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A Comparative Analysis Of Anti-Poaching Strategies

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LEILA AL-AJJAZ
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Universiteit Leiden

First Reader – Dr. Michael Sampson
Second Reader – Dr. Corinna Jentzsch

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INTRODUCTION

The International Union for the Conservation of Nature (IUCN) estimates that the 'threshold of sustainability' of elephant and rhino populations was crossed in 2010 (IUCN, 2014). At this time, poaching levels outweighed birth rates resulting in the steady decline of species populations to date (IUCN, 2014). The trafficking of wildlife ranks fourth as the most lucrative transnational crime after arms, drugs and people (Roe, 2015).

Poaching has been escalating as the demand for ivory and rhino horn from Asia is rapidly increasing. Simultaneously, large-scale organized crime and militant groups also profit from the revenues generated by the illicit trade (Maguire & Haenlein, 2015). This has repercussions for both national and international security and stability (UNODC, 2010). These security implications conceal a wider development issue. Elephants and rhinos are an important economic asset for rural communities, providing a foundation for the sustainability of the wildlife-tourism sector. The depletion of elephant and rhino populations as a result of exploitation from poaching restricts opportunities for socio-economic development at local and international levels.

There is no simple resolution to poaching and the illicit wildlife trade. However, initiatives to attempt to tackle the phenomenon can be divided into three approaches; the reduction of demand, increased security and law enforcement, and community driven socio-economic development through the support of alternative livelihoods. The primary focus of research in this field has been on the first two approaches, with limited regard to the third. As such, this paper will not focus on the demand side drivers of the industry, but rather conduct a cost-benefit analysis of security based and socio-economic solutions.

This thesis aims to encourage future research to increase its focus on the socio-economic drivers of poaching and its respective top-down or bottom-up solutions. Ideally, through a more inclusive approach to the issue by equally addressing all three aforementioned dimensions, anti-poaching strategies will be better able to tackle both the supply and demand side drivers of the industry - thus offering more effective solutions to poaching and the international crime driven by it.

RESEARCH QUESTION

With the creation of socio-economically driven conservation programs, alternative livelihoods and economic benefits can be brought to local communities that depend on stable wildlife populations. Examples of such initiatives includes: sustainable tourism, agricultural development, land-leasing and employment of community members in conservation and protection activities (Biggs et.al. 2016). Hopefully, through such initiatives the incentive to poach and engage in wildlife crime will decrease, and communities will have greater interests as well as the financial capabilities to protect the rhino and elephant populations from poaching activities.

In addition, external threats such as terrorist organizations and criminal networks pose a direct challenge to governments, communities and conservationists. Socio-economically and community driven approaches alone are not able to fully address the problem of these external actors. This increases the need for government intervention and concrete security based strategies that offer the appropriate mechanisms to combat the activities of criminal syndicates.

Due to the multifaceted nature of the problem, the security and socio-economic aspects of poaching need to be addressed on both a domestic and international scale. Therefore, this master's thesis will attempt to answer the question: *under what conditions are top-down and bottom-up approaches effective?*

CONTEXT

Elephant and Rhino Poaching

Poaching is defined as the hunting, killing or stealing of animals without legal permission, thus violating local and international conservation laws. Elephants are hunted for their valuable ivory, which is primarily used in China and South East Asia as traditional medicine or to make ornaments and jewelry (BBC, 2015). Rhino horn is similarly used as traditional medicine or as a status symbol in China and Vietnam (WWF, 2017).

Ivory is harvested by cutting the trunk off the elephant and splitting the skull to remove the tusks. Likewise, rhino horn is sawed off the rhinos head or cut out of its face with an axe. Elephants and rhinos are usually either shot down with guns or by

the more traditional use of poison arrows. At times, animals are still alive during the harvesting process if shot incorrectly (WWF, 2011). Three men can kill about 27 elephants in ten minutes (Vaughan, 2016).

Conservation Aspect

A study produced by the United Nations Environment Program and Interpol, suggests that "...the monetary value of all transnational organized environmental crime is approximately 213 billion USD annually" (Nellemann et.al, 2014:7). This means that the illegal industry deprives developing nations of billions of dollars in lost revenues and development opportunities (Nellemann et.al, 2014). The portion of this industry represented by wildlife alone is between 7 billion and 23 billion USD annually (Muruthi, 2015). Many iconic wildlife species are on the brink of extinction, specifically the African rhino and elephant, which are poached at rising levels for their valuable horns and ivory as demand from Asia continues to increase. Between 2007 and 2014 in South Africa alone, rhino poaching increased by 9000% (Scriber, 2014). From 2010-2012, more than 100,000 African elephants were illegally poached across the African continent (Scriber, 2014). In the timeframe between 1979 and 2007, African elephant populations decreased from 1.3 million to only 427,000 (Steyn, 2016). In 2011, elephant poaching contributed to 75% of all elephant deaths (Scriber, 2014).

These species are a part of Africa's natural heritage and the region has a tourism industry that is highly dependent on the survival of its wildlife (UNWTO, 2015). Wildlife tourism represents 80% of the total annual vacations to Africa sold, with wildlife safari as the most popular tourism product (UNWTO, 2015). Elephant and rhino expeditions are one of the most popular activities attracting tourists (UNWTO, 2015).

The eradication of the rhino and elephant would not only represent a historic international conservation failure, but also strongly dent the economic revenues of wildlife tourism in the region - an industry that many livelihoods are dependent upon. According to the United Nations World Tourism Organization, a 2013 estimate showed that African tourism was conservatively valued at 34.2 billion USD and continues to grow by 6.1% annually (Muruthi, 2015).

Furthermore, the eradication of Africa's megafauna has serious impacts on ecosystems. Africa's elephants are referred to as mega-gardeners as they are capable of shaping and changing the landscapes of their territories through the maintenance of grasslands, soils, clearing of trees and bush and seed distribution through dung (Steyn, 2016).

The illegal poaching and trafficking of ivory and rhino horn is a multi-billion dollar industry (Duffy, 2016; Nelson et.al, 2016). Demand for ivory alone has expanded over the last years. Rhino horn trades at higher prices than gold or heroin (Duffy, 2016). However profitable the product, the main bulk of revenue does not go to the original poacher, but instead helps fund criminal networks that fuel corruption and conflict which put both local and international communities at risk (Nellemann et.al, 2014).

Furthermore, as anti-poaching mechanisms are becoming increasingly more violent in order to meet the violence of poachers, the risks of the industry have heightened dramatically for those who are engaged in both poaching and anti-poaching initiatives. Techniques for successful poaching mitigation are debated. On one hand, top-down anti poaching strategies that mainly focus on increased law enforcement and military strategies and technology aim to protect wildlife populations through violent means, high fines, imprisonment and even death. On the other hand, community based bottom-up approaches aim to curb poaching by engaging local communities in wildlife conservation through the provision of economic opportunities and alternative livelihoods as part of conservation initiatives.

The need to research bottom-up solutions derives from the fact that top-down mechanisms primarily focus on the security factors that drive poaching rather than the development of socio-economic strategies. In contrast, bottom-up solutions usually encompass the social and economic reform needed to aid in reducing the root-causes at the community level that drive incentives to engage in poaching activities.

Although bottom-up focused strategies alone are not a panacea for tackling poaching (probably a balance of both top-down and bottom-up is needed), bottom-up driven solutions have proven to be successful in case studies selected for this study, which include; Namibia, Tanzania, South Africa and Kenya (Roe, 2015). In these regions national parks, both socio-economic and security focused strategies have been implemented to combat poaching for rhino horn and ivory.

