inequality by specifically benefitting people who have suffered from crop raiding and are therefore poorer (Tumusiime and Sjaastad 2014). However, other projects, including most revenue sharing projects, are reported to worsen economic inequality through elite capture, making the poor relatively poorer and the relatively wealthy better off (WCS and MUIENR 2008; Tumusiime and Sjaastad 2014; Twinamatsiko *et al.* 2014).

Box 5: History and impact of Bwindi Mgahinga Conservation Trust (BMCT)

BMCT was established in 1997 with the long-term objective of "designing and engaging in projects that have a positive impact on local people's wellbeing yet provide a conservation return on investment". They engage in research and park support, common goods projects, livelihood development, and improving attitudes towards conservation.

An impact assessment conducted in 2013 found that common goods projects impacted many people and were generally seen by stakeholders as successful in contributing to wellbeing. However, it was unclear the extent to which the poorest people were able to take advantage of the schools, hospitals and other infrastructure developments funded.

Livelihoods projects reach fewer people and do not appear to have major impacts at the household level, but are popular with local people, despite 65 per cent of Batwa respondents claiming that the projects had failed for one reason or another.

Conservation projects such as tree planting have been extremely successful, by providing an alternative source of firewood and increasing household incomes, as well as conserving village lands against erosion.

It was not possible to evaluate the impact of BMCT's activities on conservation, as there were insufficient records of conservation status or levels of illegal activities. However, it was noted that livelihood projects can have conservation benefits if the participants live close to the park and use their additional income to avoid illegal use, but relatively few people can benefit from the projects, and even fewer of those live near the park.

Source: Wieland M and Bitariho R (2013)

Impact of revenue sharing on wildlife crime

There is similarly scarce evidence for the impact of revenue sharing projects on wildlife crime as there is for their impact on people. It appears that revenue sharing has the potential to improve wellbeing and attitudes towards conservation, and consequently to reduce wildlife crime. However, there is also evidence to suggest that the inequity of the revenue sharing process can motivate local people to engage in further wildlife crime.

The evidence for revenue sharing reducing wildlife crime is as follows:

- Communities around Bwindi Impenetrable National Park ranked benefits from revenue sharing projects among reasons that they did not engage in illegal activities in the park (Harrison 2013).
- There were fewer signs of illegal activity in areas of Kibale National Park where people affected by crop raiding had benefited from revenue sharing. There were also no signs of poaching found in areas of the park adjacent to where elephant trenches had been built, although it was suggested that this could be because the trenches were a barrier to people as well as elephants (MacKenzie 2012b).
- Manyindo and Makumbi (2005) claimed that “UWA has seen a reduction in illegal activities emanating from adjacent communities” since revenue had been shared at Queen Elizabeth National Park, although no data were presented to confirm the statement.
- At Bwindi Impenetrable National Park, leaders of a community benefitting from revenue sharing helped to apprehend gorilla poachers (Archabald and Naughton-Treves 2001).
- Revenue sharing improved attitudes towards Bwindi Impenetrable National Park, which may indirectly contribute to increased co-operation and a reduction in illegal activities, although there was no evidence for such a reduction (Blomley *et al.* 2010).

The evidence for revenue sharing having no impact on wildlife crime, or even motivating further crime, is as follows:

- A bioeconomic analysis of revenue sharing at Bwindi and Mgahinga National Parks found that revenue sharing had suboptimal outcomes for gorilla conservation, and suggested that “local communities will engage in poaching as long as the returns from such activities exceed the returns from alternative activities” (Mukanjari *et al.* 2013).
- The decision to engage in illegal activities is made at the individual or household level, yet households around Kibale National Park reportedly perceived very low household level benefits which were outweighed by the costs of living close to the park, which suggested that revenue sharing may be insufficient to change people's behaviours (MacKenzie 2012b).
- Manyindo and Makumbi (2005) report that, despite seeing an overall reduction in illegal activities as suggested above, some people around Queen Elizabeth National Park continue to engage in illegal activities, having realised that revenue sharing funds are minimal compared to the persisting costs of living near to the park.
- Despite ranking revenue sharing among deterrents against illegal activity, those who perceived that they had not benefitted from revenue sharing listed the inequity of the process among drivers of wildlife crime around Bwindi Impenetrable National Park. For example, one focus group participant stated that *“People are angered by the revenue sharing of giving goats. Those who are benefitting by receiving goats are those who are not living near the Park. People near the Park (like us) are denied goats, so we are angry and go to the Park and poach”* (Twinamatsiko *et al.* 2014).

How to improve revenue sharing

A number of people have suggested how revenue sharing could be improved, based on the results of their studies into the process; firstly, the benefits of revenue sharing should be shared more equitably. Mukanjari *et al.* (2013) notes that revenue should be shared with “all members of local communities, to avoid some reaping benefits while others still have an incentive to poach.” In reality, however, this would result in a very small benefit per person. MacKenzie (2012a), therefore, suggests that revenue sharing should be focussed close to the park boundary and away from areas where there is high park-related employment, so that benefits are more evenly distributed.

These inequities can be addressed by increasing communication with local people and tackling corruption, claims Ahebwa (2012), which leads to the second main suggestion; the institutions responsible for revenue sharing need to be strengthened to improve accountability and transparency (Archabald and Naughton-Treves 2001; MacKenzie 2012b; Tumusiime and Vedeld 2012). The strengthened institutions should involve local people at every stage of decision-making and project implementation, and find new ways to engage marginalised members of society (Shirkhorshidi 2013).

Finally, revenue sharing projects should focus on crop raiding mitigation (MacKenzie 2012b), since local attitudes towards the park (and the assumed subsequent behaviour) seems to be shaped by loss aversion rather than provision of benefits (MacKenzie 2012a).

Fortunately, these are all issues that UWA has addressed in the most recent revision of the revenue sharing guidelines, which aims to give project proposal power to communities at the village level in parishes bordering protected areas, and targets projects towards human-wildlife conflict mitigation and improved livelihoods (see Box 4, UWA 2012). However, the changes are yet to be seen on the ground, and there are not yet monitoring and evaluation reports available for the first projects implemented under the new guidelines.

Regulated resource access

Regulated resource access has a variety of different names in Uganda; the Multiple Use Programme (MUP) at Bwindi Impenetrable National Park, Collaborative Resource Management (CRM) at other parks and Collaborative Forest Management (CFM) at forest reserves. However, they all mean the same thing; locally elected people are given permits allowing them to harvest monitored quantities of certain resources from specified areas of the protected area, sometimes during limited time periods.

Local people are permitted to harvest resources according to a Memorandum of Understanding (MoU) with community groups. Some MoUs specify that resources may not be used to generate income, in case demand increases, encouraging illegal and unsustainable use. For example, an MoU with Kiyanga resource use committee in Bushenyi district (neighbouring Queen Elizabeth National Park) states that “all herbal medicine collected will be for home consumption and not for sale. Failure to comply will lead to suspension of the MoU” (UWA and NFA 2009). The same clause applies to the collection of dead firewood by Kayanja resource users (UWA 2002). On the other hand, other MoUs make no reference to commercial use being prohibited, and suggest that income generation might be part of the aim. For example, one of the objectives of an MoU allowing women to harvest papyrus at Queen Elizabeth National Park is “to improve community livelihoods, food security and promote economic development” (UWA 2009).

Another clause of the MoUs is that resource users are responsible for monitoring the illegal harvesting of park resources and other illegal activities within the park, and must report them to the resource user committee and protected area management (UWA 2009).

Impacts of regulated resource access on local people

The obvious way in which local people benefit from resource sharing is through access to resources, meaning they can meet subsistence needs despite this access offering little or no opportunity for income. For example, access to tree seeds and seedlings at Budongo Forest Reserve provides households with a renewable source of firewood and timber for the future (Turyahabwe *et al.* 2013), while allowing firewood collection from Murchison Falls National Park significantly improved the lives of women in particular, who no longer had to travel so far to collect it (Anon 2006). Permission to collect medicinal plants at Bwindi Impenetrable National Park gives people access to traditional healthcare which they otherwise would not be able to use, as many of the plants do not grow outside the forest, sustaining sociocultural bonds with the forest and traditional knowledge (Harrison 2013). Honey from beehives in the forest is valued higher than from agricultural land at Bwindi and Kibale National Parks, because the bees have access to a wider range of wild flowers and medicinal plants (MacKenzie *et al.* 2011; Harrison 2013).

Resource sharing can improve economic wealth as well as resource wealth. People permitted to fish in Kibale National Park reported significant improvements in household income since the start of the programme, and gross income twice that of the control group. In addition, these households tended to be members of the Bakonjo tribe, who typically have low income levels, therefore the resource sharing programme was specifically improving the livelihoods of the poorest people (Solomon 2007).

It is unclear to what extent regulated resource access programmes target the very poorest households who rely on the resources within protected areas. In one study, members of the MUP at Bwindi Impenetrable National Park were found to be households more likely to have suffered from crop raiding (Tumusiime and Sjaastad 2014), indicating that the poorest households were benefitting. However, another study found that authorised resource users (ARUs) were significantly wealthier than other members of society (Shirkhorshidi 2013), suggesting that provision of permits might be affected by elite capture. At Budongo Forest Reserve, there have been reports that benefits from resource access have not been shared equitably around the community (Turyahabwe *et al.* 2013).

Resource sharing is widely acknowledged to have had a positive impact on local people's attitudes towards the park and the park-people relationship (Chhetri *et al.* 2003; Moreto 2013). This is attributed in part to the highly participatory process in which it was developed with CARE-DTC at Bwindi Impenetrable National Park, which gave people a sense of ownership over the park (Blomley and Namara 2003), but also through allowing people to continue their cultural traditions, harvesting practices and have some input into park management.

