

The Elephant poaching crisis in Tanzania: a need to reverse the trend and the way forward

Author: Kideghesho, Jafari R.

Source: Tropical Conservation Science, 9(1) : 369-388

Published By: SAGE Publishing

URL: <https://doi.org/10.1177/194008291600900120>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Opinion Article

The Elephant poaching crisis in Tanzania: a need to reverse the trend and the way forward

Jafari R. Kideghesho

Sokoine University of Agriculture, Department of Wildlife Management, P.O.BOX 3073, Morogoro, Tanzania. E-mail: kideghesho@yahoo.com or kideghesho@suanet.ac.tz

Abstract

Over the past six years, elephant poaching and the illicit ivory trade have attracted global attention and Tanzania has been slated as one of the worst offenders. During the 2013 CITES Conference of the Parties in Bangkok, Tanzania, along with Kenya, Uganda, Malaysia, Vietnam, the Philippines, Thailand and China were labeled “*the gang of eight*”, singled out as being instrumental in fueling the illegal ivory trade either as suppliers, transit countries, or consumers. Individuals, conservation groups and local and international media have accused the Tanzanian government of inaction and have linked the current slaughter of elephants to increased criminality, corruption, the proliferation of firearms, the failure of the judicial system and a perception that Tanzania is a sanctuary for criminals. Besides tarnishing the image of the country, elephant poaching has undesirable effects on the ecological, economic and security aspects. This paper explores these effects and highlights the need for reversing the current trend of this crime. The paper provides an historical overview of poaching in Tanzania and urges for immediate action to halt the crime. Focusing on factors that are considered key in driving poaching, the paper recommends some proactive measures that should be adopted in order to reverse the current trend. The paper highlights the positive outcomes the adoption of these measures could have for conservation efforts.

Key words: Poaching; wildlife crime; illicit trade; African elephant; Africa; Tanzania

Received: 5 January 2016; **Accepted** 23 January 2016; **Published:** 28 March 2016

Copyright: © Jafari R. Kideghesho. This is an open access paper. We use the Creative Commons Attribution 4.0 license <http://creativecommons.org/licenses/by/3.0/us/>. The license permits any user to download, print out, extract, archive, and distribute the article, so long as appropriate credit is given to the authors and source of the work. The license ensures that the published article will be as widely available as possible and that your article can be included in any scientific archive. Open Access authors retain the copyrights of their papers. Open access is a property of individual works, not necessarily journals or publishers.

Cite this paper as: Kideghesho, J. R. 2016. The Elephant poaching crisis in Tanzania: a need to reverse the trend and the way forward. *Tropical Conservation Science* Vol. 9 (1):369-388. Available online: www.tropicalconservationscience.org

Disclosure: Neither Tropical Conservation Science (TCS) or the reviewers participating in the peer review process have an editorial influence or control over the content that is produced by the authors that publish in TCS.

Introduction

The risk of extinction of one of Africa's most iconic species, the elephant, is growing, mainly because of poaching and habitat loss [1-3]. The African Wildlife Foundation's estimates of the population of five African endangered big mammal species indicate that the black rhino (*Diceros bicornis*) population has dropped by 97.6% since 1960 while fewer than 900 mountain gorilla (*Gorilla beringei beringei*) and only 2,000 Grevy's zebra (*Equus grevyi*) remain [1]. Lion (*Panthera leo*) is considered to have lost 85% of its historic range [1] due to land conversion, mainly for agriculture and settlements. Over the last century, the African elephant (*Loxodonta africana*) population has declined from 3-5 million in 1930s and 1940s to 1.3 million in the 1970s [3] and to less than 500,000 today [4]. Recent reports indicate that over 30,000 African elephants are now being killed per annum [1, 2].

Elephant poaching and the illicit ivory trade rank among the topmost wildlife crimes globally (5-8). The factors driving this crime include a rapid growth in the demand for ivory in Asian countries for fashion and medicinal purposes [5, 6], and unemployment, widespread poverty and corruption in the supply countries [7, 8]. The illicit ivory trade is a low risk and high profit undertaking, and is one of the main reasons making wildlife crime rank fourth after drugs, arms and human trafficking [9, 10]. The global trade of illegal wildlife is estimated to generate between US\$8 billion and US\$10 billion per annum [9, 10]. Because the demand for ivory has skyrocketed in recent years, its price in consumer countries has increased exponentially. For example, demand in China has tripled the price of ivory in just four years from US\$750/kg in 2010 to USD\$2,100/kg in 2014 [11]. High prices stimulate supply and result in increased elephant poaching in the origin countries, where economic and social problems such as poverty, population growth, unemployment, insecurity and corruption are widespread.



Fig. 1 A): Elephants – one of iconic and keystone species found in Tanzania (Photo by V.G. Ndibalema), **B):** An elephant killed for its ivory (Photo by Krissie Clark), **C):** The aircraft crashed while it was tracking a group of elephant poachers near the Maswa Game Reserve, Tanzania (Photo: Mwakilema, 2016), **D):** Ivory found in a car in Dar es Salaam (Photo by Songorwa, 2013), **E):** Ivory from poached elephants (Source: AFP September 9, 2011), **F):** Items made of elephant tusks displayed in a shop in China (Source: Theguardian.com/Environment)

Tanzania has experienced massive poaching of elephants in recent years to supply a growing market which is predominantly in East Asia. The gravity of the problem has led to its classification as one of *'the gang of eight'*, along with Kenya, Uganda, Malaysia, Vietnam, the Philippines, Thailand and China [12]. The recent poaching crisis can be considered the second worst in history, and has come after almost two decades of virtually no elephant poaching in the country. The first crisis occurred between the 1970s and the 1980s and was attributed to the growing demand for ivory in Asian countries and to the global economic recession [13].

The global economic recession had left Tanzania's wildlife and natural resources sector grossly underfunded. Indeed, between 1976 and 1981 the budget allocated to the entire natural resources sector (wildlife, forestry and fisheries) was only US\$52 million (1.2% of the budget)[13]. The wildlife sub-sector has, since then, recorded a steep drop in its budgets and therefore failing to meet its conservation obligations effectively, including those of law enforcement. The allocation for 1982-1985 was US\$14.03m; for 1985-1986, US\$6.81m; for 1986-1993, US\$2.88m and for 1993-1996, US\$0.23m [14]. These budgets have proved too low to combat commercial poaching in Tanzania. While the scientific estimates of budget for effective control of commercial poaching in Africa in 1980s and 1990s stood at a range of US\$200 to US\$400/km² per annum [15], the amount allocated for Selous Game Reserve, Tanzania's largest stronghold of elephants and rhinos, was US\$3/km² [16].

Widespread poaching coupled with inefficient law enforcement in Tanzania was manifested in the dramatic decline of the elephant population to less than 30% of what it was in 1979, a drop from 316,000 to 85,000 by 1987 [17]. This crisis was addressed in early 1990s following a nationwide anti-poaching operation, code-named "Operation UHAI" (*Uhai* is Swahili for 'life'). In this operation, the government deployed officers and soldiers from the Tanzania People's Defence Forces, the Tanzania Police Force and the wildlife authorities. The international ban on ivory trade, which was imposed by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), complemented this strategy [13].

The recent elephant poaching crisis has seen a drop of the country's elephant population from 142,788 in 2006 to 109,051 in 2009 [18, 19]. Since then, the situation has worsened with an average of 30 elephants being killed every day and huge consignments of ivory been seized within and outside Tanzania. In 2013, the population of elephants stood at 50,500 [19] and plummeted further to 43,521 in 2015, representing a drop of about 60% in a period of five years [20]. In the Selous-Mikumi ecosystems, the population dropped from 70,406 in 2006 to 38,975 in 2009 and to 13,084 in 2013 [21]. In the Ruaha-Rungwa ecosystem, another stronghold of elephants, the population plummeted by 37% from 31,625 in 2009 to 20,090 in 2013 [22]. Between 2010 and 2013, a total of 34.1 tonnes of ivory was seized from 208 recorded incidences within Tanzania and eight outside [23].