Security Aspect

Not only is poaching a conservation issue, but it is increasingly becoming a security and humanitarian one too. Ivory and rhino horn has become a form of 'bush currency' that funds the operations of militias, rebels and terrorist organizations across boarders (Vira & Ewing, 2014). The illegal trade in ivory and rhino horn represents a major security challenge, not only in Africa but also internationally. The illicit trade of ivory and rhino horn does not only impacts species populations, but has a significant human impact as well. The resource is one of the most valuable sources of illicit contraband for criminal syndicates in the region, fueling regional security risks and instability (Vira & Ewing, 2014; Poe, 2014; Peters, 2015). Heavily armed groups of poachers outgun protectors and impose a threat to communities and conservation activities. The strengthening of field protection and top-down solutions is essential for successful anti-poaching operations on the ground. Additionally, by promoting community engagement and enhancing their participation as rangers or observers, community driven efforts aid in creating a more transparent environment for disrupting poaching activities (Lambin, 2015).

An 18 month long investigation commissioned by the Elephant Action League (2011) established a direct connection between the ivory trade and the Al-Qaeda affiliate Al-Shabaab (Poe, 2014; Kalrom et.al, 2013). The investigation found that the terrorist organization generated between 200,000 and 600,000 USD a month from tusks, accounting for 40% of its operating budget (Kalrom et.al, 2013). East Africa has become ground zero for poaching activities (Christy, 2015; Poe, 2014). Militias and terrorist groups are usually poaching outside their home countries, coming from the Central African Republic (CAR), the Democratic Republic of the Congo (DRC), Sudan and Chad - five of the world's most fragile regions on the international fragility index (Christy, 2015). Due to high levels of poaching and dwindling elephant and rhino populations in these nations, poachers are now moving across boarders into neighboring countries where conservation activities have been relatively successful (Schiffman, 2014; Kalrom et.al, 2013). Sudan has no elephants left and some of the most horrific elephant killings trace back to poacher-terrorists such as the Sudanese Janjaweed or other Sudanese cross-continental marauders, who now are venturing into Kenya and Tanzania (Christy, 2015).

Although the relationship between terrorism and poaching has recently been receiving more attention by researchers and academics, it is a phenomenon that has been largely overlooked. There is a major gap in literature that thoroughly explores the connections between terrorism and poaching. Therefore, it is impossible to sufficiently counter the problem of poaching by criminal syndicates, as it is not yet fully understood.

There is a vital need to strengthen conservation activities. The fact that criminal organizations are using revenues from ivory and rhino horn to fund terrorism adds to the urgency of the issue. The collusion of two evils- poaching and terrorism- is not only an African issue, but also an international one.

Definitions

For the purpose of this study, bottom-up strategies are defined as community-driven solutions for poaching mitigation, where on the other hand, top-down strategies represent government-driven solutions. Furthermore, 'militarized means' are defined as the use of military grade equipment and techniques like helicopters, drones, machine guns, infrared scopes and heavy armored vehicles. For top-down approaches this also includes the deployment of armed forces and police cooperation with rangers when engaging in conservation activities. Notably, 'sustainable' and 'effective' anti-poaching schemes refers to the degree of success of poaching mitigation activities. For the purpose of this study, 'degree of success' refers to an absence of decline in elephant and rhino populations on a country basis, where they are either remaining at stable population numbers or even increasing in numbers of animals per herd and whether the species is on the International Union for Conservation of Nature (IUCN) Convention on International Trade of Endangered Species (CITES) Appendix I or Appendix II. Success also entails that the number of animals found dead due to poaching is decreasing, where even if heard populations are decreasing overall, the dead animals found perished due to unrelated causes (Roe, 2015). The purpose of conservation is to ensure the survival of a species in the future. Therefore, it is important to consider whether conservation should increase its focus towards economic and societal programs that drive community incentives to engage in the protection of species, or to continue the development of military style strategies that fight the external actors that feed the crime of poaching itself.

RESEARCH CONTEXT

Literature concerned with a comparative view of bottom-up and top-town anti-poaching initiatives does not exist. Most academic literature concerning socio-economically or security driven approaches is descriptive. Literature on both bottom-up and top-down approaches is mainly contributed by research institutions, think-tanks and non-governmental organizations through a limited number of case studies and analyses of the case study findings by scholars. Academic literature on bottom-up and top-down driven approaches to poaching analyses each method within its own context, without drawing on a comparison on the effectiveness of the two methods combined. Bottom-up approaches are understudied; its popularity only recently increasing as poaching for ivory and rhino horn is escalating (Scriber, 2014; Steyn, 2016). Furthermore, bottom-up approaches are less frequently implemented in national parks than top-down strategies. There are significant gaps in academic literature that study the socio-economic and security drivers of poaching and that explore the relationship between poaching and international crime and terrorism. It is important for future research to bridge these gaps in order to aid in the development of more comprehensive, sustainable anti-poaching strategies. The literature review is organized as following: (1) bottom-up approaches, (2) top-down approaches.

(1) Bottom-up approaches

Bottom-up approaches are community driven solutions that aim to tackle the socio-economic and security factors that drive incentives to poach, usually at community level. The focus by conservationists on socio-economic anti-poaching strategies on the supply side of the industry is a relatively new phenomenon compared to the prevalence of mainly security driven top-down strategies. A growing field of literature analyses the mechanisms and importance of bottom-up solutions to socio-economic issues in conservation efforts. In this area of research, poaching is linked to issues of poverty, land management and lack of alternatives to poaching (Challender & MacMillan, 2014; Pye-Smith, 2013; John et.al, 2013). From the literature it can be gathered that in order to prevent people from resorting to poaching for financial gains, opportunities for alternative livelihoods need to be created as part of conservation efforts (Challender & MacMillan, 2014; Pye-Smith, 2013; John et.al, 2013; Knapp, 2017).

One of the major weaknesses of bottom-up solutions to poaching is that security issues and protection mechanisms against external actors are not addressed. This represents a problematic downfall as poachers who are affiliated to criminal networks are becoming increasingly more militarized and violent, requiring equal measures of response.

Literature exploring bottom-up solutions predominantly links poaching with issues of poverty (Knapp et.al, 2017; Roe, 2015; Booker et.al, 2017). A report commissioned by the International Union for the Conservation of Nature (IUCN) during the Botswana African Elephant Summit in 2008, established a direct link between poverty and poaching by drawing a comparison between infant mortality rates and poaching rates (IUCN, 2013). Infant mortality often serves as an indicator of poverty (WHO, 2007; Sen, 1998) The report suggested that in areas experiencing high levels of poverty, levels of poaching were substantially higher as well (IUCN, 2013). The report also found increased poaching levels in areas with higher corruption and weaker governance (IUCN, 2013) However, according to the World Economic Forum, these crimes are opportunistic rather than poverty driven (Hickey, 2015). In some regions with high poverty, locals do not poach but instead poaching is carried out by outside criminal networks that enter communal land (Hickey, 2015). Nonetheless, poaching has also been attributed to contributing to poverty by impoverishing communities and preventing them from harnessing the benefits from wildlife conservation (Hickey, 2015; Redpath et.al, 2013; Hübschle, 2016). This demonstrates a two-way causation process; where poaching can either contribute to poverty through the exploitation of resources, but simultaneously, poverty can add to the prevalence of poaching due to the lack of better economic alternatives to sustain livelihoods.

This issue linkage emphasizes the need for more research in this field on concrete bottom-up solutions to the socio-economic drivers. As research in this area is slowly growing, it is becoming evident that strategies that only address the security drivers cannot offer long-term sustainable solutions to poaching because they do not consider the vital role of livelihood development in poaching mitigation.