Impact of regulated resource access on wildlife crime

Despite MoUs giving the responsibility of reporting illegal activities to protected area authorities, there is evidence both for resource sharing agreements reducing levels of wildlife crime and for them having no discernable influence. The evidence for resource sharing reducing wildlife crime is as follows:

- Signs of wildlife crime were lower in CFM areas of Budongo FR (Turyahabwe *et al.* 2013)
- Illegal timber harvesting was lower near villages with beekeeping associations around Kibale National Park, as beekeepers prevented logging in case they get the blame (MacKenzie *et al.* 2011)
- Communities with people permitted to fish in Kibale National Park were more likely to put out fires and collect snares (although fishers themselves were no more or less likely to admit to placing snares in the forest) (Solomon 2007)

- Local people and resource users at Kibale National Park were reported to remove snares, arrest offenders and report illegal activities to authorities (Chhetri *et al.* 2003)
- Beekeepers at Bwindi Impenetrable National Park helped to extinguish fires in the forest (Namara 2006)
- The MUP at Bwindi Impenetrable National Park “reduces the number of people involved in illegal activity” (although no evidence was presented to confirm this statement) (Collins 2001).

The cases in which no evidence could be found for regulated resource access programmes reducing wildlife crime are:

- Signs of illegal activity were found both within and outside Multiple Use Zones (MUZs) at Bwindi Impenetrable National Park (Olupot, Barigyira and Chapman 2009)
- At Bwindi Impenetrable National Park again, no change in illegal activities was noticeable overall (Blomley *et al.* 2010; Namara 2006), and illegal food collection still occurred within MUZs (Collins 2001)
- At Kibale National Park, two resource sharing agreements were cancelled when members were found to be conducting illegal activities at the same time (MacKenzie *et al.* 2011).

How to improve regulated resource access programmes

When regulated resource access is offered as an alternative to profitable illegal activities such as timber, as occurred at Budongo Forest Reserve, the evidence suggests a need to be careful to ensure that household incomes do not decline; members of Budongo Forest Reserve’s programme were dissatisfied that beekeeping did not generate as much income as timber, indicating that the programme might not be a sustainable solution to wildlife crime (Turyahabwe *et al.* 2013).

The impact of resource sharing could be improved by permitting people to access more resources in less limited areas over a greater time period, although this would require further research into what levels of harvesting are sustainable (A. Namara, pers. com.). One resource that this approach would be particularly relevant for is bushmeat, which is one of the most important resources to local people both culturally and in terms of subsistence needs. As far as we can tell, there has been no relevant research conducted into the sustainability of bushmeat hunting at a subsistence level in Uganda, using species-specific hunting methods to avoid by-catch.

Reformed Poachers Associations

Reformed Poacher's Associations (RPAs) are groups established by UWA following periods of intensive sensitisation and a poaching equipment amnesty (Kato and Okumu n.d.). Poachers are often tempted to join the group by the promise or expectation of subsequent benefits such as alternative livelihoods, but these do not always materialise (Harrison 2013). There are groups in Queen Elizabeth, Murchison Falls, Rwenzori Mountains and Bwindi Impenetrable National Parks (Olupot, McNeilage, *et al.* 2009; Harrison 2013).

Impacts of Reformed Poacher's Associations on local people

The impact of the associations on the reformed poachers is variable. At Queen Elizabeth National Park, ex-poachers are sometimes employed as casual labourers or patrol guides, which provides income (Moreto 2013). At Rwenzori Mountains National Park, an Arabica coffee enterprise was targeted at ex-poachers and succeeded in increasing household incomes (WCS and MUIENR 2008). More than 1,800 poachers surrendered their hunting equipment at Murchison Falls National Park between 2005 and 2007, in return for \$35,000 and training in alternative livelihoods, including goat rearing (Kato and Okumu n.d.). One of the three groups at Bwindi Impenetrable National Park have been given money for projects but do not seem to have done much with it, and another group has raised funds independently and are working on a fish pond project. The third group has received nothing at all, and not even any communication from UWA since surrendering their hunting equipment, and are feeling disillusioned (Harrison 2013). Some members reported being taunted by other hunters in their community who did not join the group, boasting about how the remaining hunters had meat but the ex-poachers had nothing (Harrison 2013).

In 2014, the New Vision newspaper reported a story of how members of an RPA at Murchison Falls National Park had been recruited by corrupted law enforcement rangers to poach elephants, buffalo and antelopes for them to sell for meat in Kampala in 2012. The ex-poachers had then been asked to transport ivory towards South Sudan in 2013. They apparently refused when they discovered that they would have to meet up with the Lord's Resistance Army, but were murdered by a UWA ranger to prevent them exposing the story. The men have never been found (New Vision 2014b). The Uganda Wildlife Authority later issued a response to this report, expressing its "discontent and disappointment against the authors of this false, malicious, defamatory and misleading article and information" (UWA 2014). They did, however, acknowledge that it was a matter currently under investigation in the courts, and declined to comment on the details.

Impacts of Reformed Poachers Associations on wildlife crime

There is limited evidence for RPAs reducing wildlife crime. In theory, ex-poachers can act as informants to reduce future poaching, and influence the rest of their families and communities to leave poaching (Moreto 2013), but there is no evidence to suggest that this occurs. Coffee growing around Rwenzori Mountains National Park was reported to have “appeared to have successfully reduced wildlife crime” (WCS and MUIENR 2008), although again there is no hard evidence linking the two. Kato and Okumu (n.d.) state that there was a “significant decline in illegal activities” between 2004 and 2007, based on the number of arrests made in Murchison Falls Conservation Area during that time which fell from 289 to 167 per annum. However, the MIST data for Murchison Falls National Park shows that although the number of snares found in the Park did drop significantly in 2005 (from 210 in 2004 to 74), they rapidly increased again to 216 in 2007, and then to 709 in 2008 and have been rising ever since (Harrison *et al.* in prep.). It should also be noted that this number of snares collected by rangers is dependent on patrol effort and snare detectability, and is therefore not a reliable indicator of true levels of poaching.

Conservation education and sensitisation

Conservation education, commonly referred to as sensitisation in Uganda, is run by UWA and NGOs both in communities surrounding protected areas and across the rest of the country. The aim is to reduce demand for wildlife products and increase support for conservation among consumers and traders. UWA's Community Conservation rangers run sensitisation projects around protected areas, holding meetings with local communities. Conservation education in this way usually leads to improved relations between authorities and local communities (Twinamatsiko *et al.* 2014; Moreto 2013), if only because local people perceive the authorities to be acknowledging their presence. However, sensitisation should be combined with ‘tangible alternatives for community members’ (Moreto 2013) if it is to be successful in the long term. Sensitisation was ranked as the second most important reason that people did not engage in wildlife crime at Bwindi Impenetrable National Park by community groups, after law enforcement (Harrison 2013).

At a national scale, the Uganda Wildlife Education Centre raises awareness of conservation issues among the general public, tourists and school students. WWF has also run a nationwide awareness raising campaign about the ivory trade in collaboration with UWA, using radio adverts to reach a wide audience (E. Oketcho, pers. com.).



Mother and baby elephants at Queen Elizabeth National Park (Credit: Tiziana Zoccheddu 2010)



9

Case studies

In this section we present case studies of the five types of wildlife crime for which we found the most evidence; bushmeat hunting, ivory poaching, firewood collection, timber felling and medicinal plant harvest. These also appear to be some of the most widespread wildlife crimes (Figure 6), as well as offering a contrast of resources (animal and plant) and motivations (subsistence and commercial). The case studies illustrate that the drivers and impacts of different types of wildlife crime are highly variable, although there are some cross-cutting themes and issues. A summary of profiles and motivations of offenders for each type of wildlife crime and the impacts the crime has on local people and the environment are shown in Table 6. A summary of the impacts of interventions against each type of wildlife crime is shown in Table 7. For a deeper insight into the drivers and impacts of each case study and the references underlying the summary tables, please see Appendices 3 to 7.

Table 6: Profiles and motivations of offenders for each type of wildlife crime and the impacts the crime has on local people and the environment

	Bushmeat	Ivory	Firewood	Timber	Medicinal plants
Who is involved?	Generally, people who live close to the PA, suffer from crop raiding, and have less education. Hunter households might be wealthier or poorer, or larger or smaller than others	Ivory traders tend to be wealthy Ugandans or foreign. The actual poachers are often people living near to PAs, likely to be involved in other types of wildlife crime so know the area, but also includes military units, rebel gangs and organised criminals	Firewood collectors tend to be very poor and live close to the PA	Two types: 1) people who are very poor and pitsaw to sell timber to meet basic needs and 2) less poor members of the local elite	No evidence
What are the drivers?	1) Subsistence (lack of meat or money to buy it) 2) Commercial (make money beyond basic needs, often because alternative sources of income are limited or undesirable) 3) Cultural traditions 4) Perceived injustice at protected area conservation	Foreign demand combined with lack of money in areas surrounding PAs	Subsistence (lack of alternative fuel sources)	1) Subsistence (lack of alternative sources of income to meet basic needs) 2) Commercial (high profitability of timber and lack of enforcement) 3) Trust traditional medicine over modern	1) Economic poverty (cannot afford modern healthcare) 2) Live too far from modern health centres 3) Trust traditional medicine over modern
What are the enabling conditions?	Available market and insufficient enforcement (too few patrols, corruption, low penalties)	Insufficient enforcement (corruption and low penalties), availability of weapons	Lack of enforcement	Profitable market and insufficient enforcement (weak laws, lack of staff or funding)	No evidence
What are the impacts of the crime on people?	Positive: Have food, money and renewed sociocultural bonds Negative: Potential disease transmission, long-term loss of wildlife reduces tourism appeal and revenue	Negative: Hired poachers might be killed if they do not complete the job	Positive: Provides fuel for cooking and heating Negative: Women sometimes harassed while collecting	Negative: Loss of revenue to country, creates local insecurity, sometimes involves child labour	Positive: Provides access to healthcare
What are the impacts of the crime on the environment?	No evidence for current levels, but historically caused population declines	No evidence for current levels, but historically caused severe population declines	Little evidence, but a study at Bwindi found that non-timber forest products was not at unsustainable levels	Decline in water quality and quantity, negative impacts on duiker and primate populations	Harvest can be sustainable (as shown in multiple use programmes)