Why should the trend be reversed?

Elephant poaching and other wildlife crimes have severe impacts economically, politically, socially and ecologically. These impacts include political conflicts and an increase in global insecurity; the erosion of government credibility internationally; the destruction of natural habitats; the decline in wildlife populations and, in some cases, the increased vulnerability of species to extinction; stress on the tourism sector and, consequently, reduced government revenues; and diminished local support for conservation due to minimal benefits realized from conservation of wildlife. As a result of these effects, global demand to halt elephant poaching and the illicit ivory trade is growing. This paper discusses this demand and the negative impacts of poaching and seeks to provide a rationale for intensifying the war against elephant poaching. Fig. 2 below provides a roadmap of this discussion.

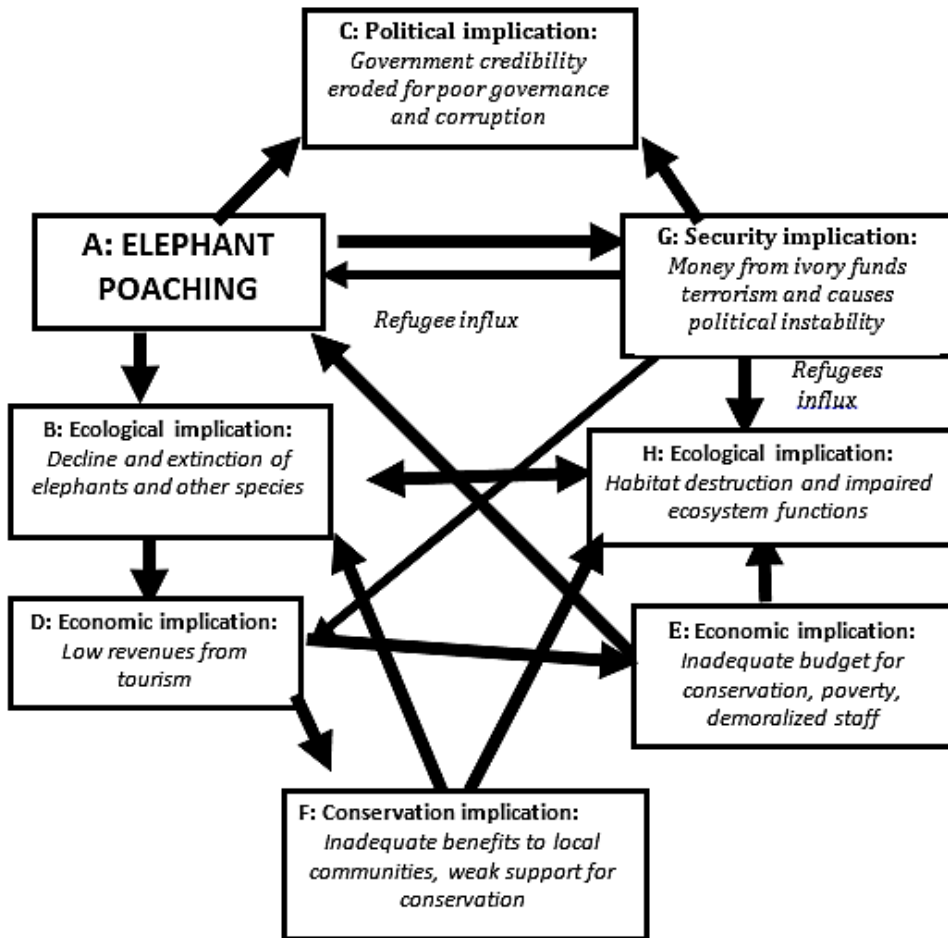


Fig.2: Schematic presentation of the implications of elephant poaching in ecological, economic, political and security aspects.

Halting elephant poaching is a global demand

The current elephant poaching surge has attracted the attention of numerous prominent individuals and institutions at local and global levels, expressing concern over the crisis and calling for immediate measures to halt it. For example, in July 2013 the US President, Barack Obama, issued an Executive Order on Combating Wildlife Trafficking, stressing the urgency of treating wildlife crime as a serious crime on par with narcotics and arms trafficking [24]. In the same vein, the Prince of Wales, Charles, and the Duke of Cambridge, William, launched an Anti-poaching Campaign with a video plea calling for prompt action among the world leaders to end the illegal wildlife trade. In this video, which was released ahead of the London Conference on the Illegal Wildlife Trade held in February 2014, William warned of the ecological, economic and political consequences of wildlife crime, referring particularly to the current wave of elephant poaching [25]. The urgency of stemming illegal elephant poaching has also been demonstrated in the deliberations of world leaders in the following conferences and summits:

a) **London Conference (12-13 February 2014):**

Forty-one countries and the EU agreed to take urgent and decisive action to combat wildlife crimes, which threaten national security and sustainable development as well as populations of iconic species, such as elephants, rhinos and tigers. The output of this conference was the London Declaration. The declaration resolved to reverse the trend of increasing illegal wildlife trade by adopting a number of measures including eradicating the market for illegal wildlife products, ensuring effective legal frameworks and deterrents were in place, strengthening enforcement and supporting sustainable

livelihoods and economic development. The Conference proceedings also aimed to build on and strengthen wider global efforts to tackle the illegal wildlife trade [26].

b) ***African Union Executive Council, 25th Ordinary Session in Malabo, Equatorial Guinea (20-24 June 2014):***

The Council expressed concern over the dramatic escalation of illegal trade in wild flora and fauna in recent years and called upon the Commission on African Wild Flora and Fauna Conservation and Illegal Trade in Wildlife to collaborate with other partners to develop strategies for the protection and conservation of wildlife. The Council also urged all member states to sign and ratify the Convention on International Trade in Endangered Species of wild Fauna and Flora (CITES). It also called upon all nations to apply zero tolerance approaches and take decisive and urgent action to strengthen laws and policies. It further insisted that all nations should engage with communities to strengthen grassroot deterrence strategies against wildlife crimes and related criminal activities such as corruption, money laundering, organized crime, illicit firearms, drugs and terrorism. The Council underscored a need to strengthen national judiciary sectors, promoting better awareness, capacity and more resources to ensure that prosecutions for illicit wildlife trafficking are conducted effectively, to the full extent of the law and using the strongest penalties available [27].

c) ***Kasane Conference (25 March 2015):***

Heads of States, ministers and officials from 31 governments met in Kasane, Botswana and reaffirmed their determination to scale up their response to the global poaching crisis, and adopt new measures to tackle the unprecedented surge in illegal wildlife trade. The conference resulted in the 'Kasane Statement on the Illegal Wildlife Trade'. The Statement recognizes the significant detrimental economic, security, social, and environmental impacts of the illegal trade in wildlife. It builds upon the commitments in the London Declaration to eradicate the market for wildlife products, ensure effective legal frameworks and deterrents against wildlife crimes, strengthen law enforcement, and support sustainable livelihoods [28].

d) ***Brazzaville, Congo (27-30 April 2015):***

The Conference sought to advance the first-ever Africa-wide strategy and action plan to tackle the illegal trade in wild fauna and flora. The output of this conference was the Brazzaville Declaration in which 20 deliberations were made [29]. The Declaration requested the African Union Assembly to urge all African countries to comply with their international obligations, review and amend national legislation in order to criminalize poaching and wildlife trafficking, coordinate their efforts in the enforcement of laws and ensure those offenses are considered as serious crimes within the framework of the United Nations Convention against Transnational Organized Crime [29].

e) ***Arusha, Tanzania (8 November 2014):***

Regional African countries of the East African Community (EAC) and Southern African Development Community (SADC) signed the Arusha Declaration, calling for a comprehensive list of activities to strengthen trans-border collaboration on combating wildlife/environmental crimes and advancing conservation work. The signatories included Burundi, Kenya, Mozambique, South Sudan, Tanzania, Malawi, Uganda, and Zambia. The member states agreed to implement 20 measures to address the problems of wildlife crimes. These measures included collaborating in combating illegal off-take; combating the unsustainable utilization of wildlife; and addressing the illegal trafficking of wildlife and other natural resources across the region. Other measures included sharing, developing and improving databases and protocols for intelligence sharing and joint investigations; developing protocols for the joint training and patrolling of wildlife and environmental law enforcement agencies where appropriate; working towards the strengthening of the Lusaka Agreement and other regional protocols already in place; and coordinating the harmonization of wildlife and environmental crime enforcement

and penalties, with particular reference to elevating certain wildlife and environmental crimes to the level of serious crimes [30].