As part of bottom-up solutions, there is also a significant gap in academic literature regarding the role of women in conservation. Whether individuals are poachers or protectors, these roles are primarily occupied by men (Barbee, 2015; Bell 2017). Notably, there has been no evidence that women are engaged in poaching for

ivory and rhino horn. The employment of women as rangers and their involvement in economic development opportunities, such as ecotourism and microenterprise, is vital for the success of bottom-up approaches (Reuter et.al, 2016; Roe, 2015; Duncker, 2017). In addition, female participation would result in more boots on the ground engaging directly in species monitoring and protection (Barbee, 2015; Bell, 2017; Dubuis, 2017). Thus far, there has only been one project testing the role of women in conservation, namely the South African 'Black Mamba' conservation initiative (BMCI) (Reuter et.al, 2016). Despite being a stand-alone initiative, the project reports positive results in regards to female-driven species protection and community development (Reuter et.al, 2016).

It is research on socio-economic issues that address the root causes of poaching at community level rather than developing strategies on how to combat poaching once an individual has already made the decision to poach. The latter falls within the scope of top-down initiatives.

(2) Top-down approaches

Top-down approaches are government-led solutions to conservation challenges. Research in this field suggests that there is a gap in literature, as research and policies regarding top-down strategies continuously fails to address both the socio-economic drivers of poaching at domestic level, and issue of cross-border movements at the international level (Hübschle, 2016; Poe, 2014). Rather, top-down driven solutions have predominately focused on the security challenges of poaching on a domestic scale whilst largely disregarding the various aspects that drive poaching due to socio-economic factors. Most likely, this has sparked researchers to shift their focus towards bottom-up solutions in order to better address the socio-economic drivers of poaching in rural communities.

This field of research is beginning to compile a greater understanding of how poaching is inter-connected to other large-scale developmental issues such as crime, corruption and state fragility, and the international spillover effects of these (Milliken, 2014; Roe, 2015; Knapp, 2012). The literature likewise suggests that governments have to meet the increasing mobility and violence by poachers in order to protect both rural communities and species populations from threat and exploitation (Wall & McClanahan, 2015; Duffy, 2016; Douglas & Alie, 2014; Booker, 2017). Research on

top-down solutions has thus far primarily been concerned with the security aspects because this dimension of poaching mitigation requires solutions that are outside the capacity of community-level action.

Recent studies have begun to use the term 'green militarization', meaning the meshing of military tactics, forces, weaponry and technology with conservation initiatives (Lundstrum, 2014; Christy, 2015; Nelleman et.al, 2014). Research is also drawing connections between terrorist organizations, international crime and the ivory trade, referring to government-led anti-poaching initiatives as a type of conservation 'war' (Wall & McClanahan, 2015; Lundstrum, 2014; Duffy 2016, Poe, 2014; Christy 2015). The escalation of violence is also due to the increasing clashes between rangers and poachers, which as a result fuels the need for government investment in armed forces, guns, vehicles, surveillance and training (Lundstrum, 2014; Nelleman et.al, 2014; Wall & McClanahan, 2015; Coons, 2015).

Furthermore, there is a significant gap in literature on the framework by which poaching is driven on an international scale. This highlights the strong need for intelligence gathering to create a clearer understanding of the terrorist groups involved and the mechanisms by which criminal syndicates are connected to one another, how the revenue from ivory and rhino horn flows, and who carries out the transactions (Vira et. al, 2014; Wall, & McClanahan, 2015). Solutions to combatting these large-scale transnational issues will require government driven solutions with international cooperation.

From here derives the relevance of this master's thesis. It is clear that poaching is an escalating phenomenon that must be controlled – not only to protect the African elephant and rhino from extinction, but also to combat the developmental issues associated with poaching. However, the driving factors and the interlinking mechanisms by which the ivory trade is spurred and financed remains understudied and unclear. Even though it is not within the capacity of this study to establish a framework on the trade flows and relationships of the international actors and drivers of poaching, it aims to contribute to existing literature by providing a cost-benefit analysis of bottom-up and top-down solutions in relation to the socio-economic and security drivers of the poaching problem.

THEORETICAL FRAMEWORK

Assumptions of Rational Choice

Conservation activities are becoming increasingly more dangerous and militarized, primarily in response to the growing militarization of poachers and violent clashes between poachers and protectors. The risks of the industry are driving up the price of ivory and rhino horn, especially as demand from Asia continues to grow (National Geographic, 2015). Poachers are often hired from local communities by criminal networks, as locals best know how to navigate the territory and track elephant or rhino populations (Haas et.al, 2016). Despite the lucrative nature of the industry, it is the local poacher who receives the least revenue from their hunt as the bulk of income instead goes to the funding of criminal organizations, which puts both local and international communities at risk (Nellemann et.al, 2014).

This study will assume that people are rational actors driven largely by financial incentives. This assumption is supported by the theoretical lens of Rational Choice Theory. The theory is a framework for understanding economic behavior with the idea that each individual is a rational actor aiming to maximize his or her 'utility' or 'happiness'. John et.al (2013) describe rational choice as:

"When making decisions, people are influenced by the potential financial costs and benefits of a given course of action ... and by their understanding of how they are expected to behave within society. Rational Choice becomes a powerful predictive theory when it is combined with assumptions about preferences or with data on peoples observed choices" (John et.al, 2013: 345).

Although this study will not focus on Rational Choice Theory and its application, the theory is an important mechanism to justify the assumptions made regarding rational human behavior driven by financial gains. Hereforth, this study will refer to the aforementioned financially motivated assumption as simply 'rational choice'. By better understanding the influencing factors that drive people to either act as poachers or protectors, policies and conservation programs can be designed that optimize conservation activities in respect to the local economic and social conditions (Messer, 2017).

Theory of Change

For the purpose of this study, the term Illegal Wildlife Trade (IWT) refers to the illegal transnational trafficking of wildlife products, such as high valued ivory and rhino horn, rather than the customary use of wildlife for sustenance at community level.

Communities that live with wildlife are a key to combatting poaching due to their proximity and knowledge of the area. Their involvement and expertise aids in the reporting, detection and prevention of poaching activities.

There is a strong need for conservation strategies to identify the circumstances and mechanisms by which community participation can reduce IWT and poaching. However, the role of communities in combatting poaching and IWT and the conditions under which community involvement can and cannot succeed have received little attention. A guiding framework to assess and monitor such conditions is lacking, even though such a framework is essential to facilitate appropriate conservation strategies on the ground.

To address this theoretical gap, Biggs (2016) developed a Theory of Change (TOC) that explores the key enabling and disabling conditions for mechanisms to achieve the engagement of communities as actors in combatting poaching and IWT (Biggs et.al, 2016: 3). By providing a coherent and transparent framework, TOC is applied to community focused conservation initiatives that are driven by a mixture of different conditions under which community based conservation strategies are likely to succeed or fail (Biggs et.al, 2016: 4).

A TOC is:

A decision support tool that helps illustrate the causal links and sequences of events needed for an activity to lead to a desired outcome or impact... TOC maps the missing link between what an activity does, what impact it has and how this leads to the desired outcomes (Biggs et.al, 2016: 3 & Center for Theory of Change, 2015).

The TOC developed by Biggs (2016) defines four pathways for engaging communities. These include; the strengthening of disincentives for illegal poaching, increasing incentives for wildlife stewardship, decreasing the costs of living with wildlife and creating alternative livelihoods (Biggs et.al 2016: 5-6). In addition, there

are six conditions that play a role as enabling factors of these four pathways, namely: voice and accountability; political stability and absence of conflict or terrorism; government effectiveness, regulatory quality, rule of law and control of corruption (Biggs et.al, 2016: 4).