Table 7: Evidence of impacts of interventions against bushmeat hunting, ivory poaching, firewood collection, timber felling and medicinal plant harvest on people and the environment

	Bushmeat	Ivory	Firewood	Timber	Medicinal plants
Impact of law enforcement on people	Likely to have a negative impact on people hunting for subsistence, but little or no impact on commercially-driven hunters who can afford the penalties	Very little or no impact on ivory traders who can afford to pay fines or bribes to escape conviction. No evidence for impact on ivory poachers	Strong negative impact on people who are fined or imprisoned	Limited impact, as loggers are often wealthy enough to pay fines or bribe their way out of conviction	No evidence
Impact of law enforcement on crime	Does not always deter; 29 per cent are reportedly habitual offenders. At Bwindi Impenetrable NP, law enforcement was ranked as the top deterrent against illegal activity (mostly poaching)	Little evidence that the legal system is an effective deterrent as the penalties are too small, and most escape without conviction	No evidence	Limited impact on commercial logging, due to small penalties and corruption	No evidence
Impact of revenue sharing on crime	Receiving benefits from revenue sharing can deter people from poaching, but resentment at the perceived inequity of revenue sharing can drive people to hunt. No signs of poaching were found in areas of Kibale NP adjacent to elephant trenches dug with tourism revenue	Limited evidence, but likely to have little or no impact on ivory poaching, as the potential benefits are incomparable to the potential money wealth from ivory. However, key informants suggested that people who have benefitted from revenue sharing might report ivory poachers	No evidence	No evidence	No evidence
Impact of regulated resource access on crime	Variable evidence. Snares found both in and out of access areas. At Kibale NP, ARUs report offenders and remove snares. At Bwindi Impenetrable NP, research found that bushmeat hunters were highly unlikely to be ARUs	Limited evidence, but likely to have little or no impact on ivory poaching; the potential benefits from resource access are no match for the potential wealth from ivory	Regulated resource access makes firewood collection no longer a crime. Access to non-firewood resources sometimes reduces illegal firewood collection	At Budongo FR, permitting beekeeping reduced illegal logging for a while, but honey was not as profitable as timber so was unsustainable. At Kibale NP, beekeepers report illegal loggers	Regulated access to medicinal plants makes it legal to harvest. No evidence for access to other resources impacting illegal medicinal plant harvest



Kidepo Valley National Park (Credit: Henry Travers 2010)

10

Conclusions and recommendations

The aim of this review was to collate and examine the evidence for links between wildlife crime and poverty in Uganda. In particular, we sought to answer the questions

- 1) To what extent does poverty drive wildlife crime?**
- 2) What impact does wildlife crime have on poor people?**
- 3) What impacts do interventions against wildlife crime have on poor people?**



Our ability fully to answer these questions is hampered by the availability of evidence. We searched for evidence in peer-reviewed and grey literature, including MSc and PhD theses, published and unpublished reports and media articles, and complemented this evidence with interviews with key informants, including the Uganda Wildlife Authority's Conservation Area Managers. Despite our wide-ranging search, the majority of our sources were relevant to only five protected areas: Kibale National Park (24 sources), Queen Elizabeth National Park (23), Bwindi Impenetrable National Park (18), Murchison Falls National Park (17) and Budongo Forest Reserve (12). There was a particular lack of evidence relating to Kidepo and Semuliki National Parks, all the Wildlife Reserves, and the majority of the Forest Reserves. In addition, of all the evidence we reviewed, only 11 studies attempted to quantify poverty in any way³, although most of these used multidimensional poverty measures of sorts. Considering the complexity of poverty, the studies tended to limit themselves to measuring the economic capabilities of households, when perceptions of well-being, vulnerability and security are also very important. There appears to have been very little monitoring or evaluation of any kinds of intervention against wildlife crime, so the impacts of interventions on poor people were particularly difficult to assess.

Despite a bias towards only a few protected areas and a general scarcity of data, we arrived at the following conclusions.

What are the main drivers of wildlife crime in Uganda?

This is the question for which we found the most evidence, particularly related to drivers of bushmeat hunting. Evidence was generally qualitative and the result of interviews with people living around protected areas, although we found a small number of studies that had attempted quantitatively to determine the aspects of a person's livelihood or wellbeing that drove them to hunt (see Table A3, Appendix 3).

The evidence suggests that wildlife crime in Uganda is driven by subsistence need, desire for commercial gain, cultural traditions, perceived injustice in the distribution of costs and benefits of conservation, and by politics. Based on the evidence, we estimate that there are more people involved in wildlife crime for subsistence and cultural purposes than for other types of crime although this could be due to reporting bias and not a true reflection of the different types of crime occurring.

3. Blomley *et al.* 2010; MacKenzie and Ahabyona 2012; MacKenzie and Hartter 2013; Nkonya *et al.* 2008; Olupot *et al.* 2009; Plumptre *et al.* 2004; Solomon 2007; Tumusiime *et al.* 2010; Tumusiime *et al.* 2011; Twinamatsiko *et al.* 2014

Subsistence crime seems to be conducted by the poorest members of society, ie those who lack basic necessities and the means to access them, and especially in times of stress and shock, such as drought, conflict or events such as crop damage or livestock loss. The impact of these events is felt particularly hard in areas of high population density, because there are scarce and limited resources for people to turn to. In these challenging periods, more people are dependent on resources in protected areas to meet their basic needs.

To what extent does poverty drive wildlife crime?

Our conclusions in this section are limited by the lack of consideration given to multidimensional poverty in the evidence. Very few studies refer specifically to different aspects of poverty as drivers of wildlife crime, meaning that we have had to infer the relevant category.

The OECD definition gives five components of poverty; economic, human, political, sociocultural and protective capabilities. We found evidence for each of these aspects of poverty being drivers of wildlife crime in Uganda.

Economic capabilities include the ability to earn an income and access to productive resources and assets. Low economic capability is the primary driver of wildlife crime for subsistence purposes, because people lack the resources they need, the money to buy them, or the ability to earn an income in an alternative, legal way.

Human capabilities are based on elements of wellbeing such as health, education, nutrition, clean water and shelter. Poor health and nutrition can drive people to hunt bushmeat or harvest medicinal plants as a solution, particularly when they cannot afford to buy food or modern healthcare. Natural resources such as poles and grasses are used to create shelter in times of need.

Low political capabilities, such as having no voice or influence over public policies and degradation of human rights, leads to resentment against authorities and has been shown to drive wildlife crime. For example, the inequity of the revenue sharing process at Bwindi Impenetrable National Park, from which poor people feel excluded, drives some to hunt bushmeat in retaliation.

Socio-cultural capabilities involve participating as a valued member of a community and belonging in a society valued by the poor themselves. It is the strength of these social bonds and cultural traditions, rather than the lack of them, that encourages people to participate in culturally-driven wildlife crime, such as bushmeat hunting.

Finally, protective capabilities include the ability to withstand economic and external shocks, which is limited by insecurity, vulnerability and risk. Very many people in Uganda live close to the 'poverty line' and rely on natural resources to cope during times of extreme hardship.

The evidence suggests that the aforementioned aspects of poverty drive wildlife crime for subsistence purposes and in response to perceived injustice. Culturally driven crime increases with the strong social and cultural bonds associated with high socio-cultural capabilities. The illegal wildlife trade, however, is ultimately driven by economic wealth among consumers, not poverty. The bushmeat trade is driven by both sociocultural wealth of strong tradition and social bonds, combined with the economic wealth of the urban population within Uganda. The ivory trade, and to a lesser but growing extent, the pangolin trade, are driven by demand predominantly from the growing middle classes in China and Southeast Asia.

What impacts does wildlife crime have on local people and more broadly?

Wildlife crime for subsistence and cultural purposes can benefit poor people by providing them with resources or experiences that they need or desire, unless they are caught. Commercially driven wildlife crime, however, is more likely to be harmful to poor people. The people involved may be involved in other types of organised crime as well, and may reduce security. In addition, commercial crime (eg illegal timber felling or ivory poaching) is likely to have a greater impact on the environment than subsistence crime. Degradation of the environment has the potential to lead to environmental stress (eg drought), while loss of biodiversity may reduce the tourism appeal and consequently the associated revenue, negatively impacting local people.

The impact of wildlife crime on poor people, the nation and on the wildlife itself is not well correlated with the number of people engaged in a particular crime. We found little evidence that subsistence-driven wildlife crime had severe impacts on wildlife, of the scale witnessed for current ivory poaching or timber extraction

What interventions are used to reduce wildlife crime in Uganda, and what effect do they have on local people and wildlife crime?

The main types of intervention used in Uganda are law enforcement, regulated resource access, revenue sharing, reformed poachers associations and conservation education and sensitisation, the latter four being variants of Integrated Conservation and Development (ICD) projects.

Law enforcement can be extremely harmful to the rural poor undertaking subsistence-driven crime when they are unable to pay the fines and when loss of a household member affects productivity, lowering both economic and human capabilities of the household. The threat of fines and imprisonment appears from the evidence to be enough to keep the majority of local people from engaging in wildlife crime. The exceptions to this are the chronically poor households who have little or no alternative, and the profit-driven offenders who perceive little chance of capture and who can afford to pay fines or bribes to escape imprisonment.

Regulated resource access can benefit local people by providing access to otherwise scarce, unavailable or expensive resources. Although not the original aim of resource access programmes, some have been shown to increase household incomes. Despite a general consensus that resource access tends to improve local attitudes towards protected areas, there is insufficient evidence to conclude that this leads to a behaviour change and reduces wildlife crime.