Elephant is a keystone and umbrella species

Along with other browsing mammals and fire, the African elephant plays a crucial role in shaping the structure and functioning of savannah ecosystems [31-34]. Because of this role the elephant has been classified as a keystone species and an ecosystem engineer [32]. In the course of feeding, elephants break, fell and uproot trees and thus reduce the tree density and bush cover of the grasslands, open up space for other plants that cannot survive in the shade of forests. In so doing, they maintain suitable habitats for many other species in savannah and forest ecosystems including browsing and grazing animals [31]. Furthermore, about a third of tree species in central African forests rely on elephants for seed dispersal [35]. Poaching, and its impact on this keystone species, therefore has a huge knock on effect throughout the ecosystem [36].

Besides its role as a keystone species and an ecosystem engineer, the elephant is also an umbrella species. Umbrella species are those with large area requirements. When their habitats or home ranges are sufficiently protected, many other species hosted in these home ranges are also protected [37-40]. Essentially, umbrella species are species that are of high priority in conservation. Elephant poaching, therefore, has undesirable effects not only on elephants but also on a large number of co-occurring species.

Elephant poaching can erode a government's credibility

The mass killing of elephants has brought Tanzania under criticism from the local and international community. Criticisms have been linked to poor governance, lack of accountability and corruption. Local and international media, conservation groups and politicians have implicated some senior government officials in this crime. For instance, a British journalist, Martin Fletcher, queried the country's top authorities for turning a blind eye to the rampant poaching of elephants [41]. The Environmental Investigation Agency [19], on the other hand, linked the current poaching crisis with increased criminality, corruption, the proliferation of firearms, the failure of the judicial system and a perception that Tanzania is a sanctuary for criminals. During the 2013 CITES Conference of the Parties (COP 17) held in Bangkok, Tanzania and seven other countries – Kenya, Uganda, Malaysia, Vietnam, the Philippines, Thailand and China - were labeled “*the gang of eight*” for being instrumental in fuelling the illegal ivory trade either as suppliers, transporters or consumers [12].

Criticisms for poor performance in combating elephant poaching directed to Tanzania and other countries prompted pressure from conservation activists, urging severe measures against these countries. One of the measures that have been implemented is banning the import of elephant trophies by United States of America [42] and members of the European Union [43] (also see Table 2). These countries are the main markets for wildlife trophies sustaining hunting industry in Tanzania.

Finger pointing at government officials has implications socially and politically, regardless of whether the allegations are genuine or false. It lowers citizens' trust in their government and may encourage criminality, corruption and even rebellion. The following words of an elder in Olasiti village, adjacent to Tarangire National Park, illustrate this fact:

It is awfully unfair to arrest a poor woman collecting dead branches of trees from the park for cooking or gaol a man who kills a rabbit to feed his kids while nothing happens to ‘*Wakubwa*’ [well-off people and top government officials] who are mercilessly killing thousands of elephants, not for survival but for greed (pers. comm., 5 August, 2015).

Elephant is one of the principal resources in the tourism industry

Tourism is an important vehicle for economic development as demonstrated by its contribution to the Gross Domestic Product (GDP), employment, visitor exports [i.e., spending within the country by international tourists for both business and leisure trips, including transportation spending], domestic spending, business spending, and capital investment (Appendix 1). Over 80% of Tanzania's tourism is wildlife-based and is mainly stimulated by charismatic species, particularly the Big Five – elephants, rhinos, lions, buffaloes (*Syncerus caffer*) and leopards (*Panthera pardus*). Because these species are threatened, their contribution to the tourism sector is lessened. The black rhino is critically endangered with only few individuals remaining in the country [44] while the population of lions is dwindling due to loss of habitat and because of retaliatory killings by local communities [45-48]. The increase in elephant poaching has further depleted the country's 'Big Five' populations, and threatens other species whose survival depends on the role of these animals as keystone and umbrella species. This has negative implications for both the local and national economy due to loss of revenue from the tourism sector and the impact on associated businesses and interests (Appendix 1).

Besides the loss of species valuable to tourism, the sector is also threatened if revenue from elephant poaching is used to fund civil wars and terrorist activities (Fig. 2), as happened just over a decade ago, when the number of international tourists to Tanzania and Kenya dropped dramatically in response to political instability and terrorist activities [49,50]. The gravity of elephant poaching in Tanzania affected the country economically because of international trade embargoes imposed on the sale and export of trophies - even those obtained legally through the consumptive utilisation of wildlife (Appendix 2). This has deprived the country of much needed revenues that could have been used to support conservation efforts and channeled into poverty relief programs.

Elephant poaching impacts conservation budgets

Historically, the budget allocated for wildlife conservation in Tanzania has been too low to fund effective law enforcement. For instance, the government allocated the wildlife sector US\$6.5 million for three years (2010-2012), only 10% of the budget requirement [52]. This suggests that wildlife is receiving minimal priority among the government sectors, despite its immense contribution to the national coffers. If this is the case at a time when elephants and other wildlife species are being decimated, it is unlikely that commitment will increase if their numbers become so low with insignificant contribution to the economy. Previous experience has shown that there is a strong link between inadequate conservation budgets and an increase in wildlife crimes in Tanzania [13, 16, 53].

Furthermore, given the meagre financial resources allocated to the wildlife sector, it is apparent that compliance with and enforcement of international commitments and obligations to combating wildlife crime cannot be effective. For example, the Worldwide Fund for Nature (WWF) report on the compliance with and enforcement of CITES commitments for tigers, rhinos and elephants grouped 22 countries involved in illegal trade in these species into three groups [54]. The first group received a green score, indicating adequate performance, the second a yellow score indicating a need for improvement, and the third a red score, implying very poor performance (Appendix 3). Tanzania was one of seven countries that received a yellow score for both elephants and rhinos which, although not as bad as a red score, implies inadequate performance.

Poaching weakens local and global support for conservation

Tanzania, like other developing countries, has subscribed to conservation policies that seek to strike a balance between conservation and development goals. These policies have arisen in response to local resistance to previous conservation policies which were exclusive, prohibitive and punitive. The new policies seek to provide local communities with tangible benefits from wildlife resources as a way of motivating them to align their behaviours with the conservation goal through refraining from activities which are ecologically destructive, such as poaching and habitat destruction. The Tanzania Wildlife Policy

stresses the need to ensure that wildlife conservation competes effectively with other land uses, and in so doing transforming wildlife from a liability to an asset [55].

Realizing this ambition requires that healthy populations of wildlife species are maintained. If poaching continues unabated, it is impossible for local communities to access adequate benefits that will inspire them to support conservation efforts. Numerous studies have shown that if conservation activities do not make a tangible contribution to poverty reduction or if the benefits arising from conservation do not outweigh the costs and exceed returns that may have been realised through alternative, albeit ecologically damaging, land uses, then local support will not be maintained [56-59]. Local communities sharing land with wildlife are likely to engage in poaching and encroach on habitats as a coping strategy against poverty and as a compensation for the economic losses caused by conservation through opportunity costs, crop damage, livestock depredation, wildlife-related accidents and diseases transmission [60,61](See also Fig. 2).