The strengthening of disincentives of poaching is an important factor in response to IWT (Challender & MacMillan, 2014). The first pathway includes increasing the social stigma of poaching and strengthening law enforcement and penalties. Communities are key to the strengthening of disincentives for poaching by applying social sanctions against poachers, or, by employing them as game guards and scouts (Biggs et.al, 2016: 5). The second pathway of the TOC focuses on increasing incentives for stewardship of wildlife. The mechanisms in pathway two aim to support enterprise development that generates benefits from wildlife conservation (Biggs et.al, 2016: 6). This entails the development of eco-tourism enterprise and the training of locals to work as guides or in hospitality. The outcome of developing an industry that is dependent on wildlife is that communities will value wildlife more and have greater incentives to protect it (Biggs et.al, 2016: 6, Frost & Bond, 2008). Creating a sense of ownership and developing mechanisms by which communities can benefit from wildlife are considered by some scholars as key to community engagement in wildlife protection (Roe, 2015). The third pathway in the TOC entails decreasing of costs of living with wildlife. Living in areas with great biodiversity can generate a variety of costs, especially when wildlife penetrates community land, raids crops and attacks people, fueling human-wildlife conflict (Biggs et.al, 2016: 7, Woodroffe et.al, 2007). According to the theory, decreasing the costs of living with wildlife is therefore a critical element to discourage communities from engaging in poaching (Biggs et.al, 2016: 7). Lastly, the fourth pathway highlights the necessity of creating alternative livelihoods. According to Biggs (2016), by creating alternative sources of income the need to poach is reduced (Biggs et.al, 2016: 8). This can be achieved through the development of small enterprise and micro-financing schemes (Roe et.al, 2015).

In the framework of this TOC, a few challenges need to be considered that can affect the outcomes of the pathways. Firstly, alternative income generating activities to poaching must be able to produce comparable levels of income for them to be attractive. Furthermore, when community members become active in law enforcement against poaching, their immediate personal safety comes under threat, especially

when confronted by armed poachers (Biggs et.al, 2016: 8). Biggs (2016) highlights that community relationships can breakdown, especially if there are some members working as eco-guards and rangers (who are then perceived as law enforcement agents rather than members of the community), whilst others are engaged in poaching (Biggs et.al, 2016:8). A final challenge is that if community based conservation initiatives prove successful and households begin to generate revenue from wildlife conservation, then this increases the risk of in-migration by outsiders who aim to share the benefits, thus leading to conflict or an increase in poaching as households seek additional income (Biggs et.al, 2016:7, Homewood et.al, 2004).

A downfall of the theory is that it does not consider the role of outsiders and the effect of poaching activities by criminal syndicates. It also does not consider the role of security related issues on conservation initiatives, such as state fragility or effect of conflict in neighboring countries.

The TOC will aid in the analysis of the case study findings, as it is a useful framework to determine whether enabling conditions for successful socio-economically driven solutions are in place, and whether, through a particular intervention, a pathway is able to achieve appropriate solutions to poaching. The analysis section will refer back to this TOC in order to understand the causal links between the drivers of poaching and their respective top-down to bottom-up solutions. If the findings of the case studies follow the causal mechanisms as prescribed in the TOC pathways, then it can be assumed that the conservation initiative was successful. Furthermore, the sustainability of a case-study project can also be predicted using this theory when considering the aforementioned challenges that can affect the outcomes of the pathways. If the findings of the case studies demonstrate these challenges, then it can be assumed the project is unsustainable and more prone to failure.

RESEARCH DESIGN

Data Collection

This study will primarily use NGO and government produced and funded case studies on rhino and elephant conservation projects, news reports and features, academic literature and research that does not date before 2000, remaining within a timeframe of the last 17 years. By researching the link between poaching and

international crime as well as the economic and social challenges of bottom-up solutions, this thesis addresses a gap in academic literature and therefore has to rely on a variety of primary sources including reports, working papers, NGO case studies and publications, newspaper and magazine articles and press releases. The research will be conducted through data triangulation – by collecting and comparing data from multiple case studies and resources that have tested bottom-up and top-down strategies in nature conservatories specifically targeted at elephant and rhino conservation. The methodological challenge of this study lies in the assessment of the data and being able to find sufficient information that develops a comprehensive overview of the strengths and gaps in top-down and bottom-up conservation initiatives.

Case Studies Overview

This study aims to analyze bottom-up and top-down driven solutions to poaching. The solution to reducing the numbers of animals being killed cannot be achieved solely though security focused government-led initiatives, but must also come from economic and social reforms at the community level with the aid of NGO's or local government. This thesis aims to conduct a Small-N study, determining the relationship between the different kinds of variables in the cases that aid to achieve successful bottom-up or top-down solutions. The cases were selected according to the methodological approach of most similar systems design (MSSD), based on the various similarities between the cases. The countries that were chosen are all culturally close, have similar levels of economic development and have similar geography and biodiversity. The purpose of MSSD is to keep at a constant as many extraneous variables as possible when testing the effect of independent variables on the dependent variable (Bartolini, 1993). The benefit of choosing countries that have certain similarities is that contesting variables are kept constant so that explanatory factors cannot intervene in the relationship between independent and dependent variables (Przeworski & Teune, 1970: 76-85). However, according to Przeworski and Teune, the dependent variable is likely to be over-determined because it is impossible to find cases were all contesting variables can be kept at an exact constant (Przeworski & Teune, 1970: 76-85).

This study will use the cases of national parks in Namibia, Tanzania, South Africa and Kenya for its analysis (Cooney et.al, 2016; Roe, 2015; Mabele, 2016).

Detailed information on the cases, and the analysis of these, can be found in the following *'cases and analysis'* sections. Notably, for the cases of Tanzania and Kenya there is a difference in level of cross-border security threat by criminal syndicates and terrorist organizations in comparison to a lower level of threat in the cases of South Africa and Namibia. Kenya and Tanzania's geographical proximity to some of the world's least stable nations, including South Sudan, Sudan, The Democratic Republic of Congo and Somalia, create additional conservation challenges as transnational poaching activities flow between the porous borders (Christy, 2015). This key difference in level of security threat is used as an indicator to determine whether there is a relationship between a higher presence of transnational organized crime and poaching.

In all cases national parks, both socio-economic and security focused strategies are implemented as part of rhino and elephant conservation efforts. Poaching has been a major issue in all the parks with high and increasing levels of elephant and rhino killing for their commodities (Cooney et.al, 2016; Roe, 2015; Mabele, 2016). Across all case studies, socio-economic, community driven strategies have been implemented. All cases also reported similarity in the challenges they faced regarding funding and timeframe. The types of socio-economic initiatives that were used across all cases include: economically centered methods such as revenue sharing from tourism; creation of conservation jobs for community members as rangers or eco guards; land leasing initiatives, which encourage community incentives to ensure wildlife protection by preventing poaching on their land; enterprise development and community resource management (Cooney et.al, 2016; Roe, 2015; Mabele, 2016, Duncker et.al, 2017). Socially centered bottom-up methods included: adding a connotation of prestige to being an eco-guard or ranger; human – elephant conflict mitigation; community intelligence gathering; relationship building and integrated community support in law enforcement (Cooney et.al, 2016; Roe, 2015; Mabele, 2016; Duncker et,al, 2017). Security centered strategies are the same for all cases which includes: the deployment of rangers, deployment of police or armed forces; use of weapons; presence of violence; use of violence, use of military grade surveillance technology such as GPS tracking and infrared; intelligence gathering, tracking and law enforcement activities (Cooney et.al, 2016; Roe, 2015; Mabele, 2016).