There is very little evidence to suggest that revenue sharing makes a significant contribution towards poverty alleviation or reduces wildlife crime. On the contrary, it has been reported to disproportionately benefit less poor members of local communities, creating resentment and driving further wildlife crime. Although community projects such as the establishment of schools, health centres, roads and water sources should theoretically alleviate poverty and contribute towards improved wellbeing among the community, as far as we can tell, no monitoring and evaluation has yet taken place to confirm it. Instead, local people report that their children cannot attend the schools that have been built with tourism revenue, because they must guard the household's crops against wild animals from the parks instead.

Although we could find insufficient evidence to confirm it, we suggest that revenue sharing and regulated resource access are unlikely to reduce the commercial illegal wildlife trade. These interventions were not set up with the primary aim of reducing poverty, but of improving attitudes towards protected areas and giving local people some benefits from conservation. Neither intervention therefore has the capacity to increase local incomes to the level that commercial law-breakers seek, as the benefits per person are too small. Reformed poachers' associations are aimed at bushmeat hunters, both subsistence and commercial, but will only be a long-term success if the groups are provided with options to generate as much income as they previously did from poaching.

In order to determine and provide suitable alternative, profitable sources of income, conservationists need to invest in better understanding the complexity of poverty and livelihoods. Uganda's use of the Multidimensional Poverty Index is a good step towards a better understanding of poverty, but conservationists' understanding of how different livelihoods contribute to a household's wellbeing also needs to improve. For the illegal wildlife trade to be stopped, significantly more effort must be invested nationally and internationally into law enforcement along the commodity chain and demand reduction strategies among the consumer population.

Recommendations for policy, implementation and research

Stopping people from accessing resources or locations that they need or desire for sociocultural reasons is arguably making them poorer. We suggest that UWA, with support from NGOs and other agencies, continue working with local people to allow them to utilise traditional resources in a sustainable way, although we acknowledge that human population densities around protected areas are too high for everyone to be able to benefit. Consideration could be given to conducting research into the sustainability of bushmeat harvesting, using species-specific hunting methods (ie not snares, which can injure or kill endangered species), as this is an area for which we could find very little evidence. We are not suggesting that people are suddenly permitted to hunt within protected areas, but that, like with any other resources added to multiple use programmes, research is conducted into the sustainability of regulated harvest, as bushmeat is the resource most desired for both subsistence and cultural purposes. Alternatively, meat from sport hunting could be shared with local communities, as is the case in Namibia (Weaver *et al* 2011), or from animals killed to mitigate human-wildlife conflict, as was the case when the Game Department managed Uganda's protected areas.

Law enforcement needs to be improved if commercial wildlife crimes are to be reduced. With the illegal ivory trade of substantial and continuing concern Uganda, and the poaching of elephants on the increase, reducing corruption in the legal system and making court cases transparent, and increasing penalties so that they become a deterrent is paramount. However, care should be taken to ensure that penalties are suited to the offence; increasing fines for people involved in subsistence crime would be ineffective and unethical.

The delivery process and equitability of development projects is as, if not more, important than the benefit being delivered. Although development projects are unlikely to have an impact on commercial wildlife crime, to reduce crime driven by perceived injustice, the process of revenue sharing in particular needs to be improved by making it more transparent, less limited by corruption, and more targeted towards indirectly compensating and supporting people who bear the costs of conservation. UWA's guidelines for revenue sharing have recently been revised to this effect, but the changes have yet to be seen on the ground (M. Twinamatsiko, pers. com.). Most importantly, local people should be more involved in the development of projects and the distribution of benefits. This may require capacity building, not just at the local level, to improve the management and efficiency of benefit sharing.

We recommend that research could focus on the effectiveness of conservation and development projects in tackling the drivers of wildlife crime and alleviating poverty of local people involved, either local people undertaking crime or affected by it in some way. Given that inequitable revenue sharing has been shown to worsen economic inequality and motivate further wildlife crime, this is a matter requiring urgent investigation. Research should also investigate which types of project are more successful than others; projects targeted at individuals such as the provision of livestock, or community projects such as schools.

Our review was limited by a lack of evidence in a number of areas, namely:

- Quantification of multidimensional poverty, as a driver of wildlife crime and following interventions against wildlife crime
- Reliable measures of wildlife crime
- A general lack of evaluation of the outcomes of interventions, both on people and on wildlife crime, using appropriate metrics and with meaningful controls.

We suggest that future research into the links between wildlife crime and poverty focus on these gaps, in order to establish a solid evidence base upon which future policy decisions can be made, not just in Uganda but internationally.

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Appendices

Appendix 1: Methodology

We used a combination of interviews with key informants and literature searches to gather evidence from multiple sources. Key informants were particularly useful because so little is published on wildlife crime due to its sensitive nature and the subsequent difficulty of getting reliable information. The two main groups of key informants were members of the Uganda Poverty and Conservation Learning Group (U-PCLG) and Uganda Wildlife Authority (UWA) Conservation Area Managers (CAMs).

The U-PCLG comprises members of most organisations working in environmental, conservation and development fields in Uganda, who between them have many years of experience and a great breadth of knowledge and insight into issues such as wildlife crime and poverty. The project was first introduced to the group at a quarterly meeting in June 2014. We emailed all members of U-PCLG at the beginning of August 2014, detailing the aim of the project and scope of the evidence review, and requesting that they send us details or copies of any relevant reports they were aware of. We sent follow-up emails to members we thought could be particularly knowledgeable in mid to late August, requesting meetings between 16th and 29th September 2014, when Mariel Harrison was in Kampala. We presented and discussed the wildlife crime project with U-PCLG members at their September meeting in Kampala and arranged ten further meetings from there (Table A1).

Table A1: Key informants interviewed for the evidence review

Key Informant	Organisation	Date of meeting
Akankwasah Barirega	Ministry of Tourism, Wildlife and Antiquities	22nd September
Chris Bakuneeta	Makerere University	22nd September
Mark Infield	Independent	23rd September
Arthur Mugisha	International Union for the Conservation of Nature (Uganda)	23rd September
Gerald Tenywa	Environmental journalist for the New Vision	24th September
Annet Kandole	CARE	26th September
Moses Olinga	Uganda Wildlife Authority Law Enforcement Division	26th September
Eddie Oketcho	World Wide Fund for Nature	29th September
Agrippinah Namara	Independent	29th September
Andrew Lemieux	WILDLEO (Wildlife Intelligence and Leadership Development programme)	9th October (skype)

Between them, UWA's CAMs manage all of Uganda's National Parks and Wildlife Reserves, which are grouped geographically into Conservation Areas. Having worked in various roles both on the ground and in management positions within UWA, the CAMs were thought to have insights into the drivers and impacts of wildlife crime that might not always be reported. We emailed an interview to the seven CAMs in late August 2014, and received six responses plus one from Moses Olinga, UWA Warden for Law Enforcement.

We searched for evidence in the literature from four main sources; peer-reviewed literature on Web of Knowledge, published reports on NGO websites, media reports and MSc and PhD theses.

We searched Web of Knowledge using the search term: Uganda AND conservation AND (poach* OR hunt* OR trap* OR snare* OR harvest* OR “resource use”), which yielded 258 results. We read the abstract of each paper and downloaded the full paper if it seemed likely to contain relevant information (around one fifth). We also conducted searches in Web of Knowledge for the impacts of wildlife crime on the environment (Uganda AND (poach* OR hunt* OR trap* OR snare* OR harvest* OR “resource use”) AND (environment* OR biodivers* OR ecolog* OR impact)) and for studies on revenue sharing (Uganda AND “revenue sharing”).

We searched the websites of NGOs known to be working on conservation and/or development in Uganda for relevant reports, including CARE, WWF, WCS, and FFI. We searched the website of the New Vision, Uganda’s leading newspaper, for items containing “poach*”, “ivory”, “illegal timber” and “pangolin” and saved relevant articles.

We visited the Environmental Sciences library at Makerere University in Kampala to gather evidence from MSc and PhD theses. We selected theses to review from a list of titles and made notes from the most relevant (n=13). We also visited the libraries at UWA and IUCN, but neither had functioning catalogues, making searching too difficult in the limited time we had available.

All evidence was stored in Mendeley Desktop, the free reference managing software, and notes from the evidence were stored in MS Excel, making subsequent searching for information easier.

We also downloaded the CITES records of exports from Uganda since 2002 from the CITES trade database (<http://trade.cites.org>), to examine recent trends in the legal and illegal wildlife trade.

Appendix 2: Evidence of wildlife crime in Uganda's protected areas

Table A2: A summary of the available evidence for all the various forms of wildlife crime, showing which protected areas there is evidence for each crime occurring

Notes

Total: Number of protected areas crime is known to occur; **BINP:** Bwindi Impenetrable National Park; **KNP:** Kibale NP; **KVNP:** Kibale Valley NP; **LMNP:** Lake Mburo NP; **MENP:** Mount Elgon NP; **MFNP:** Murchison Falls NP; **QENP:** Queen Elizabeth NP; **RNP:** Rwenzori Mountains NP; **SNP:** Semuliki NP; **MGNP:** Mgahinga Gorilla NP; **AWR:** Ajai Wildlife Reserve; **BKWR:** Bokora Corridor; **BUWR:** Bugungu WR; **EMWR:** East Madi WR; **KAWR:** Katona WR; **KIWR:** Kigezi WR; **MWR:** Matheniko WR; **PUWR:** Pian-Upe WR; **BFR:** Budongo Forest Reserve; **MFR:** Mabira FR; **KFR:** Kalinzu FR; **MHFR:** Mazira Hills FR; **EFR:** Echuya FR