Essentially, it is only realistic to expect local support for conservation efforts when the returns from legal economic endeavours exceed the returns generated by wildlife crimes, and when it substantially improves the local economy [60, 61]. If poaching has minimal financial risks and greater financial reward, people will engage in it. A study in the Serengeti found that poaching was rife because it paid more than other economic activities. The majority of poachers (96%) earned an average income of US\$425 per annum, while revenues from crops were US\$79, from livestock, US\$61 and from small businesses, US\$118 [62]. Holmern *et al.* estimated that illegal hunting for bush meat was 45 times more profitable than for bush meat obtained legally from wildlife cropping schemes [63].

The effect of poaching on wildlife populations, and hence the reduction in tourism revenues, translate into a situation where benefits from conservation initiatives cannot outweigh the conservation costs incurred by local communities through property damage and opportunity costs (i.e., the alternatives forgone as a result of conservation). Over a decade ago, the estimated costs of living with wildlife in the Serengeti were 250 times greater than the benefits earned from conservation initiatives [64]. Such a scenario means that there is little incentive for local communities to buy into conservation and undermines the government's declaration that conservation is only pursued if development needs are not compromised. It prompts perceptions that there is no genuine commitment to this agenda.

Elephant poaching is also threatening the global status of key protected areas, which results in less support for conservation from the international community. For instance, on 18th June 2014, the World Heritage Committee in its 38th Session held in Doha, Qatar, added the Selous Game Reserve to the List of World Heritage in Danger because of rampant poaching and, consequently, the dramatic decline in wildlife populations, especially elephants and rhinos [65]. The population of the two species has dropped by almost 90% since 1982, when Selous was added to the World Heritage List. The reserve, covering 50,000 km², is one of the largest protected areas in Africa and is renowned for its populations of elephant, black rhinoceros, cheetah, giraffe, hippopotamus and crocodile, amongst many other species. It also has an exceptionally high diversity of habitats making it a valuable laboratory for on-going ecological and biological processes.

Elephant poaching is a security and humanitarian issue

Elephant poaching, along with other wildlife crimes, is increasingly being perceived as a security and a humanitarian issue, linked to civil wars and terrorism in Africa [66-78]. The role of wildlife crime in fuelling insecurity has been acknowledged globally by prominent figures, as is evident from the following quotations:

The environmental, economic and social consequences of wildlife crime are profound. Of particular concern are the implications of illicit trafficking for peace and security in a number of countries where organized crime,

insurgency and terrorism are often closely linked. [The UN Secretary-General, Ban Ki-Moon on World Wildlife Day, March 2014].

Today wildlife crime has become a serious threat to the sovereignty and stability of some of our countries. More and more of the profits are used to finance civil conflicts and terrorist-related activities. Furthermore, illicit wildlife trafficking is often linked to other forms of illegal trafficking and to money laundering. Over and over again, all across Africa, we have seen poachers move into peaceful regions blessed with rich natural assets, initiating a spiral of criminality and suffering that ends in civil war. [Gabon President, Ali Bongo, at the African Development Bank 2013 Annual Meeting].

Illegal wildlife trade is more than simply a danger to the natural world - it's a threat to global stability and security. It's time for wildlife crime to be made a priority by world leaders and law enforcers. [The Prince of Wales and Duke of Cambridge, at a high-profile international conference at St James' Palace, London, on 21 May 2015, focusing on the urgent battle to end illegal trade in wildlife].

The rebel and terrorist groups believed to have benefited financially from elephant poaching include Somalia's al-Shabaab, which is thought to earn some 40% of its revenues through illegal trade on ivory obtained from northern Kenya [70]; Uganda's Lord Resistance Army (LRA), rebels in the Democratic Republic of Congo (DRC) [72]; Darfur's Janjaweed, which has targeted elephants in Chad, Cameroon, the Central Africa Republic and northern DRC [71, 73]; and Nigeria's Boko Haram through killing elephants in Cameroon [74, 75].

Civil wars and insurgency have had a notable impact on elephant populations in Africa. For instance, following the operations of Sudan People's Liberation Army – SPLA, Southern Sudan recorded a loss of over 95% of its elephant population from over 130,000 in 1986 to 5000 in 2012 [76,77]. In February 2012, Cameroon's Bouba N'Djida National Park suffered a loss of about 80% (over 300) of its elephant population, killed by Sudanese rebels [78]. This mass killing prompted intervention by Central African countries which deployed about 1,000 soldiers and law-enforcement officials in a special operation to safeguard the region's last elephant populations [78].

Elephant poaching contributes to refugee problems and environmental destruction

Through funding civil wars and terrorist activities, elephant poaching indirectly forces people to flee their home countries and seek refuge elsewhere. The influx of refugees to many countries has proved to be a social, economic, political and ecological burden. Socio-economic problems to host communities include diseases, competition for water and firewood, destruction of infrastructure such as school buildings and desks [79], banditry, and other property crimes such as robbery and theft [79, 80].

Refugees have contributed immensely to deforestation and wildlife poaching in host countries. The 1990s influx of refugees who fled from the civil wars in Rwanda, Burundi and DRC to western Tanzania is a good example. Illegal bush meat hunting became a coping strategy for refugees. This resulted in the loss of over 90% of the population of ungulates in Burigi-Biharamulo Game Reserves [81, 82]. Refugees also harvested the forests and woodlands for fuel wood and construction poles, leading to serious land degradation [83-85]. Following four years of deforestation in forest reserves, forest regeneration declined by 35% [83]. The consumption of 1,200 tons of fuel wood per day was recorded at the peak of the Rwanda refugee crisis in the Kagera Region alone [84]. The average daily consumption of fuel wood in 1997 was 300 metric tons [85].

The way forward

Poaching is driven by numerous motives. These include a high demand for wildlife products, inadequate benefits accruing to local communities from conservation activities, poverty and unemployment, population pressure, inadequate funds for conservation, corruption and political instability. Taking into

account of these motives, this section outlines some strategies that could help to combat elephant poaching in Tanzania.

Control demand for ivory in consumer countries

Elephant poaching in supply states is a response to the high demand for ivory in consumer countries which elevates prices and generates high returns to those participating in this illegal trade. Controlling demand would lessen this problem significantly. Possible strategies to achieve this, which should be rolled out in destination countries, include conducting public interest campaigns to raise awareness about the risk posed to elephants through buying ivory; setting up effective domestic market enforcement mechanisms for controlling the ivory market; changing social norms supporting the consumption of ivory; or banning the trade completely [86]. CITES should contribute to controlling the market in destination countries.

Increase benefits to local communities

Elephant poaching often escalates because of the support local communities give to wealthy commercial poachers. This is because returns from poaching greatly exceed legal economic activities, making it an important livelihood and coping strategy among the poor communities [56, 60, 61]. In order to win local support in fighting elephant poaching and other wildlife crimes, it is imperative that conservation authorities revise their benefit-sharing schemes to ensure that returns from conservation schemes are sufficient enough to deter local people from participating in poaching activities. While benefits to communities from conservation activities can hardly exceed returns generated through elephant poaching for ivory, they can nevertheless strengthen the local economy and this, along with awareness campaigns and improved law enforcement, could reduce the problem significantly.

Address the problem of household poverty and unemployment

Impoverished people are more likely to commit crimes to meet their daily needs as they cannot always obtain them through legitimate means. Poaching is one of the property crimes occurring in Tanzania, which is perceived as a way of combating food and income poverty among the majority of the poor and unemployed youth living in wildlife rich areas [60-63, 87-90]. Strategies aimed at addressing household poverty and unemployment, therefore, have the potential to minimize the problem of poaching and other wildlife crimes. Possible strategies to this end include the improvement of existing economic sectors which are environmentally friendly; increasing job creation through industrialization; and policies aimed at making technology, training, credit, marketing and distribution channels more easily accessible to small business.