Variables

This master's thesis aims to demonstrate that there is a strong need to develop initiatives that address the socio-economic challenges for conserving elephant and rhino populations to where they can be sustainable. For conservation efforts to be successful in reducing poaching, issues of economic and social development have to be addressed at a local level. In addition, there is also an urgent need to protect species populations from external threats such as the criminal organizations that are dependent on the trade of ivory and rhino horn for revenue. This means that there are two sides to the coin; on one side socio-economic focused strategies address solutions through community development, whilst security focused approaches address the means by which to protect people and wildlife from highly organized and violent external actors. Socio-economic focused strategies alone will not protect elephant and rhino populations from militarized extremist organizations and the demand from the black market in Asia.

Dependent variables:

Stability of elephant and rhino populations, CITES status of species population.

Independent variables:

Bottom-up solutions (community driven initiatives and poaching interventions): Creation of micro-enterprise, development of (eco)tourism industry, community participation in ecotourism industry, community members becoming rangers, scouts or eco-guards, incentives of people to protect wildlife, positive attitude towards wildlife, agriculture and land management initiatives.

Top-down solutions (government driven initiatives and poaching interventions): Deployment of rangers with weapons, use of military grade technology, deployment of law enforcement and armed forces in anti-poaching activities, change in legislation, conviction of poachers, international cooperation in anti-poaching initiatives, investment in domestic conservation projects, development of wildlife tourism industry.

Other variables to consider across case studies: Prevalence of corruption, cross-border crime flows and external pressures such as regional conflicts and refugees.

Hypotheses

On the one hand, conservation strategies need to address the socio-economic factors that drive poaching incentives, calling for sustainable long-term solutions to the factors that push community members to becoming involved in poaching. On the other hand, security focused approaches need to address solutions to poaching activities that are beyond the capabilities of local communities. This can include, for example, the deployment of armed forces in response to the increasing violence of poachers. Security approaches alone cannot induce the socio-economic change and engagement needed at community level to prevent people from poaching. In their search for income and sustenance, oftentimes individuals resort to poaching due to lack of alternatives. Especially individuals who struggle with issues of poverty fall victim to the lucrative promises made by criminal organizations that scout for poachers (Redpath et.al, 2013). By introducing opportunities for economic development as part of conservation initiatives, alternative livelihoods to poaching can be created and the need to resort to poaching for income and sustenance reduced. Therefore:

H1) Socio-economic approaches are more successful at reducing elephant and rhino poaching at *community level* than security-driven approaches.

Furthermore, in fragile states such as the Democratic Republic of Congo (DRC), Central African Republic (CAR), Chad and Sudan, where instability is high, so is the rate of poaching by criminal syndicates. Elephants in Sudan have been completely eradicated, therefore now criminal organizations from Sudan, CAR and DRC go to poach in neighboring nations such as Kenya or Tanzania where relatively stable elephant populations remain due to successful conservation efforts (Christy, 2015). It is important to consider whether there is a relationship between state

fragility and escalation of poaching in order to more fully address the security related issues of poaching and their possible solutions. Therefore:

H2) Poaching driven by security factors requires different solutions to socio-economically driven factors.

Discussion of Limitations

This master's thesis is an exploratory study and will attempt to answer the research question using a variety of publicly available data and resources, which may have an effect on the generalizability and utility of the findings of this research. Furthermore, this study will only focus on the development of conservation activities since 2005, as the selected case studies do not go beyond this timeframe. An additional limitation to this research is the time in which it is conducted due to the fact that there is a significant gap in literature on the successful implementation of community driven solutions to poaching, as these are still being tested and studied.

The time allocation of this study does not allow for fieldwork to research the hypotheses to a greater extent, which in the future may serve as starting-point for a continuation of the findings of this paper. It is also important to note that there is no economic theory that specifically connects poaching to poverty other than to some extent the TOC and Rational Choice Theory and the assumption that people are rational actors driven by financial incentives.

Finally, often money spent on conservation activities gets bundled together into broader categories such as law enforcement, armed forces, training, infrastructure, etc. Therefore there is no accurate picture of the expenditures that go into anti-poaching efforts. As such no clear comparison can be drawn on which strategy may be more cost effective.

CASES

The following section will provide a detailed description of each case study separately. The tables offer a brief overview of each country's profile according to conservation initiative and highlight the species, species stability, type of poachers and opportunities that were created through top-down and bottom-up conservation approaches. For the purpose of this study, success of conservation initiative is

measured by whether the species is on the IUCN (International Union for Conservation of Nature) CITES (Convention on International Trade of Endangered Species) Appendix I or Appendix II. Species that are listed on CITES Appendix I are the most critically endangered, whereas species listed on Appendix II are endangered but not under threat of extinction (CITES Appendices, 2013). Species can be listed on Appendix I, yet their population in a given area can be stable – there is an absence of a population decline. However, this does not account for a healthy species population but rather means that there is a species population that is critically endangered, even though numbers are not declining at the moment of measurement. Species on Appendix II with a stable status represent healthier populations that are not critically threated by extinction. Species can move between appendixes according to their population health.

Additionally, external security or terror threat is defined by the presence of cross border movements by militias and criminal syndicates who carry out poaching activities. These groups move to poach outside their home countries, predominantly coming from The Central African Republic (CAR), the Democratic Republic of the Congo (DRC), Sudan and Chad (Christy, 2015). Due to high levels of poaching and dwindling elephant and rhino populations in these nations, poachers venture into countries where conservation activities have been relatively successful (Schiffman, 2014). Species populations in Kenya and Tanzania are under increased pressure from external threats as poacher-terrorists enter national parks through porous and poorly managed borders (Christy, 2015).

Country Profiles

The following section will provide a general country overview in the form of a table, followed by a detailed description of each case study. The case studies represent conservation initiatives that are governed by the use of both top-down and bottom-up strategies. The case studies demonstrate the initiatives that were taken to curb poaching activities and conserve elephant and rhino populations. In the section *'outcomes and challenges'*, information on the effects and successes or failures of the implemented conservation strategies will be provided on a country and case-by-case basis.

Table 1.

Location	KENYA
Focus Species	African Elephant and Black Rhino
CITES Status Elephant Rhino	High Risk from Poaching Appendix I Appendix I
Elephant Stability	Stable
Rhino Stability	Stable
Poachers	Members of local or neighboring communities, locals hired by outsiders.
Opportunities	Creation on conservation jobs, eco-tourism, enterprise development, community resource management, land-lease payments based on community performance in conservation.
External Security and Terror Threats	Yes

SITE(S)

The case of Kenya includes two major areas of study, which are represented by the Northern Rangelands Trust (NRT) conservancies and the Olderkesi Wildlife Conservancy (OWC).

Northern Rangelands Trust:

The NRT conducts conservation management projects, made up of 19 community run conservancies which cover 2.5 million hectares of community land in Kenya (King & Craig, 2015). Conservancies are well-governed, community owned areas with the goal of improving socio-economic conditions, land management and wildlife conservation strategies. Communities own the land, either through legal or traditional mechanisms and work together to ensure conservation of species on their territories.

The success of these conservancies is related to the broader benefits they bring to local communities. Poverty levels among communities are generally high with more than 70% of the population living below the national poverty line (King & Craig, 2015). In this respect, conservancies offer alternative livelihoods to communities other than farming and livestock grazing, generating both financial and non-financial benefits (Pye-Smith, 2013). In 2013, conservancies generated 700 full-

time and 800 part-time jobs in conservation activities, including microenterprise and tourism operations (King & Craig, 2015). Allocation of revenues was managed by community members to increase notions of ownership and responsibility. Non-financial benefits included better levels of security from external threats and militias, which was considered more important by some communities than financial gains (King & Craig, 2015).