Resource	Use	Total	Ref																										
			BI NP	K NP	KV NP	LM NP	ME NP	MF NP	OE NP	R NP	S NP	MG NP	A NP	WR NP	KA NP	EM NP	BU NP	BK NP	WR NP	M NP	B NP	PU NP	WR NP	M NP	K NP	MH NP	E NP	FR NP	
Liana	Building rope	2	✓																	✓									1
Liana	For making bundles of firewood	1																		✓									2
Liana	For making duiker traps	1																		✓									3
Liana	For making drying hoops for clothes	1																		✓									4
Liana	For making crafts	4	✓	✓					✓																✓			5	
Firewood	For cooking food	10	✓	✓					✓	✓											✓	✓						6	
Firewood	To generate income	2							✓															✓				7	
Charcoal	To generate income	6	✓	✓					✓														✓					8	
Charcoal	Not specified	3							✓												✓							9	
Poles	For construction	10	✓	✓					✓	✓											✓	✓						10	
Grass	For construction	3	✓	✓					✓															✓				11	
Medicinal plants	To treat human diseases	5	✓						✓															✓				12	
Medicinal plants	To treat livestock diseases	1																						✓				13	
Medicinal plants	To generate income	2	✓																					✓				14	
Medicinal plants	Not specified	4							✓	✓											✓							15	
Edible plants	Food	3		✓					✓															✓				16	
Bamboo	Not specified	5	✓						✓														✓			✓		17	
Bamboo	For making crafts	3	✓						✓														✓					18	
Bamboo	For construction	3	✓						✓														✓					19	
Bamboo	For bean stakes	1							✓																		✓	20	

Resource	Use	Total	BI NP	K NP	KV NP	LM NP	ME NP	MF NP	OE NP	R NP	S NP	MG NP	A NP	BK NP	BU NP	EM NP	KA NP	KI NP	M NP	PU NP	B NP	M NP	K NP	MH NP	E NP	Ref
Bamboo	For cooking food	2								✓		✓														21
Bushmeat	Not specified	17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	22
Bushmeat	Revenge	5	✓		✓	✓	✓	✓													✓					23
Bushmeat	For household consumption	8	✓	✓	✓	✓	✓	✓	✓	✓											✓					24
Bushmeat (primates)	For household consumption	1							✓																	25
Bushmeat	To generate income	8	✓	✓	✓	✓	✓	✓	✓						✓						✓					26
Bushmeat	Cultural purposes	5	✓	✓			✓	✓	✓	✓																27
Bushmeat (primates)	Cultural purposes	1							✓																	28
Timber	For construction	2		✓					✓																	29
Timber	To generate income	6	✓	✓	✓	✓	✓	✓	✓	✓												✓				30
Timber	Not specified	8	✓	✓	✓	✓	✓	✓	✓			✓			✓						✓					31
Honey	Not specified	5	✓				✓	✓	✓	✓		✓													✓	32
Honey	For household consumption	4	✓				✓	✓	✓	✓												✓				33
Honey	To generate income	3	✓	✓			✓	✓	✓																	34
Honey	For traditional medicine	3	✓	✓			✓	✓	✓																	35
Fruit	Not specified	1							✓																	36
Fruit	For household consumption	5	✓	✓	✓	✓	✓	✓	✓	✓															✓	37
Encroachment	Agriculture	2																							✓	38

Resource	Use	Total	BI NP	K NP	KV NP	LM NP	ME NP	MF NP	OE NP	R NP	S NP	MG NP	A WR	BK WR	BU WR	EM WR	KA WR	KI WR	M WR	PU WR	B FR	M FR	K FR	MH FR	E FR	Ref
Encroachment	Animal grazing	11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	39
Encroachment	Settlement	2				✓								✓												40
Encroachment	Not specified	4				✓	✓								✓	✓										41
<i>Ficus</i> bark	Bark cloth	2								✓												✓				42
Papyrus	Basket weaving	1																				✓				43
Mushroom	For household consumption	5	✓	✓		✓	✓			✓												✓				44
Tree shoots	For roasting meat on for sale	1																								45
<i>Dioscorea</i> (wild yam)	For household consumption (famine)	3	✓	✓		✓																				46
Water	For household use	8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓											✓	47
Wild coffee	Not specified	1		✓																						48
Fish	Not specified	3	✓	✓		✓		✓																		49
Fish	For household consumption	3	✓	✓					✓																	50
Fish	To generate income	1							✓																	51
Chimps	For traditional medicine	1		✓																						52
Chimps	To sell young chimpanzees	1		✓																						53
Chimps	Accidentally/ purposefully caught in illegal 'man-traps'	1																							✓	54

Resource	Use	Total	BI NP	K NP	KV NP	LM NP	ME NP	MF NP	QE NP	R NP	S NP	MG NP	A WR	BK WR	BU WR	EM WR	KA WR	KI WR	M WR	PU WR	B FR	M FR	K FR	MH FR	E FR	Ref	
Chimps	Accidentally caught in leg-hold traps or snares	1																									55
Lions	Retaliation to livestock loss	2			✓				✓																		56
Lions	Retaliation to human injury/death	1							✓																		57
Lions	Parts used in witchcraft	1							✓																		58
Lions	Parts used in traditional medicine	1							✓																		59
Hyenas	Retaliation to livestock loss	1							✓																		60
Leopards	Retaliation to livestock loss	1							✓																		61
Trespassing	Not specified	2			✓				✓																		62
Ivory	To generate income	4		✓	✓			✓	✓																		63
Elephant meat	By-product of ivory poaching	1							✓																		64
Fire	Not specified	2												✓													65
Fire	To create pasture	1															✓										66
Fire	To aid poaching	1																									67
Palm	To brew liquor	1									✓																68
Gorilla	Gorilla infants	1	✓																								69
<i>Prunus africana</i>	For traditional medicine	1								✓																	70
<i>Prunus africana</i>	To generate income	1									✓																71

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Appendix 3: Case study — Bushmeat hunting

Profiles of bushmeat hunters

There have been very few investigations into who bushmeat hunters actually are in Uganda ie their socioeconomic profiles. Our extensive search of the literature produced only four studies: Plumptre *et al.*'s (2004) study of people living in the Albertine Rift around Bwindi Impenetrable NP, Mgahinga NP and Echuya FR; Olupot, Mcneilage, *et al.*'s (2009) socioeconomic analysis of bushmeat hunting at Rwenzori Mountains NP, Queen Elizabeth Conservation Area and Murchison Falls Conservation Area; Tumusiime *et al.*'s (2010) investigation into wildlife snaring at Budongo FR; and finally Twinamatsiko *et al.*'s (2014) research into the profiles and motivations of resource users at Bwindi Impenetrable NP. The results of their studies are shown in Table A3. The lack of congruity between the studies illustrates the diversity of bushmeat hunters within Uganda.

Table A3: Socioeconomic characteristics of bushmeat hunters and consumers at different protected areas in Uganda

Characteristics	Rift	RMNP	QECA	MFCA	BFR	BINP
Native to area	-	NS	NS	NS	No	-
Education	-	NS	NS	NS	Hunters have less education	Hunters have less education
Household size	-	NS	NS	Consumers come from larger households	Hunters come from smaller households	Hunters come from larger households
Gender of household head	-	Female-headed households consume less bushmeat			-	NS
Income / wealth	-	-	Hunters annual incomes are lower than average	Hunters annual incomes are higher than average	-	Arrested hunters are wealthier than average
Livelihood	-	Hunters are smallholders as opposed to pastoralists or ranchers			Subsistence farming	-
Proximity to forest	People within 3 km are more likely to know about bushmeat hunting	-	-	-	-	Hunters live closer to the Park than average
Livestock ownership	People with fewer livestock are more likely to know about buying bushmeat	Hunters own pigs and chickens rather than cows and sheep			-	-
Suffer crop raiding	-	Yes	Yes	Yes	Yes	Yes
Reference	(Plumptre <i>et al.</i> 2004)	(Olupot, Mcneilage, <i>et al.</i> 2009)			(Tumusiime <i>et al.</i> 2010)	(Twinamatsiko <i>et al.</i> 2014)

-: Not tested, NS: Not significant

Rift: Bwindi Impenetrable National Park, Mgahinga Gorilla National Park, Echuya Forest Reserve; RMNP: Rwenzori Mountains National Park; QECA: Queen Elizabeth Conservation Area; MFCA: Murchison Falls Conservation Area; BFR: Budongo Forest Reserve; BINP: Bwindi Impenetrable National Park

Drivers

One of the most commonly quoted drivers of bushmeat hunting across Uganda is the need for protein from meat; people do not have livestock of their own to eat or the money to buy it (eg Olupot, Mcneilage, *et al.* 2009; Azakozu 2009; Tumusiime *et al.* 2010; Twinamatsiko *et al.* 2014). This is a classic example of low economic capabilities driving wildlife crime; the reason for engaging in bushmeat hunting is a household's inability to consume or access other, legitimate resources to fulfil their need for protein.

There are a number of circumstances in which people are particularly in need of bushmeat. First, bushmeat hunting is more frequent in the lead up to festive seasons such as Christmas and Easter, when people want to be eating meat or raising extra cash (Kapiriri 1997; Mugisha 2002; Moreto 2013). Second, overexploitation of alternative protein sources; local fishing communities around Queen Elizabeth NP traditionally get protein from the lakes, but illegal overfishing has reduced the size and quantity of fish, leading local people to compensate by hunting bushmeat (Moreto 2013). Finally, insecurity and conflict causes people to uproot, losing land and social networks and becoming more dependent on the environment as a result (Anon 2008). Poaching around Murchison Falls NP has been reported to increase in response to swelling populations of refugees from South Sudan and the Democratic Republic of Congo (New Vision 2014d). At East Madi WR, bushmeat is hunted to meet demand at nearby internally displaced person (IDP) camps and army units (Azakozu 2009), and at Semliki NP by UPDF (Uganda People's Defence Force) deployed in the reserve (Mugisha 2002).

In some areas, people do have livestock but prefer not to kill them to eat. For example, around Budongo FR people see their animals as a source of income and therefore not for household consumption (Tumusiime *et al.* 2010). Others reported that they would prefer not to keep domestic animals because they take too long to mature and can be raided by baboons (Tumusiime *et al.* 2010).