Ensure adequate budget and other support for conservation

The minimal budget allocation to the wildlife sector undermines law enforcement activities including patrols, prosecution, investigations and intelligence gathering. The government and its partners in development should allocate adequate funds for conservation activities. More importantly, the government should support conservation efforts and avoid the scenario of 'milking a cow without feeding it'. For example, it is paradoxical for government departments such as Treasury and Tanzania Revenue Authority to turn down requests for tax exemptions on vehicles and firearms imported by or donated to wildlife authorities for the purpose of reinforcing anti-poaching operations and yet look at these authorities as a strategic source of revenues to feed the government coffers.

Address the challenge of political interests overriding professionalism

Political interference on conservation work leaves wildlife officers unable to exercise their professionalism and enforce law effectively as many are demoralised and fear retaliation from politicians. Some politicians have assumed such power that their actions cannot be challenged, even when they are wrong. It is imperative that professionalism is respected and the behavior of politicians which is destructive to conservation regulated. Commitment from the top government officials is required to ensure observance of the principles of good governance and ethical leadership among the politicians. Education and raising

awareness along with taking disciplinary action against those failing to comply with ethical leadership may help to pre-empt unacceptable behaviour that frustrates conservation efforts. The approach of the fifth phase government under the leadership of Dr John P. Magufuli, fostering accountability and good governance, is the right direction to changing the current scenario.

Intensify the war against corruption

It is indisputable that corruption contributes to elephant poaching and the ivory trade. The vice is a function of weak institutional, legal and regulatory systems along with an increasing lack of any moral sense of right and wrong among the government officials. The problem can be addressed by strengthening institutional, legal and regulatory systems for combating corruption, adopting a policy of zero tolerance for corruption, imposing heavy penalties on corrupt officials, and by improving living standards for civil servants.

Promote political stability within and outside the country

The impacts of political unrest and of refugees on wildlife species in Tanzania are well documented [7, 80-85]. The fact that the effects of political unrest can spill over into neighbouring countries and affect the wildlife in these countries shows that it is imperative that all possible strategies are employed to maintain peace in the entire region. In order to meet this ambition, Tanzania should take a lead in advocating and ensuring that the principles of good governance, democracy and accountability are observed within and beyond its boundaries. Social problems such as inequality, injustice, corruption and nepotism should be fought at all costs as a way of maintaining peace.

Capitalize on existing opportunities

The war against elephant poaching is faced with numerous challenges. However, there are opportunities which can be used to win this war. These include increasing public awareness about the negative impacts of poaching and growing public pressure to combat poaching; the presence of relevant policies, plans and strategies (at local and global levels) aiming at addressing the problem of poaching and/or the factors which drive it; growing international concern over elephant poaching and the illicit ivory trade; and the willingness and commitment of support from the international community as is demonstrated by the declarations made in various international fora and by prominent world personalities [24-29].

Implications for conservation

Elephant poaching continues to be a sad reality and Tanzania is one of the worst offenders. The ecological, political, economic and security implications of this crime as presented in this paper provide sufficient rationale for interventions to halt this problem. Understanding the factors motivating this crime provides an entry point to this end. As a way forward, this paper has recommended some measures to combat some of the factors believed to be driving the current wave of elephant poaching. Reversing the trend of elephant poaching and other wildlife crimes has positive implications to conservation through:

a) Guaranteeing sustainable tourism industry

Elephants are a significant source of revenue which is generated through tourism (both consumptive and non-consumptive). The value of a single elephant over its life time (60-70 years) when viewed through a non-consumptive lens (tourism) is estimated at US\$1,607,624.83 with an annual financial contribution of US\$22,966 [91]. However, poaching risks the loss of these revenues. In 2013, for example, elephant poaching deprived Africa's tourism industry and local communities and economies of about US\$45 million [91]. Efforts to reverse the current trend of poaching will help to guarantee a sustainable tourism industry through which some of the revenue generated will be used to fund conservation work. Furthermore, a sustainable revenue stream to local economies through tourism activities motivates policy makers to pass effective measures to safeguard wildlife species including elephants.

b) *Restoring government credibility internationally*

Rampant elephant poaching has tarnished Tanzania's image internationally following growing criticism over poor accountability, poor governance and corruption (12, 19, 41). Reversing the trend of poaching is important to restoring a good image of the country and, therefore, attracting support for conservation and development programmes.

c) *Enhancing protection and the survival of other species*

Survival of elephants helps to guarantee the survival of other species of ecological, cultural and economic importance due to the ecological role that elephants play as a keystone and an umbrella species.

d) *Reducing ecological damage from insecurity and related impacts*

As shown earlier, the illicit ivory trade is increasingly becoming an important source of funding for civil wars and terrorist activities in Africa [66-78]. Civil wars and terrorist operations are linked to ecological problems such as wildlife poaching and deforestation perpetrated by rebels and refugees [7, 80, 82-85]. Halting elephant poaching is, therefore, important to ending these operations and hence forestalling illegal activities directed at wildlife species and their habitats.

Acknowledgments

I am deeply indebted to the Editorial board for their support and allowing me to publish in Tropical Conservation Science. I thank two anonymous reviewers for their constructive criticism which has immensely shaped this paper. Lastly, I am grateful to Mr Fredrick Chiwanga for reading the manuscript and correcting English. Nahavachenyi mnu.

References

- [1] African Wildlife Foundation (AWF). n.d. Africa is home to the world's most iconic wildlife: but poaching might destroy it forever. <https://www.awf.org/campaigns/poaching-infographic/> Accessed on 08 August, 2015.
- [2] Skinner, N. 2014. African elephant numbers collapsing. Long-awaited study suggests that many of the continent's elephant populations could be wiped out in ten years. *Nature* www.nature.com/news/african-elephant-numbers-collapsing-1.15732.
- [3] Worldwide Fund for Nature (WWF). 2015. Human-Elephant Conflict. http://wwf.panda.org/what_we_do/endangered_species/elephants/. Accessed on 7 August, 2015.
- [4] IUCN (2015). Updated African Elephant Database reveals declining elephant populations. www.elephantdatabase.org, Accessed on 30 January 2016.
- [5] Ripple, W.J., Newsome, T.M., Wolf, C., Dirzo, R. et al. 2015. Collapse of the world's largest herbivores. *Science Advances*, May 2015 DOI: 10.1126/sciadv.1400103. Accessed on 10 July 2015.
- [6] Wildlife Trade Monitoring Network (TRAFFIC). 2012. Illegal hunting and trade of wildlife in savanna Africa may cause conservation crisis. *ScienceDaily*, 12 October 2012.
- [7] Kideghesho, J.R. and Msuya, T.S. 2012. Managing the wildlife protected areas in the face of global economic recession, HIV/AIDS pandemic, political instability and climate change: experience of Tanzania. In: *Protected Areas Management*. Sladonja, B. (Ed), pp.65-91. INTECH Open Science/Open minds.
- [8] Environmental Investigation Agency (EIA). 2014. *Vanishing point: criminality, corruption and the devastation of Tanzania's elephants*. Environmental Investigation Agency, Washington DC. <http://eia-international.org/wp-content/uploads/EIA-Vanishing-Point-lo-res1.pdf>. Accessed on 10 July, 2015.