According to NRT, tackling elephant and rhino poaching requires a multi-faceted approach. This includes the engagement of community members as rangers, creation of rapid response teams to instances of poaching or security threats to villages, intelligence gathering and social pressure on communities to engage in protection activities (Pye-Smith, 2013). On daily patrols, a network of around 400 community rangers monitors wildlife across all conservancy areas who are in direct contact with Kenyan law enforcement authorities. However, just over one third are armed and these operate under the Kenyan Police forces (King & Craig, 2015). In addition, there are three armed rapid response teams made up of 25 rangers from communities in the conservancies. Rangers are specially trained and armed multi-ethnic groups who are granted jurisdiction to move between tribal territories, thus being able to operate where traditional law enforcement would not have access (King & Craig, 2015). A local informant network complements the conservancies intelligence services, engaging community members in the protection of populations and reporting of crime. NRT projects found that although there are significant risks involved in the anti-poaching activities at ground level, community members reported that the benefits of wildlife protection outweigh the dangers of engaging in the protection of species (Roe, 2015). Kenya has legally recognized the role of conservancies through the 2013 Wildlife Conservation and Management Act (WWF, 2014). This includes their role in the tackling of wildlife crime, managing inter-tribal conflict and tackling banditry.

Olderkesi Wildlife Conservancy:

The OWC is an important wildlife corridor between the Loita and Ngurman hills and the Maasai Mara National Reserve (Roe, 2015). All wildlife in OWC is under threat by poaching activities and changing patterns of commercial use of land. Increasing demand for land for farming livestock is adding tension to wildlife – human conflict dynamics.

The conservation program is based on incentive payments to local communities that aim to ensure wildlife protection from poachers within their areas and to manage and prevent clashes between farming activities and wildlife. The program is based on a mechanism of lease payments that are competitive with the revenues from alternative domestic land use such as agriculture and livestock grazing (Cottar, 2015). Payments are made directly to community elders to mitigate corruption. Violations of agreements regarding land use, such as poaching, results in a reduction of lease payments to community leaders who are then held accountable for making up the deficit (Cottar, 2015; Roe, 2015). In instances where payments are reduced due to violations of agreements it is up to the community leaders to punish the culprits (if these are community members or locals in the area). The nature of this scheme is that is promotes collective accountability and responsibility for wildlife protection and sustainable land management.

Additionally, the conservancy also coordinated a team of local scouts and rangers that operate as undercover units, liaising with other rangers and community members to collect evidence in instances of poaching (Cottar, 2015). When community members cooperate with rangers and scouts who are investigating wildlife crime, payments are contributed towards their lease payments, fostering incentives to cooperate with wildlife services.

The sustainability of this initiative is dependent on its economic benefits and whether the community maintains that land for wildlife conservation is worth the risks of protecting it (Cottar, 2015). While the level of financial security for communities in conservancies is generally better, it remains vulnerable to external factors such as domestic prices of commodities like wheat and maize. If the prices for these goods rise, the returns from land leasing for wildlife may not suffice in the future.

As part of its crackdown on wildlife crime in the area, Kenyan authorities have raised fines and penalties for perpetrators whilst increasing rewards for informers (Cottar, 2015). Simultaneously, ivory poachers have reportedly become more ruthless and violent (Cottar, 2015; Roe, 2015). Although poachers were once welcomed by villagers, their tactics now include turning villages against them through threats and acts of violence against both people and property (Cottar, 2015; Roe, 2015). This fosters fear for security and loss of livelihood and can push community members to not cooperate with authorities or report crimes of poaching.

Table 2.

Location	TANZANIA
Focus Species	African Elephant and Black Rhino
CITES Status	Extremely high and increasing levels of poaching
Elephant	Appendix I
Rhino	Appendix I
Elephant Stability	Rapidly Decreasing
Rhino Stability	Stable / Decreasing
Poachers	Locals financed by outsiders
Opportunities	Community intelligence gathering, participation and rangers and eco-guards, enterprise development and wildlife-human conflict mitigation programs
External Security Threats	Yes

SITE(S)

Ruvuma Elephant Project:

The Ruvuma Elephant Project (REP) covers two conservation areas in Tanzania: the Sealous Game Reserve in the South of Tanzania and the Niassa National Reserve, which shares national boundaries with Mozambique. The Sealous-Niassa wildlife corridor is one of the most notorious areas for elephant poaching in Africa (Roe, 2015). Conservation strategies involve community participation programs and intelligence sharing.

The REP focuses its initiatives on close community collaboration to achieve a mechanism of reciprocal support and participation. This includes joint patrols and operations by both rangers and community members and intelligence gathering activities.

The Sealous-Niassa wildlife corridor falls within multiple administrative zones within three local government districts and five wildlife management areas which are community-based organizations that have legal authorization to protect and manage resources in a sustainable manner (Swai & Lotter, 2015).

The aim of the REP is to establish a reliable overview of elephant populations and threats in the area, and to better understand population migration patters, control

poaching and to ensure law enforcement is a functioning deterrent mechanism (Swai & Lotter, 2015). The overall goal is to reduce elephant and rhino mortality rates caused by human-elephant conflict and interaction. To enhance species protection and community participation, REP has facilitated the training and education of community-based scouts and rangers with skills in case reporting and poaching prevention. Through air surveillance and geographical positioning system (GPS), REP collected data on elephant populations, number of carcasses and poaching activity. Additionally, the project established cooperation incentives by giving financial rewards for compliance and the delivery of information (Swai & Lotter, 2015). Through financial rewards the REP also supports individuals seeking to obtain alternative livelihoods and income generating activities that contribute towards the wellbeing of communities in the conservancies (Swai & Lotter, 2015). The REP initiative actively facilitates community engagement in conservation projects and through this participation the project also aims to change human attitude and behavior towards wildlife as locals recognize the importance of healthy species populations for the sustainability of the ecosystem and their livelihoods (Swai & Lotter, 2015).

However, the involvement of community members is not without risks. The REP reported that due to increasing violence by poachers community guards have been shot or their homes destroyed (Roe, 2015) In order to ensure that community members remain committed to species protection, REP offers financial compensation to rebuild morale. REP reports that through rapid response mechanisms to times of crisis, overall commitment levels remained high as the rewards outweighed the risks of protection (Swai & Lotter, 2015).

Despite resurgence of ivory and rhino horn poaching in the Sealous-Niassa corridor, REP reported that in general elephant poaching has been manageable in the area and anti-poaching strategies successful at keeping species populations relatively stable (Swai & Lotter, 2015). However, should the pressure and violence from external actors increase, this stability may become jeopardized in the future.

Table 3.

Location	SOUTH AFRICA
Focus Species	African Elephant and Black Rhino
CITES Status Elephant Rhino	Increasing risk of poaching from outsiders. Appendix II Appendix II
Elephant Stability	Stable
Rhino Stability	Stable
Poachers	Poachers are mainly externally hired outsiders and middlemen.
Opportunities	Revenue and income from eco-tourism, enterprise opportunity, jobs as rangers and eco-guards, development of alternative livelihoods, development of infrastructure as incentive to participate in conservation initiatives.
External Security Threats	No

SITE(S)

Black Mamba Conservation Initiative:

The Black Mamba Conservation Initiative (BMCI) operates in the Balule Private Nature Reserve and Greater Kruger Conservation Area. The project operates under three main components including; teams of two that conduct anti-poaching operations, a teams of 23 armed rangers that track species populations and respond to crisis, and lastly, environmental monitors which consist of a team of 26 unarmed intelligence gatherers (Reuter et.al, 2016). The BMCI employs a team of environmental monitors as part of its anti-poaching strategy that is made up of a team of women who act as observers, conduct road blocks and vehicle checks, undertake patrols and gather intelligence from their communities (Reuter et.al, 2016). They also act as teachers, educating their communities on the importance of wildlife conservation. These women are called the Black Mambas and support the rangers and armed response teams by providing intelligence on poaching and incursion.