Another economic driver of bushmeat hunting is to make money, as opposed to hunting it to consume at the household level. Moreto (2013) makes an important distinction between two types of bushmeat sellers at Queen Elizabeth NP; those who are trying to generate a basic income with which to obtain basic necessities, and those who are profit-driven and trying to attain wealth above and beyond what they need.

Olupot *et al.* (2009) found that although no bushmeat was sold around Rwenzori NP, around two thirds of what was hunted at Queen Elizabeth and Murchison Falls NPs was sold; one third to neighbouring households and the remainder further afield. This was usually to other villages within the sub-county, but occasionally to urban centres. At Queen Elizabeth NP, profits from bushmeat hunting contributed around 21 per cent of hunters' annual incomes, which were far below the local average. By contrast, poachers at Murchison Falls NP had annual incomes higher than the average, with bushmeat contributing 48 per cent.

Key informants reported that bushmeat from national parks was available for sale in Kampala and other urban centres. Urban dwellers view it as a traditional and healthy delicacy and will pay more money for bushmeat than more domestic meat (A. Mugisha pers. com.; M. Olinga pers. com.). Note that while the urban bushmeat market is widely acknowledged, there is no hard evidence for its extent; investigations by Olupot *et al.* (2009) resulted in two quotes but no meat was seen as it was apparently hunted to order.

Another very common driver of bushmeat hunting is tradition and culture. Rather than being a characteristic of poverty, strong tradition is demonstrative of sociocultural wealth. There are many different cultures surrounding the hunting and consumption of bushmeat in Uganda. There is the tradition of a family or tribe being hunters, for whom bushmeat hunting is a highly valued cultural activity (Olupot, Mcneilage, *et al.* 2009; Kabagumya 2001; Twinamatsiko *et al.* 2014). For example, the Banyabatumbi tribe are traditionally hunters and meat eaters and Queen Elizabeth NP was their hunting ground (Kairu 2005). Similarly, Katonga WR is land that originally belonged to the Batooro people (Mugisha 2002). For some, hunting is a rite of passage to become a man and gain acceptance into the family (Moreto 2013).

Bushmeat itself also has a cultural value. Bushmeat is commonly believed to be tastier than domestic meat (Olupot, Mcneilage, *et al.* 2009; Tumusiime *et al.* 2010; Twinamatsiko *et al.* 2014) as well as having medicinal properties (eg hippo meat at Queen Elizabeth NP (WCS and MUIENR 2008) and duiker meat at Bwindi Impenetrable NP (Twinamatsiko *et al.* 2014)). At Bwindi Impenetrable NP, bushmeat is sought specifically to treat severe childhood malnutrition and worms (Twinamatsiko *et al.* 2014), indicating that low human capacity (poor health and wellbeing) is a driver of poaching. Around Queen Elizabeth NP, hippo meat is associated with fertility and loyalty of women; it is believed that a new bride will not conceive until she has consumed hippo meat (Moreto 2013). Unlike in most of West and Central Africa, monkeys tend not to be hunted or eaten in Uganda. The exceptions are when there is an influx of Congolese refugees, for whom hunting primates is acceptable (Anon 2001), and at East Madi WR, where the skin of colobus monkeys is used in cultural dances (Azakozu 2009).

Bushmeat hunting is an activity also associated with ancestral spirits (eg Kibale NP, Kabagumya 2001). Some say that they must appease their ancestors by eating their traditional foods or they will be cursed (eg Bwindi Impenetrable NP, Harrison 2013), while others claim to be physical driven by a spiritual entity (eg Queen Elizabeth NP, Moreto 2013).

The final driver of bushmeat hunting is perceived injustice or revenge. People are reported to poach in response to crop raiding and livestock loss (Olupot, Mcneilage, *et al.* 2009) and inequity of tourism revenue sharing (Twinamatsiko *et al.* 2014). Not only do people hunt animals to control crop raiding (eg at Budongo FR, Tumusiime *et al.* 2010) and livestock loss (eg poisoning lions at Queen Elizabeth, Moreto 2013), but also out of anger. This is illustrative of low political capabilities; people feel that they are not treated fairly by not being compensated for losses due to wildlife, that they are not benefitting as they should from the often corrupt revenue sharing process, and they do not have a voice to change things, so they show their anger through damaging what they know the authorities value; the wildlife.

Enabling conditions

The enabling conditions allowing people to participate in bushmeat hunting are insufficient and ineffective law enforcement and markets. At many protected areas, there are too few rangers with too little equipment to create a deterrent. Mugisha (2002) reported that poaching was common at Pian-Upe WR, where insufficient staff were prevented from patrolling regularly by insecurity in the area. Similarly, at Kigezi WR there was a lack of enforcement due to lack of arms and food; most rangers were reported to be away looking for food themselves (Mugisha 2002). At Budongo FR, the authorities are reported to not patrol the forest specifically for bushmeat hunting due to a lack of staff (Turyahabwe *et al.* 2013).

It is not only lack of rangers and patrols that enables people to hunt. It was recently reported that rangers at Queen Elizabeth NP are willing to help poachers to locate animals (New Vision 2014d), and will work with local people to forewarn them of patrols (Moreto 2013). Conservation Area Managers (CAMs) acknowledged connivance of law enforcement rangers with poachers in interviews. A. Namara (pers. com.) suggested that connivance was a result of poor supervision, remoteness of some parts of protected areas and low pay for lower ranks of staff, factors all confirmed by Moreto (2013).

Impacts of bushmeat hunting on local people

The immediate impact of poaching on local people is positive; they have the meat that they need, either out of hunger or as medicine, and have appeased their ancestors or participated in a rewarding sociocultural activity. If they sell the bushmeat, they have money with which to purchase basic necessities or even luxuries. One key informant pointed out a potential negative impact of consuming bushmeat, which was that it might transmit diseases from wildlife to people. The impact on a poacher will be very different if he is caught, but this is discussed later under 'impacts of interventions'.

Impact of bushmeat hunting on the nation

Since the high levels of poaching during the civil war in the 1980s which caused the decline of many species, in particular elephants at Queen Elizabeth and Murchison Falls NPs (Kato and Okumu n.d.; Smart *et al.* 1985; Lamprey and Mugisha 2009; New Vision 2009c) and large mammals at East Madi WR (Azakozu 2009), there is no evidence available for the impact of current levels of bushmeat poaching on wildlife populations. However, there is evidence for chimpanzees being injured and occasionally killed in snares set for other species at Budongo FR (Waller and Reynolds 2001; McLennan *et al.* 2012). It is estimated that more than 36 per cent of Budongo FR's 700 chimpanzees have been maimed by snares (Tumusiime *et al.* 2010). Additionally, the New Vision newspaper recently reported that tourists were disappointed at how few animals they could see on game drives and attributed it to commercial poaching (New Vision 2013a). There is no hard evidence for this being the case, but if it turned out to be true then it would have a significant impact on Uganda's economy. Uganda's tourism industry is founded on wildlife, and is the country's leading foreign exchange earner, contributing 5.7 per cent of GDP each year and rising (Anon 2014c).

Impacts of interventions against bushmeat hunting on people and wildlife

There are varying opinions on the impact of law enforcement on poachers. While commercial poachers were generally thought by Key Informants to be able to afford penalties, fines and imprisonment are likely to have a major impact on the households of people hunting for subsistence purposes.

There is variable evidence for regulated resource access impacting bushmeat poaching. At Bwindi Impenetrable NP, snares have been observed both in and out of the multiple use zones (MUZs) (Olupot, Barigyira and Chapman 2009), and little change in illegal activities has been noted in the park in general or in the MUZs (Namara 2006). Despite this, indirect questioning methods employed at Bwindi Impenetrable NP by Twinamatsiko *et al.* (2014) concluded that bushmeat hunters were highly unlikely to be ARUs.

At Kibale NP, ARUs apparently remove snares and help to arrest poachers (Chhetri *et al.* 2003). While authorised fishers are no more or less likely to admit to placing snares in the park, the communities they come from are more likely to help to remove them (Solomon 2007).

There are very few examples of revenue sharing resulting in reduced poaching. At Kibale NP, MacKenzie (2012) found no signs of poaching along sections where elephant trenches had been built with revenue sharing funds, although she acknowledged that this could be because the trenches were a barrier to people as well as the intended elephants. At Bwindi Impenetrable NP, local people reported that revenue sharing could deter people from poaching, but only if the benefits were perceived to be strong enough and if they were equitably shared (Twinamatsiko *et al.* 2014). In addition, resentment about the inequity of revenue sharing and level of corruption in the system drove some people to poach further (Twinamatsiko *et al.* 2014).

Reformed Poacher's Associations (RPAs) are the only intervention targeted specifically at bushmeat hunters, and are detailed in Section 8. In summary, RPAs have the potential to positively impact hunters lives and reduce poaching. However, many groups fail to meet ex-poachers expectations of leading to equally high alternative incomes or sources of meat, resulting in disillusion and possibly a return to poaching.

Appendix 4: Case study – Ivory

Relatively few elephants are poached for their ivory in Uganda compared to the levels seen elsewhere in Central and Eastern Africa. For example, the elephant population in Selous reserve, Tanzania, fell by over 80 per cent between 2006 and 2013, from approximately 70,000 to just 13,000 (EIA 2014). By contrast, over the same time period, MIST records indicate that at least 60 of Queen Elizabeth NPs estimated 3,000 elephants (Plumptre *et al.* 2008) are known to have been poached, or around 2 per cent of the population.

Despite low levels of elephant poaching in Uganda, the ivory trade is strong; much of the ivory traded in the region seems to transit through Uganda at some point (CITES 2013c). Over one third of raw ivory transactions occur in Kenya, Tanzania or Uganda, and Uganda is a transit point for ivory originating in Central Africa (Underwood *et al.* 2013). There is very little evidence for who the people involved in transporting and trading ivory in Uganda are, but the people occasionally arrested are more often Chinese than Ugandan (Table A4). Therefore we will not be examining the impacts of the ivory trade on local people.