- [9] Convention on International Trade for Endangered Species of Flora and Fauna (CITES). 2013. *Wildlife crime ranks among trafficking in drugs, arms and humans*. http://cites.org/eng/news/sg/2013/20130926_wildlife_crime.php. Accessed on 15 July, 2015.
- [10] United Nations Office on Drugs and Crime (UNODC). 2015. *Wildlife crime worth USD 8-10 billion annually, ranking it alongside human trafficking, arms and drug dealing in terms of profits*. UNODC chief. <https://www.unodc.org/unodc/en/frontpage/2014/May/wildlife-crime-worth-8-10-billion-annually.html>. Accessed on 10 July, 2015.
- [11] Stiles, D. 2014. *Opinion: can elephants survive a continued ivory trade ban?* <http://voices.nationalgeographic.com/2014/09/15/opinion-can-elephants>. Accessed on 9 July, 2015.
- [12] Otieno, J. 2013. *CITES threatens sanctions on 'Gang of Eight' over poaching, illegal ivory trade*. <http://www.theeastafrican.co.ke/news/East-Africa-joins-the-infamous-Gang-of-Eight-over-poaching/>. Accessed on 9 August, 2015.
- [13] Yeager, R. 1986. Land use and wildlife in modern Tanzania. In: *wildlife, wild death: land use and survival in Eastern Africa*. R. Yeager, and N.N. Miller (Eds.), pp.21-65. State University of New York Press, Albany, New York.
- [14] Wildlife Sector Review Task Force (WSRTF). 1995. *A Review of the Wildlife Sector in Tanzania*. Volume 1: Assessment of the Current Situation. Ministry of Tourism, Natural Resources and Environment, Dar es Salaam, Tanzania.
- [15] Leader-Williams, N., Albon, S.D. and Berry, P.S.M. 1990. Illegal exploitation of black rhinoceros and elephant populations: patterns of decline, law enforcement and patrol effort in Luangwa Valley, Zambia. *Journal of Applied Ecology* 27(3):1055–1087
- [16] Baldus, R., Kibonde, B. and Siege, L. 2003. Seeking conservation partnerships in the Selous Game Reserve, Tanzania. *Parks* 13(1):50–61.
- [17] Princen, T. 1994. Ivory trade ban: NGOs and international conservation. In: *The Environmental NGOs in world politics: linking the local and the global*. Finger, M. and Princen, T. (Eds), pp.121–159. London, Routledge
- [18] Convention on International Trade for Endangered Species of Flora and Fauna (CITES). 2010. *CITES Cop15, Doc. 68 annexe 6a*, 2010.
- [19] Environmental Investigation Agency (EIA). 2014. *Vanishing point: criminality, corruption and the devastation of Tanzania's elephants*. Washington DC. <http://eia-international.org/wp-content/uploads/EIA-Vanishing-Point-lo-res1.pdf>. Accessed on 10 July, 2015.
- [20] Cornell, M. 2015. *Is the worst of Tanzania's elephant crisis over? After announcing devastating elephant losses, a top Tanzanian minister says poaching is now on the decline*. news.nationalgeographic.com/.../150713-elephants-poaching-ivory-tanz... Accessed on 9 August, 2015.
- [21] Tanzania Wildlife Research Institute (TAWIRI). 2013a. *Aerial census of large animals in the Selous-Mikumi ecosystem – population status of African elephant, 2013*. Arusha, Tanzania.
- [22] Tanzania Wildlife Research Institute (TAWIRI). 2013b. *Aerial census of large animals in Ruaha-Rungwa ecosystem – population status of African elephant, 2013*. Arusha, Tanzania.
- [23] Wildlife Division. Unpublished data. *Elephant ivory seizure within and outside the country from 2010 to 2013*. Ministry of Natural Resources and Tourism, Dar es Salaam, Tanzania.
- [24] The White House. 2013. *Executive order - combating wildlife trafficking*. <https://www.whitehouse.gov/the-press-office/2013/07/01/executive-order-combating-wildlife-trafficking>. Accessed on 5 July, 2015.
- [25] Foley, J.A. 2014. *Prince Charles and Prince William speak out against poaching and illegal wildlife trade*. <http://www.natureworldnews.com/articles/5988/20140211/prince-charles-william-speak-out-against-poaching-illegal-wildlife-trade.htm>. Accessed on 18 August, 2015.
- [26] UK Department for Environment, Food and Rural Affairs. 2015. *London conference on the illegal wildlife trade 12-13 February 2014 declaration*. Department for Environment, Food & Rural Affairs, Department for International Development, Foreign & Commonwealth Office and Home Office https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/281289/london-wildlife-conference-declaration-140213.pdf

- [27] African Union. 2014. *Decision on African wild flora and fauna conservation and illegal trade in wildlife* Doc. EX.CL/843(XXV). http://www.au.int/en/sites/default/files/decisions/9662-ex_dec_813-850.pdf. Accessed on 25 January, 2016.
- [28] UK Department for Environment, Food and Rural Affairs. 2015. *Kasane conference on the illegal wildlife trade, 25 March 2015, Statement*. Department for Environment, Food & Rural Affairs. <https://www.gov.uk/government/uploads/.../kasane-statement-150325.pdf>. Accessed on 25 January, 2016.
- [29] TRAFFIC. 2015. *International conference on illegal exploitation and illicit trade in wild flora and fauna in Africa 27-30 April 2015, Brazzaville*. www.traffic.org/.../BRAZZA%20DECLARATION%20FINAL_EN.pdf. Accessed on 25 January, 2016.
- [30] ICCF. 2015. *The Arusha declaration on regional conservation and combating wildlife/environmental crime*. http://iccfoundation.us/publications/Arusha_Declaration_Regional_Conservation_Combating_Wildlife_Environmental_Crime.pdf. Accessed on 25 January, 2016.
- [31] Pringle, R.M. 2008. Elephants as agents of habitat creation for small vertebrates at the patch scale. *Ecology* 89:26–33.
- [32] du Toit J.T., Moe, R. and Skarpe, C. 2014. Elephant mediated ecosystem processes in Kalahari-Sand Woodlands. In: *Elephants and savanna woodland ecosystems: a study from Chobe National Park, Botswana*. Skarpe, C., du Toit, J.T. and Moe, R. (Eds.), pp.30-40. John Wiley & Sons, Ltd.
- [33] Kohi, E.M. 2013. *The bulldozer herbivore: how animals benefit from elephant modifying an African savanna*. PhD thesis, Wageningen University, Wageningen.
- [34] Kohi, E.M., de Boer, W.F., Peel, M.J.S., Slotow, R., van der Waal, C., Heitkönig, I.M.A., Skidmore, A., and Prins, H.H.T. 2011. African elephants *Loxodonta africana* amplify browse heterogeneity in African savannah. *Biotropica* 43:711–721.
- [35] Campos-Arceiz, A. and Blake, S. 2011. Megagardeners of the forest – the role of elephants in seed dispersal. *Acta Oecologica* (Science Direct) 37:542–553. doi:10.1016/j.actao.2011.01.014.
- [36] Cromsigt J.P.G.M. and de Beest, M. 2014. Restoration of a megaherbivore: landscape-level impacts of white rhinoceros in Kruger National Park, South Africa. *Journal of Ecology*, DOI: 10.1111/1365-2745.12218.
- [37] Caro, T.M. 2010. *Conservation by proxy: indicator, umbrella, keystone, flagship and other surrogate species*. Island Press, Washington.
- [38] Caro, T.M. 2003. Umbrella species: critique and lessons from East Africa. *Animal Conservation* 6 (2):171-181.
- [39] Rowland, M.M., Wisdom, M.J., Suring, L.H. and Meinke, C.W.. 2006. Greater sage-grouse as an umbrella species for sagebrush-associated vertebrates. *Biological Conservation* 129:323–335.
- [40] Roberge, J.M. and Angelstam, P. 2004. Usefulness of the umbrella species concept as a conservation tool. *Conservation Biology* 18:76-85.
- [41] Fletcher, M. 2014. Tanzania slaughters over 11,000 elephants a year for the bloody trade in tusks and its President turns a blind eye, so will the Prince really shake hands with him? *Daily Mail on Sunday*, <http://www.dailymail.co.uk/news/article-2554773/Tanzania-slaughters-11000-elephants-> Accessed on 9 July, 2015.
- [42] United States Fish and Wildlife Service (US-FWS). 2014. *Import of elephant trophies from Tanzania and Zimbabwe*. US Fish and Wildlife Service – International Affairs. <http://www.fws.gov/international/permits/by-activity/sport-hunted-trophies.html>. Accessed on 30 June, 2015.
- [43] European Union (EU). 2015. *Information on the EU ban on the import of elephant hunting trophies from Tanzania, Mozambique and Zambia*. ec.europa.eu/environment/cites/pdf/elephanttrophies.pdf. Accessed on July 24, 2015.
- [44] Emslie, R. 2012. *Diceros bicornis*. *The IUCN red list of threatened species*. Version 2015.2. www.iucnredlist.org. Accessed on 08 August 2015.