The main objective of the initiative is to protect wildlife through local community engagement. The initiative aims to create bonds between communities

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and wildlife. All Black Mambas are recruited from local disadvantaged communities and are put through a six-week training program prior to the start of their fieldwork (Reuter et.al, 2016). The program addresses social needs in communities and aims to determine how alternative livelihoods can be created through conservation initiatives. Through its activities, BMCI aims to address unemployment in South Africa and assist with skills development and education (Reuter et.al, 2016). Black Mambas are also employed around schools in their communities to raise awareness and provide a better understanding of the importance of wildlife for the next generation.

Financial benefits are provided to those employed in anti-poaching efforts. Non-financial benefits include personal care items, training and certification, food rations, and media visibility.

Makuleke Eco-tourism Project:

The Makuleke Initiative is located in the Pafuri Camp (PC) in the northern region of South Africa's Kruger National Park. PC is a community driven ecotourism project that aims to protect the wildlife in the region from poaching and sustain a competitive ecotourism enterprise that helps to provide communities with alternative livelihoods and sustainable income opportunities (UNDP, 2012).

The strategies of the project are centered around community participation initiatives under the notion that community-based engagement is the most effective mechanism for wildlife protection and sustainable development (UNDP, 2012). PC activities aim to generate income through sustainable environmental use, and to raise awareness among the local population about the importance of protecting species and biodiversity. Additionally, anti-poaching units have been established to identify and combat poaching activity for ivory and rhino horn.

The project is based on communally owned land and managed through a three-way partnership between local Makuleke landowners, private enterprise such as Safari companies and the State (Roe, 2015; UNDP, 2012).   Ecotourism revenues are an important source of income for funding wildlife protection initiatives. The project is the largest employer of residents in the Makuleke area with 90% of the community working in PC ecotourism projects (UNDP, 2012). Furthermore, a revenue sharing agreement as been negotiated as part of a partnership between the Makuleke community and Safari organizations, which are to pay 8% of revenues from lodging to the community on whose land they stand (UNDP, 2012). These revenues in return

help fun community development projects such as independent agribusiness or hospitality initiatives run by locals, such as bed and breakfasts. The generation of revenue helps locals to maintain sustainable alternative livelihoods in the ecotourism sector. Makuleke community members also participate directly in wildlife protection initiatives through their employment as eco-guards and rangers. To further participation incentive, the PC project funds and assists the development of infrastructure such as healthcare and education facilities (UNDP, 2012).

N A M I B I A

Table 4.

Location	NAMIBIA
Focus Species	African Elephant and Black Rhino
CITES Status Elephant Rhino	Risk of poaching from outsiders. Appendix II Appendix II
Elephant Stability	Stable
Rhino Stability	Stable and Increasing
Poachers	Poachers are mainly externally hired outsiders and middlemen.
Opportunities	Revenue and income from eco-tourism, enterprise opportunity, jobs as rangers and eco-guards, social prestigious connotation of being ranger, community based responsibility and management.
External Security Threats	No

SITE(S)

Rhino Custodianship Program (RCP):

The RCP is an initiative based in 13 communal conservancies in Namibia (Muntifering et.al, 2015). The RCP is a state-established program on community managed land, spearheaded by Namibia's Ministry of Environment and Tourism. The project aims to achieve rural development goals with the management of biodiversity through the restoration of black rhino populations. The project is driven by demand from local communities to establish rhino-tourism initiatives. The RCP program offers opportunities to enhance local values and institutions that support species conservation by finding common interests between communities and government.

This includes; the management of tourism on communal land to conserve and utilize rhino populations for tourism, granting of custodial rights to land owners by government, granting rights to local people to benefit from the non-consumptive use of rhino without the requirement of sharing revenues with government, and enhancing local conservation activities through assigning joint responsibility for the protection of rhinos (Muntifering et.al, 2015). Tourism organizations also play a role in conservation by providing financial means for monitoring rhino populations. Additionally, rangers who have been appointed by communities are provided with training, field gear and monitoring equipment. They receive performance-based incentive payments to enhance the quality and quantity of their work (Muntifering et.al, 2015).

The project highlights the importance of recognizing the rights of locals to manage and benefit from wildlife and to help these build the capacity to do so, thereby creating alternative livelihoods. Local communities must function as critical partners in conservation efforts.

The Rhino Rangers Incentive Program (RRIP):

The RRIP is a community driven initiative that was created through communities demand to enhance rhino protection mechanisms in response to an escalating threat from poachers. Communities in Namibia North-West regions acted as a catalyst for capacity building initiatives to protect the black rhino. Community leaders asked the Ministry of Environment and Tourism and Rhino Custodians Program to assist in rhino monitoring and protection, thus creating the RRIP (Hambo et.al, 2015)

The initiative focuses on the improvement of species population monitoring by creating joint patrols with rhino specialists, skills training and job creation by employing locals and rangers or scouts. Further incentives include the donation of equipment and resources to communities, as well as performance-based financial bonuses (Hambo et.al, 2015).

The RRIP aims to increase rhino population stability by strengthening tourism regulations as well as increasing the number of 'boots on the ground' in rhino populated areas. In the region, poaching is on the rise by outside recruited middlemen (Hambo et.al, 2015). The project additionally works towards reducing local tolerance to poaching by enhancing human-wildlife relationships and educating locals in the

importance of biodiversity. The training of community members in conservation strategies also involves recording and reporting criminal and suspicious behavior to official capacities. By enhancing the relationship between officials and locals the ability and motivation of communities to detect and report poaching activities should be increased (Hambo et.al, 2015).   RRIP operates through the concept that a stable wildlife population depends on the local communities level of tolerance regarding poaching, and the locals accepting and understanding that rhinos are of greater value alive rather than dead. The project creates new revenue generating opportunities through rhino tourism to help increase their value to community members and thereby strengthen the importance of conserving them.

OUTCOMES AND ANALYSIS

In all case studies, anti-poaching strategies aim to address a multifaceted and complex issue with no one-fits-all solution. The findings of this study suggest that solutions to combatting poaching activities are two-sided. On one hand, there are socio-economic issues, such as poverty and lack of alternative livelihoods that drive poaching incentives at community level. On the other hand, security threats and illegal activity by criminal syndicates, as well as domestic economic instability, are factors requiring government driven actions and solutions. These findings suggest that poaching must be addressed at each level, treated as both separate and interlinking issues in order to maximize the effectiveness of each approach. Although this study does not address solutions to the demand side influences from Asia, the high prices for the commodity must be considered as perpetuating mechanisms for driving the illegal activity - especially as ivory and rhino horn represents a form of 'bush currency' for criminal syndicates (Duffy, 2016).

Due to the security and socio-economic dimensions of poaching, the following section will provide and overview of the outcomes and challenges of the case studies. This section will also provide a cost-benefit overview and analysis of bottom-up and top-down solutions through a domestic and international context.

Table 5.

Policies	Outcomes	Challenges
• Better monitoring by rangers • Increased investment in conservatory initiatives. • Multi-ethnic surveillance groups	• Success in reducing poaching within conservancy. • Decrease in human-wildlife conflict. • Increased range of patrols. • Improved security. • Increase in community incentive to protect wildlife.	• Downturn in tourism affects success. • Financial sustainability requires minimum 10-year investment commitment. • External poaching on the rise. • Corruption impedes prosecution.

Northern Rangelands Trust (NRT) and Olderkesi Wildlife Conservatory (OWC):

The approach for successfully tackling poaching is multi-faceted; including intelligence gathering, social pressure, land-leasing initiatives, employing community members as rangers and the deployment of rapid response teams to instances of poaching.