Table A4: Seizures of ivory in Uganda between February 2012 and December 2013, as investigated and reported by environmental journalists from the New Vision newspaper

Date	Location	Quantity	Nationality	Outcome
Feb '12	Pakwach	99 pieces of worked and 10 pieces of raw ivory	Chinese and Congolese	On going
Feb '12	Entebbe airport	17 pieces of worked ivory	Chinese (diplomat)	Cautioned
Apr '12	Entebbe airport	6kg of raw ivory pieces	Chinese	Fined
Jun '12	Entebbe airport	473kg of raw ivory pieces	Liberian	On the run
Aug '12	Entebbe airport	5kg of worked ivory	Not known	Cautioned
Aug '12	Entebbe airport	Nine pieces of raw ivory and 15kg of worked ivory	Liberian	Fined sh500,000
Aug '12	Old Kampala	One piece of raw ivory	Ugandan	On going
Aug '12	Kiryadongo	Four pieces approximately 35kg	Ugandan	2 years
Aug '12	QECA	6kg of raw ivory	Ugandan	On going
Sep '12	Rubirizi	Six pieces of raw ivory	Ugandan	1 year
Oct '12	Zana Entebbe Road	30kg of raw ivory	Ugandan and Congolese	Unknown

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Nov '12	Entebbe airport	62kg raw ivory	Ugandan and Congolese	Unknown
Nov '12	Entebbe airport	62kg of raw and worked ivory	Chinese	'Prosecuted'
Mar '13	Entebbe airport	Two polished pieces of elephant thigh bones	Italian	Cautioned
Jul '13	Bundibugyo / Fort Portal	Two pieces (8kg)	Ugandans (reverend and retired captain)	On going
Jul '13	Entebbe airport	13 pieces polished ivory	Chinese	Fined sh 1m
Aug '13	Entebbe airport	Eight pieces polished bangles	Chinese	Fined
Aug '13	Entebbe airport	Two pieces in form of spears	Sudanese	Cautioned
Aug '13	Entebbe airport	Six pieces polished bangles	Chinese	Fined sh 1m
Sep '13	Entebbe airport	15 pieces of worked ivory	Chinese	Fined sh 1m
Sep '13	Entebbe airport	Two pieces	Chinese	Fined sh 1.3m
Sep '13	Pakwach	Two pieces (35.5kg)	Ugandan	4 years
Oct '13	Kabarole district	Two pieces (18kg)	Ugandan (reverend)	On going
Oct '13	Entebbe airport	116kg of polished ivory	Guinenian	Fined sh 2m each
Oct '13	Bweyogerere	2903kg raw ivory	Kenyan and Ugandan	On going
Oct '13	Entebbe airport	5kg of worked ivory	Chinese	Fined sh 2.8m
Oct '13	Entebbe airport	Ivory	Vietnamese	Fined sh 2m
Oct '13	Entebbe airport	Ivory	Chinese	Fined sh 2.2m
Nov '13	Kabale	Elephant bones and tail	Ugandans	On going
Dec '13	Entebbe airport	440 pieces of raw ivory, 15 pieces rhino horn, 372 pieces of worked ivory in form of bangles, chop sticks and necklaces	Not known	On going

Source: Adapted from <http://www.newvision.co.ug/newvision/cms/newsimages/file/ivory-data-114.jpg>

Notes: QECA–Queen Elizabeth Conservation Area, sh–Ugandan shilling, sh 1m ~ US\$333 (March 2015)

Profiles of ivory poachers

There is no evidence on the socioeconomic profiles of people poaching elephants for their ivory, and very little for the drivers of ivory poaching. This is due to a combination of factors. First, ivory poaching is not very common in Uganda (although incidences are rapidly increasing in frequency; 32 elephants were reported poached at just Queen Elizabeth, Murchison Falls and Kibale NPs in the first nine months of 2014, Figure 8). Second, with ivory poaching being such a highly lucrative but illegal activity, people are reluctant to share what they know. Finally, as we will discuss in the following section, the ivory trade in Uganda seems to involve corrupt members of the police, customs officials and even the Uganda Wildlife Authority, making reliable information very hard to come by.

Drivers of ivory poaching

The following information is all derived from informants' insights and occasional reports, although both tend to lack hard evidence.

Poaching of ivory is ultimately driven by demand in foreign countries, notably China and southeast Asia where demand is rising among the growing middle classes (EIA 2014), although the United States of America and Europe continue to import substantial quantities of ivory as well. It has been reported that ivory from Uganda and Central Africa is sold to fund the Lord's Resistance Army (LRA) (New Vision 2012a; New Vision 2013b). Ivory in this region is also thought to fuel insecurity in South Sudan and the Democratic Republic of Congo (MoTWA n.d.).

Ivory has been listed on Appendix One of CITES since 1989, meaning that all trade is prohibited, except for items produced before 1947 and one-off approved sales of stockpiles. Because killing elephants for their ivory is illegal, the traders employ others to kill and transport the ivory for them, which is where local people living around Uganda's protected areas enter into the equation.

Local people are reportedly recruited to poach ivory because they know the local environment and where elephants are likely to be. With local incomes so low and ivory so profitable, it is not hard to tempt someone into ivory poaching (Habati 2012). It is therefore likely to be economic poverty that drives an individual to participate in ivory poaching if he is offered the chance.

Conditions enabling ivory poaching

There are a number of enabling conditions that allow ivory poaching to occur in Uganda. During Idi Amin's reign in the 1970s, the population of Uganda's elephants dropped significantly due to lack of law enforcement and insecurity (Lamprey and Mugisha 2009; Kato and Okumu n.d.). Amin's troops reportedly poached Queen Elizabeth NP's elephant population from 8000 down to just 200 (New Vision 2009c). Law enforcement is now in place and prevents poaching on such a large scale, but corrupted and conniving members reportedly allow it to continue.

According to Moreto *et al.* (2014), corruption in government and the police force makes wrongdoing at lower levels 'tolerated if not expected'. Rangers, motivated by their own low wages (New Vision 2014d), are able to use their access to the parks and links with other officials to poach and trade ivory. Corruption within UWA has recently been reported to have reached new heights, with the suspension in November 2014 of the Executive Director and five members of the law enforcement department over the disappearance of 1,335 kilograms of ivory from their stores, worth over \$1 million (New Vision 2014c). The Executive Director appears to have since returned to work and no further reports have been made.

The availability of weapons is another enabling condition. Some of these are left over from the civil war, while others can be hired from security officers (Moreto 2013; Kato and Okumu n.d.). The availability of weapons in neighbouring DRC reportedly allows Congolese poachers to cross the border and poach Ugandan elephants (Moreto 2013). In 2008, there was a report of two poachers using an UWA gun to try to poach elephants at Queen Elizabeth NP. Their father was a former UWA employee who had not returned his weapon on retirement (New Vision 2008a).

Interventions against ivory poaching and trading

Law enforcement is the main intervention used against ivory poaching and the ivory trade, but there is very little evidence that it is effective. Those arrested tend to be transporters or traders rather than poachers, and are very rarely charged because they can afford to pay their way out of prison, or can ask someone else to do it for them. One key informant explained that most of the ivory trade is controlled or influenced by one 'big man' in Kampala, who has links with all the necessary areas of government and police to ensure that he and his accomplices are never caught or charged.

If offenders are charged, they are usually given the option of a prison sentence or a fine. The fine is usually far less than the value of the goods they were transporting, so is easily payable and is not a deterrent.

The money or value of goods shared with local communities through revenue sharing, resource sharing or RPAs cannot compete with the money offered by ivory traders, so cannot be used as the sole intervention against ivory poaching. That does not mean that it is worthless however, as one key informant noted that some people who have benefitted from their nearby park might decline the opportunity to poach ivory or even report someone who is doing so, despite the potential economic gains, although there is currently no evidence to support this notion.

Appendix 5: Case study — Firewood collection

Drivers of firewood collection

Firewood is collected illegally from protected areas because of the lack of alternative sources of fuelwood (Aine-omucunguzi *et al.* 2009; Plumptre *et al.* 2004; Kabagumya 2001; Twinamatsiko *et al.* 2014). Many of Uganda's protected areas are surrounded by densely populated rural areas where land is too scarce for trees to remain or be replanted (Plumptre *et al.* 2004; Twinamatsiko *et al.* 2014). At Queen Elizabeth NP, firewood has reportedly been collected by army soldiers from a nearby camp (Moreto *et al.* 2014).

Most firewood is collected for subsistence purposes, but is occasionally used to generate income, both directly and indirectly. To generate income directly, firewood can be sold, although there is very little evidence for there being a firewood trade from Uganda's protected areas. It has been suggested that selling illegally collected firewood might be the crime of choice for substance abusers around Queen Elizabeth and Murchison Falls NPs; firewood is quick and easy to collect and can be rapidly sold, allowing the offender to buy more alcohol. As an addict, the offender may find it difficult to hold down a normal job, so collecting firewood is the easiest way to make money (A. Lemieux, pers. com.)

Firewood is used indirectly to make money as fuel for small industries such as firing bricks, distilling spirits, curing fish and tobacco, cooking food to sell and producing charcoal (Tabuti *et al.* 2003; WCS and MUIENR 2008; Kairu 2005).

Conditions enabling firewood collection

Firewood collection is enabled by ineffective law enforcement. Rangers at Queen Elizabeth NP sometimes allow local people to collect resources including firewood in return for money or food (Moreto 2013).

Impacts of firewood collection on local people

Collecting firewood usually has a positive effect on the household, by providing them (in the short term) with a resource that they need to stay warm and cook with. However, there have been reports of women being harassed by National Forest Authority (NFA) officials while collecting firewood at Kasokwa Central FR (Watkins 2009).