- [45] Kissui, B. 2008. Livestock predation by lions, leopards, spotted hyenas, and their vulnerability to retaliatory killing in the Maasai steppe, Tanzania. *Animal Conservation*, 11(5):422 - 432.
- [46] Ikanda, D. and Packer, C. 2008. Ritual vs. retaliatory killing of African lions in the Ngorongoro Conservation Area, Tanzania. *Endangered Species Research* 6:67-74.
- [47] Mésochina, P., Mbangwa, O., Chardonnet, P., Moshia, R., Muti, B., Drouet, N., Crosmay, W. and Kissui B. 2010. *Conservation status of the lion (Panthera leo Linnaeus, 1758) in Tanzania*. Paris: SCI Foundation, Ministry of Natural Resources and Tourism – Wildlife Department, TAWISA, IGF Foundation.
- [48] Riggio, J., Jacobson, A., Dollar, L., Bauer, H., Becker, M., Dickman, Funston, P., Groom, R., Henschel, P., de longh, H., Lichtenfeld, L. and Pimm, S. 2013. The size of savannah Africa: a lion's (*Panthera leo*) view. *Biodiversity and Conservation* 22(1):17-35.
- [49] Kaltenborn, B.P., Kideghesho, J.R. and Nyahongo, J.W. 2011. The attitudes of tourists towards the environmental, social and managerial attributes of Serengeti National Park, Tanzania. *Tropical Conservation Science* 4(2)132-148.
- [50] Runyoro, V.A. and Kideghesho, J.R. 2010. Coping with the effects of global economic recession on tourism industry in Tanzania: are we prepared? *Journal of Tourism Challenges and Trends* 3(1)95-110.
- [51] World Travel and Tourism Council (WTTTC). 2013. *Travel & tourism economic impact 2013 Sub Saharan Africa*. WTTTC, London, U.K.
- [52] Wildlife Division (WD). Unpublished. 2013. Status of wildlife poaching in Tanzania. Ministry of Natural Resources and Tourism. Paper presented to H.E. President of the United Republic of Tanzania. Dar es Salaam, Tanzania.
- [53] Songorwa, A.N. 1999. Community-based wildlife management (CWM) in Tanzania: are the communities interested? *World Development* 27(12):2061-2079.
- [54] Nowell, K. 2012. *Wildlife crime scorecard: assessing compliance with and enforcement of CITES commitments for tigers, rhinos and elephants*. WWF Report. <http://www.legalservicesindia.com/article/article/is-poverty-a-cause-of-corruption-1613-1.html>. Accessed on 10 July, 2015.
- [55] United Republic of Tanzania (URT). 2007. *The Wildlife Policy of Tanzania*. Government Printer, Dar es Salaam Tanzania.
- [56] Archabald, K. and Naughton-Treves, L. 2001. Tourism revenue-sharing around national parks in Western Uganda: early efforts to identify and reward local communities. *Environmental Conservation* 28 (2):135-149.
- [57] Kideghesho, J. R., Roskaft, E., and Kaltenborn, B. P. 2007. Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. *Biodiversity and Conservation* 16(7):2213-2230.
- [58] Kideghesho, J.R. and Mtoni, P.E. 2008. The potentials for co-management approaches in western Serengeti, Tanzania. *Tropical Conservation Science* 1(4):334-358.
- [59] Muhumza., M. and Balkwil, K. M. 2013. Factors affecting the success of conserving biodiversity in national parks: a review of case studies from Africa. *International Journal of Biodiversity* DOI:10.1155/2013/798101.
- [60] Loibooki, M., Hofer, H., Campbell, K.L.I., East, M. 2002. Bushmeat hunting by communities adjacent to Serengeti National Park: the importance of livestock ownership and alternative sources of protein and income. *Environmental Conservation* 29:391-398.
- [61] Kideghesho, J.R., Roskaft, E., Kalternborn, B.P. and Tarimo, T.M.C. 2005. Serengeti shall not die: can the ambition be sustained? *International Journal of Biodiversity Science and Management* 1(3)150-166.
- [62] Knapp, E.J. 2012. Why poaching pays? A summary of risks and benefits illegal hunters face in Western Serengeti, Tanzania. *Tropical Conservation Science* 5(4):434-445.
- [63] Holmern, T., Roskaft, E., Mbaruka, J., Mkama, S.Y. and Muya, J. 2002. Uneconomical game cropping in a community-based conservation project outside the Serengeti National Park, Tanzania. *Oryx* 36:364-372.

- [64] Emerton, L. and Mfunda, I. 1999. *Making wildlife economically viable for communities living around the Western Serengeti, Tanzania*. IUCN .
- [65] UNESCO. 2014. *Poaching puts Tanzania's Selous Game Reserve on list of world heritage in danger*. <http://whc.unesco.org/en/news/1150/>. Accessed on 20 December, 2015
- [66] Cardamone, T. 2012. *Ivory and insecurity: the global implications of poaching in Africa*. Global Financial Integrity, United States Senate Committee on Foreign Relations. http://www.gfintegrity.org/storage/gfip/documents/Capitol_Hill/. Accessed on 8 August, 2015.
- [66] UN Security Council. 2014. *Security council, adopting resolution 2195 (2014), urges international action to break links between terrorists, transnational organized crime*. <http://www.un.org/press/en/2014/sc11717.doc.htm> Accessed on 10 July, 2015.
- [67] Nellemann, C., Henriksen, R., Raxter, P., Ash, N., Mrema, E. (Eds). 2014. *The Environmental Crime Crisis – Threats to Sustainable Development from Illegal Exploitation and Trade in Wildlife and Forest Resources: A UNEP Rapid Response Assessment*. United Nations Environment Programme and GRID-Arendal, Nairobi and Arendal, <http://www.unep.org/unea/docs/RRAcimecrisis.pdf>
- [68] Vira, V. and Ewing, T. 2014. *Ivory's curse: the militarization and professionalization of poaching in Africa*. Born Free USA, Washington D. C.
- [69] Schiffman, R. 2014. Ivory poaching funds most wars and terrorism in Africa. *Environment*, <http://www.newscientist.com/article/mg22229692.700-ivory-poaching-funds-most-war-and-terrorism-in-africa.html#>. Accessed on 10 July, 2015.
- [70] Kalron, N. 2012. Africa's white gold of jihad: al-Shabaab and conflict ivory. *Elephant League* <http://elephantleague.org/project/africas-white-gold-of-jihad-al-shabaab-and-conflict-ivory/> Accessed on 9 July, 2015.
- [71] Somaville, K. 2014. *Ivory, insurgency and crime in Central Africa: the Sudan's connection*. <http://africajournalismtheworld.com/tag/janjaweed-ivory/>. Accessed on 10 July, 2015.
- [72] Marais, A., Fennessy, S. and Fennessy, J. 2012. Giraffe conservation status – country profile: Democratic Republic of Congo. *Giraffa* 6(2):13-16.
- [73] Saah, R.J. 2012. *Janjaweed and ivory poaching: Cameroon calls in the army to combat wave of elephant poaching in national park*. Reuters <http://africajournalismtheworld.com/tag/janjaweed-and-ivory-poaching/>. Accessed on 10 July, 2015.
- [74] Tumanjong, E. 2012. Foreign poachers target Cameroon elephants: Expert. *The World Post*. <http://www.huffingtonpost.com/huff-wires/20121204/af-cameroon-ivory-poaching/> Accessed on 12 July, 2015.
- [75] US Embassy. 2012. *Protection of Cameroon's Wildlife a National Security Priority*. Press Release by US Ambassador, Michael S. Hoza. http://yaounde.usembassy.gov/pr_030315.html. Accessed on 8 July, 2015.
- [76] Holland, H. 2012. *South Sudan's elephants could be wiped out in 5 years*. Reuters <http://www.reuters.com/article/2012/12/04/us-sudan-south-elephants-id> Accessed on 9 July, 2015.
- [77] Taverner, L. 2013. *Over 125,000 elephants killed in South Sudan during civil war*. <http://africanwildlifetrust.org/index.php/author/lindyawt/page/23/>. Accessed on 8 August, 2015.
- [78] Worldwide Fund for Nature (WWF). 2012. *African troops to fight Sudanese elephant poachers*. *Sudan Tribune*. <http://www.sudantribune.com/spip.php?article45980>. Accessed on 28 May, 2015.
- [79] Whitaker, B.E. 2002. The distribution of burdens and benefits among the local hosts. *Journal of Refugee Studies* 15(4):339-358.
- [80] Jambiya, G., Milledge, S.A.H. and Mtango, N. 2007. 'Night time spinach': conservation and livelihood implications of wild meat use in refugee situations in North-Western Tanzania. TRAFFIC East/Southern Africa, Dar es Salaam, Tanzania.
- [81] Mogire, E.O. 2011. *Victims as security threats: refugee impact on host state security in Africa*. Farnham, Surrey, Burlington, VT: Ashgate.
- [82] Kideghesho, J.R., Rija, A.A., Mwamende, K.A., Selemani, I.S. 2013. Emerging issues and challenges in conservation of biodiversity in the rangelands of Tanzania. *Nature Conservation* 6:1-29.

- [83] Ndyeshumba, P. 2000. The use of remote sensing for environmental impact assessment and determination of the area affected by refugees in Ngara District, North Western Tanzania. *International Archives of Photogrammetry and Remote Sensing* 33:981-984.
- [84] United Nations High Commission for Refugees (UNHCR). 2002. Refugee affected areas. *UNHCR Engineering and Environment in UNHCR* 7(3) – December 2002. Environmental Services Section. Switzerland <http://www.unhcr.org/protect/> Accessed on 15 February, 2015.
- [85] United Republic of Tanzania (URT). 2008. *Keynote address by Honourable Mizengo Peter Pinda (MP), Prime Minister of the United Republic of Tanzania at the Second United Nations High Commissioner for Refugees' Dialogue on Protection Challenges on the Theme of Protracted Refugee Situations in Geneva, December 10, 2008*. United Republic of Tanzania, Dar es Salaam.
- [86] Vandegrift, J. 2012. *Elephant poaching: CITES failure to combat the growth in Chinese demand for ivory*. <http://lib.law.virginia.edu/lawjournals/sites/lawjournals/files/Elephant%20PoachingCITES.pdf>. Accessed on 26 January, 2016.
- [87] Bitanyi S., Nesje, M., Kusiluka, L.J.M., Chenyambuga, S.W. and Kaltenborn, B.P. 2012. Awareness and perceptions of local people about wildlife hunting in western Serengeti communities. *Tropical Conservation Science* 5(2):208-224.
- [88] Fyumagwa, R., Hassan, S.N., Kideghesho, J.R., Kohi, E., Keyyu, J., Magige, F., Mfunda, I.M., Mwakatobe, A., Ntalilwa, J., Nyahongo, J.W., Runyoro, V. and Røskaft, E. 2013. Human rights and conservation of biodiversity considerations associated with roads in the Serengeti: response to Hopcraft et al. *Conservation Biology* DOI: 10.1111/cobi.12469.
- [89] Campbell, K.L.I. and Hofer, H. 1995. People and wildlife: spatial dynamics and zones of interaction. In: *Serengeti II: Dynamics, Management and Conservation of an Ecosystem*. Sinclair, A.R.E. and Arcese, P. (Eds), pp.534-570. Chicago, USA: Chicago University Press
- [90] Metzger, K.L., Sinclair, A.R.E., Hilborn, R., Grant, J., Hopcraft, C. and Mduma, S.A.R. 2010. Evaluating the protection of wildlife in parks: the case of African buffalo in Serengeti. *Biodiversity Conservation* 19:3431–3444.
- [91] David Sheldrick Wildlife Trust (DSWT) “I worry”. 2013. *Dead or alive: valuing an elephant*. (<http://iworry.org/wp-content/uploads/2013/09/Dead-or-Alive-Final-LR.pdf>). Accessed on 27 January, 2016.

Appendix 1: Contribution of tourism to the Tanzanian economy

GDP: Direct contribution	2,397.4bn (TAS)	4.5%	4.0	4,563.1bn (TAS)	4.2	6.2
GDP: Total contribution	6,899.5bn (TAS)	12.9%	4.3	13,800.2bn (TAS)	6.7	12.6
Employment: Direct contribution	402,500 (Jobs)	3.8%	-0.4	500,000 (Jobs)	3.5	2.2
Employment: Total contribution	1,196,000 (Jobs)	11.2%	-0.1	1,195,500 (Jobs)	2.7	11
Visitor exports	2,743.2bn (TAS)	17.6	3.5	5,183.8bn (TAS)	19.6	6.2
Domestic spending	1,186.2 (TAS)	2.2	4.7	2,236.8bn (TAS)	2.0	6.1
Leisure spending	3,451.9 (TAS)	3.9	3.8	6,422.7bn (TAS)	3.5	6.0
Business spending	477.5 (TAS)	0.5	4.3	997.9bn (TAS)	0.6	7.2
Capital investment	1,634.2bn (TAS)	9.4	2.4	3,186.3bn (TAS)	9.6%	6.7

¹ 1US\$ = 2,000 TAS; Source: [51].

Appendix 2: Sanctions on wildlife trade imposed on Tanzania following widespread elephant poaching

Date	Sanction
March 2010	Tanzania's application to CITES to sell its ivory stockpile was rejected on the grounds of the elephant poaching situation. The proceeds were expected to be used exclusively to fund conservation, community conservation and development programmes.
April 4, 2014	The US Fish and Wildlife Service suspended imports of sport-hunted African elephant ivory taken during calendar year 2014 in Tanzania and Zimbabwe [42].
July 2, 2015	The European Union (EU), basing on recommendations from its Scientific Review Group (SRG), banned the import of hunting trophies of African elephants from Tanzania and Mozambique [43]. Before the decision, eighteen international environmental and conservation organizations were pressurizing the EU governments to halt all exports of raw ivory [19].

Appendix 3: Compliance and enforcement scores for origin, transit and destination countries
(Key: Y =Yellow, G = Green, R =Red).

Country	Group	Rhino	Elephant
Cameroon	Primarily origin		R
Central Africa Republic	Primarily origin		R
Congo	Primarily origin		Y
Democratic Republic of Congo	Primarily origin		R
Gabon	Primarily origin		Y
India	Primarily origin	G	G
Indonesia	Primarily origin		Y
South Africa	Primarily origin	Y	G
Zimbabwe	Primarily origin	Y	G
Kenya	Transit and Origin	Y	G
Mozambique	Transit and Origin	R	R
Nigeria	Transit and Origin		Y
Tanzania	Transit and Origin	Y	Y
Zambia	Transit and Origin	Y	R
Laos	Transit and Origin	Y	R
Malaysia	Transit and Origin		Y
Myanmar	Transit and Origin	Y	Y
Nepal	Transit and Origin	G	G
China	Primarily Destination	G	Y
Egypt	Primarily Destination		R
Thailand	Primarily Destination	Y	R
Vietnam	Primarily Destination	R	Y

Source: [49].