Interventions against firewood collection

The two interventions used specifically against firewood collection are law enforcement and regulated resource access. There is little evidence on the impact of law enforcement specifically on firewood collectors, although one key informant suggested that fines and imprisonment would have a strongly negative impact on firewood collectors households, as they tended to be the very poorest members of the community who could not afford to pay fines as firewood collection had been solely for subsistence and as such had not made them any money (A. Lemieux, pers. com.). Other reports indicate that rangers might be lenient with firewood collectors and let them off with warnings.

Some resource access programmes allow local people to collect firewood from inside protected areas (for example at Kibale and Murchison Falls NPs). In these cases, resource sharing has a positive impact on the people authorised to collect firewood, allowing them access to the resource they need and making the daily work of women in particular easier (Kabagumya 2001; Anon 2006). It also reduces levels of wildlife crime by simply making it no longer a crime to collect firewood in the designated areas. Resource access programmes that permit local people to collect resources other than firewood can also reduce illegal firewood collection. For example, there were fewer incidences of firewood collection in areas of Budongo FR where local people were permitted to keep beehives (Turyahabwe *et al.* 2013). However, this was not the case at Bwindi Impenetrable NP, where signs of illegal activities including firewood collection remained both inside and outside of MUZs (Olupot, Barigyira and Chapman 2009). Twinamatsiko *et al.* (2014) found that members of the MUP were statistically no more or less likely than other members of their community to collect firewood from Bwindi Impenetrable NP. Additionally, some people authorised to fish at Kibale NP are thought to sometimes still illegally collect firewood (Solomon 2007).

Appendix 6: Case study – Timber

Drivers of timber felling

Timber is illegally harvested from protected areas in Uganda for a number of reasons. There is subsistence demand in local villages for timber for construction purposes (MacKenzie and Hartter 2013). This demand tends to be met by local pitsawyers, who fell and saw timber into planks by hand.

In some areas, the reported lack of alternative income sources is driving people to cut timber to provide for their household's basic needs (WCS and MUIENR 2008). Around Bwindi Impenetrable NP, it was reported that local men sometimes go pitsawing to pay for their children's school fees (Harrison 2013). However, it is not just the poorest people illegally logging in Uganda. The majority of illegal timber activities seem to be conducted by relatively wealthy members of society, who can afford to buy chainsaws, hire trucks to transport their timber to markets, and bribe officials to turn a blind eye (Esipisu 2014). CARE has recently set up a mobile alert system, allowing local community members to report suspicious or illegal activity anonymously to a central system (CARE International 2014). Local people are encouraged to report the time, location and details of any activity, with a photo if possible (trained community members have been given smartphones to enable photographic evidence and GPS locations). The reports are sent to LC (local village) chairmen, the police and local authorities to deal with immediately. However, many of the people who are supposed to be responding are the ones being reported for illegal activity. Example messages read along the lines of "I have just seen the LC [village] chairman entering the forest at XX with a chainsaw again" (A. Kandole, pers. com.). Investigations by the New Vision have also uncovered the involvement of the LC chairmen in the illegal timber trade. The NFA reportedly uncovered a store of illegally felled timber in a house belonging to an LC chairman. In another location, a group of 20 loggers were camped in a village near to the forest, but the local chairman had not reported them (New Vision 2012b).

Conditions enabling the illegal timber trade

The extent of the illegal timber trade in Uganda is enabled by the weak laws governing the timber industry, and the lack of funding to ensure that they are enforced (CARE International 2012). The NFA, the body responsible for managing the forest reserves, are understaffed, underpaid and sometimes unmotivated as a result. The New Vision recently reported that staff had no fuel with which to patrol areas of Mabira FR (New Vision 2012b). It may also be enabled by a lack of awareness of the impacts of deforestation in some locations (WCS and MUIENR 2008), which are detailed in the following section.

Impacts of the illegal timber trade on local people

The illegal timber trade has negative impacts on both local people and Uganda in general. The clearing of both wetlands and forests is reported to be a main cause of declining water quality (WCS and MUIENR 2008) and quantity (New Vision 2013c). In 2013, the illegal timber trade was reported to have lost Uganda 23 billion UGX (New Vision 2013c). Logging has also been shown to have negative impacts on wildlife populations, including duiker and primates (Struhsaker 1998), which in the long-term could diminish the appeal of forest NPs to tourists and subsequently reduce revenue.

Some commercial pitsawyers are reported to employ juveniles, taking them out of school and violating child labour laws (New Vision 2009a). Additionally, timber traders are described as 'thugs', whose presence increases local insecurity (New Vision 2013c). At Mount Elgon NP, park rangers were accused of using guns to protect illegal loggers and terrorizing local people who wanted to harvest firewood and medicinal plants from the park (New Vision 2008b). NFA rangers have been attacked or killed by illegal loggers in some FRs. In one instance, a local man signed up to be a ranger at Nakalanga FR but was burnt to death along with his pregnant wife and child in their home after reporting a stockpile of illegal timber on one of his first patrols (New Vision 2009b).

Interventions against the illegal timber trade

The main interventions in place to reduce illegal logging are the mobile alert system established by CARE mentioned above, law enforcement, and regulated resource access (known as collaborative forest management or CFM in forest reserves).

The mobile alert system has been successful to an extent; in the first four months of use, six cartels were reportedly caught, two of them linked to powerful politicians (Espisu 2014). However, although the system has proven successful in highlighting who is involved and the extent of the problem, there is often little serious response and charges are rarely made, because of the status of the people involved (A. Kandole, pers. com.). CARE is now sharing the alerts with selected journalists, so that those involved can be reported in the media before they can be released from prison (Espisu 2014).

Law enforcement suffers similar issues. The NFA is underfunded and understaffed, so in the few areas that patrols go out the rangers are susceptible to bribery (CARE International 2012). Officials who do not give in to corruption are threatened, attacked and even killed (New Vision 2009b). However, increased surveillance and stricter law enforcement was reported to reduce incidences of illegal logging in 2010, although no evidence was provided to support that statement (New Vision 2010).

At Budongo FR, local people were permitted to keep beehives in the forest and collect tree seeds and seedlings to reduce dependence on illegal logging for income. It was successful in that the number of trees being cut in the CFM zones were significantly fewer than in non-CFM zones. However, local people were reported to be dissatisfied due to their reduced income; 88 per cent of households had previously been involved in the timber industry. In addition, local people felt that they had not been as involved as they would have liked in the development of the CFM programme, and felt that benefits had been shared inequitably (Turyahabwe *et al.* 2013). This suggests that, unless changes are made to the way CFM is managed at Budongo FR, it may not be sustainable.

At Kibale NP, another beekeeping programme has been more successful in reducing illegal logging. Beekeepers protect the park in case UWA blames them for illegal activities, and as such, illegal timber harvesting is significantly lower near villages with beekeeping associations (MacKenzie *et al.* 2011).

Appendix 7: Case study – Medicinal plants

Drivers of medicinal plant collection

There are three drivers of illegal medicinal plant harvest; modern healthcare facilities are often too far away or too expensive (Aine-omucunguzi *et al.* 2009; Kamatenesi 1997; Kabagumya 2001; Kapiriri 1997), and many people report that traditional medicine is more effective at treating certain conditions (Eilu *et al.* 2007; Ssegawa and Kasenene 2007; Kabagumya 2001; Twinamatsiko *et al.* 2014).

At Bwindi Impenetrable NP, where various Integrated Conservation and Development (ICD) projects have made modern healthcare available to most people over the past 20 years or so, local people reported that the main reason people harvested medicinal plants from the park was because they were more effective than modern medicines (Twinamatsiko *et al.* 2014). Traditional medicine is particularly sought for gastro-intestinal diseases and psycho-spiritual problems (Harrison 2013; Ssegawa and Kasenene 2007).

Impacts of medicinal plant harvest on people and biodiversity

Access to medicinal plants provides trusted treatment to people who want to need it. A study at Bwindi Impenetrable NP showed that current levels of harvesting of non-timber forest products, including medicinal plants, were not unsustainable (Olupot, Barigyira and McNeilage 2009). There are, however, international concerns over the commercial harvest of the bark of African cherry, *Prunus africana*. The bark is used to treat a variety of illnesses by traditional healers across Africa, including in Uganda, but is also used to treat non-cancerous enlargement of the prostate in Europe and the United States. Overharvesting of the valuable bark for export leaves trees girdled and dying (Jimu 2011).

Interventions for medicinal plant collection

The main intervention specifically targeting the illegal harvest of medicinal plants is regulated resource access. Local people are permitted to harvest medicinal plants at Bwindi and Kibale NPs, which reduces wildlife crime by making it no longer a crime for people to collect the plants. This is beneficial to local people, who then have access to their preferred healthcare when they need it. However, concerns have been raised that the controlled harvest timings restrict people from being able to collect a treatment when they need it (Harrison 2013).



Knowledge
Products

Research Report

April 2015

Biodiversity

Keywords:

*Wildlife Crime, Poverty Alleviation,
Illegal Wildlife Trade, Uganda*

Wildlife crime is an issue of considerable international concern. And with the recent increase in the illegal wildlife trade, and the increasing militarisation with which some kinds of wildlife crime are carried out, concern is growing. Poverty is often cited as a driver of wildlife crime, but wildlife crime, and responses to it, can also have negative impacts on poor people.

Using Uganda as a case study, we review the evidence for the following potential linkages. Is poverty a driver of wildlife crime? What impacts does wildlife crime have on poor people? And what impacts do responses to wildlife crime have on poor people?

Despite contradictory evidence, we conclude that poverty is one driver of wildlife crime among many, and that in general wildlife crime tends to have positive impacts on poor people who engage in it. Improved monitoring and evaluation would allow us to more confidently determine the impact of responses to wildlife crime on local people.

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Bull Bull, the most famous elephant in Kidepo Valley National Park, who damaged one of his tusks in a fight (Credit: Tiziana Zoccheddu 2010)



This review was grant funded by the UK government's Illegal Wildlife Trade Challenge Fund. However, the views expressed are those of the authors and not necessarily those of the UK government or the other institutions involved.