The NRT employs a mixture of both socio-economic and security focused approaches, with a network of 400 community rangers monitoring elephant and rhino populations on daily patrols (King & Craig, 2015). All of these are in direct communication with government authorities and national law enforcement. Only a third of rangers are armed and those who do carry weapons operate under the Kenyan police rather than through the jurisdiction of community elders (King & Craig, 2015). In addition, teams of rangers made up of multi-ethnic groups who are granted special jurisdiction to move between different communal territories, thus operating in areas government-employed law enforcement could not. This strategic synergy between communities and authorities proved as a highly effective mechanism for species populations monitoring and protecting (King & Craig, 2015). As the NRT conservatories grew and community engagement demonstrated effectiveness, government incentives to invest in making intelligence gathering more formal and strategic increased as well (King & Craig, 2015). The NRT reported that an additional benefit of community-led conservation programs is their role changing social norms and applying social pressure to expose or shame poachers, including customary punishments such as banishing or cursing individuals – actions that still carry weight in traditional communities (King & Craig, 2015).

Despite the risks of engaging in species conservation and protection from poachers, community members in both NRT and Olderkesi conservancies reported that the benefits of protecting wildlife nevertheless outweighed the dangers (King & Craig, 2015; Cottar, 2015). The growing success of conservancies has increased government appreciation and recognition, leading to conservancies of the NRT gaining a legal foundation for their role through the 2013 Wildlife Conservation Management Act (King & Craig, 2015). The Act protects conservancies' rights to manage the tackling of illegal trade, poaching, inter-tribal conflict and banditry.

Both the NRT and Olderkesi reported that the successes of initiatives are encouraging even though the dynamics of conservation strategies have changed since 2010 due to an increase in the price for ivory and transnational poaching activities (King & Craig 2015; Cottar, 2015). Most NRT conservancies that were implemented between 2001 and 2011 reported a reduction in poaching, backed up by evidence that includes aerial survey data on species populations and carcass data. The findings suggest that there was an increase in elephant populations by 27% between 2002 and 2008, where the animals that were being killed in Kenya was significantly lower inside conservancies that outside their jurisdiction (King & Craig, 2015). In the period between 2009 and 2012, ranger-led species monitoring reported that there was an increase in poaching activity, with the number of elephant carcasses found due to poaching rising from 34% to 81%, and the overall population declining by 14% in that same time period (King & Craig, 2015). Despite the overall decline, species populations remain stable on conservancy land to date, even though conservancies were unable to fully contain a dramatic rise in poaching levels between 2011 and 2015 (King & Craig, 2015; Cottar, 2015). In response, government authorities strengthened their support for conservancies through the employment of police, support of wildlife services and increased investment.

Olderkesi and the NRT reported that community conservancies proved to be effective and respected mechanisms for conservation and maintaining alternative livelihoods as long as the nature of their governance remained inclusive and in the governance of the community (King & Craig, 2015; Cottar, 2015). Successful conservancies should not exclude locals from land use, nor should boundaries between wildlife and community members be created (Cottar, 2015). Working towards a common cause enforces incentive to participate in conservation and ensure the anticipated outcome is sustained.

Additional findings through conservancy initiatives highlight the importance of ownership, suggesting that the local communities who own the land must be the main entities in decision making processes, with NGO's and governments only acting as supportive partners. Strong community ownership is important for the projects to be self-sustaining, especially at times of poor governance (Cottar, 2015). Notably, non-financial incentives must also be considered as a valuable tool for success; such as the social prestige of acting as a ranger or the value of elephants and rhinos as cultural heritage. In respect to changing perspectives and incentives, social pressure is one of the strongest factors that influences mindsets within communities according to NRT findings (King & Craig, 2015).   Kenya's crackdown on poaching and wildlife crime has resulted in the dramatic increase of fines and penalties for illegal behavior, paired with financial incentives and rewards for informers (Cottar, 2015). Simultaneously, ivory and rhino horn poachers have become more ruthless and violent (Cottar, 2015). These factors cannot be addressed and combatted by communities alone, but require government response through the deployment of armed forces.

T A N Z A N I A

Table 6.

Policies	Outcomes	Challenges
• Better monitoring by rangers. • Heightened law enforcement. • Employing locals as guards and informers. • Integrated community and law enforcement protection. • Multiple agency governance.	• Increased transparency hindering corruption. • Increase in incentives to participate in protection. • Drop in species carcasses related to poaching. • Change in social perceptions towards poaching. • Drop in poaching related elephant deaths.	• Porous long border. • Increase in poaching violence. • Increase in use of weaponry by poachers. • Funding constraints

The Ruvuma Elephant Project (REP):

The REP is built on initiatives of community engagement as a tactic to combat poaching for ivory and rhino horn. Community engagement is fostered through

employing local people as informers and guards. Through community engagement and the strengthening of values regarding wildlife, the project also worked to change social perceptions towards conservation. Locals receive financial rewards for delivering information and for carrying out tasks. Additionally, the REP aids locals with crop protection and the sale of chili peppers, which are used for crop protection from wildlife. They also receive financial rewards for good performance in law enforcement activities.

Due to the increasing violence of poachers, conservation work is not without risks. Community guards have been shot or their homes destroyed and raided (Swai & Lotter, 2015). The REP reports that in order to maintain incentive and morale for wildlife protection engagement, conservation initiatives must be quick to provide compensation (Swai & Lotter, 2015; Roe, 2015). Furthermore, the REP case study found that the rewards outweigh the risks, as locals remained committed to the project, with an increasing amount of people wanting to join conservation and protection activities (Swai & Lotter, 2015).

The REP conducts ground patrols and aerial surveillance missions to monitor species populations. Since the beginning of the project in 2012, elephant carcass sightings suggest a substantial drop in poaching activities inside the REP protected area, where 216 were sighted in 2012 compared to 68 in 2014 (Swai & Lotter, 2015). However, despite the decline of elephant carcasses within the REP conservancy, elephant populations are declining in Tanzania overall (Swai & Lotter, 2015; Roe, 2015). This not only reflects the effectiveness of conservancies, but simultaneously suggests that although conservancies can be successful mechanisms of species protection, there are not enough initiatives similar to REP in place to conserve elephant populations in areas of Tanzania that remain unmonitored and unprotected.

Since the start of REP, interventions have resulted in the seizure of 1,582 snares, 25,586 pieces of illegal timber, 175 elephant tusks, 805 firearms, 1,531 rounds of ammunition, 6 vehicles and 15 motorbikes - with law enforcement activities resulting in the arrest of 562 people (Swai & Lotter, 2015). Success of the REP is reportedly attributed to the high levels of community engagement with the integrated support of formal law enforcement (Swai & Lotter, 2015). The REP study suggests that local involvement in poaching activities is due to a manifestation of other issues, including: lack of purpose, absence of alternatives, lack of understanding of importance of conservation and lack of good relationships between authorities and

communities (Swai & Lotter, 2015). In order to ensure the long-term success of conservation initiatives, it is important to address these factors and recognize them as causes for conservation failures.

Finally, the findings of the REP stipulate that the project functions with positive results thanks to the mechanisms by which it is governed. The conservancy area is protected by multiple agencies rather than through a single authority. These include; communities and organizations working with communities, non-governmental organizations (NGO's) with special focus on protected area management, and government authorities (Swai & Lotter, 2015). The benefit of multiple agency involvement is that it hinders corruption by increasing the transparency of investments and financial flows (Swai & Lotter, 2015; Roe, 2015).

S O U T H A F R I C A

Table 7.

Policies	Outcomes	Challenges
• Alternative livelihood development. • Engagement of women in anti-poaching strategies. • Collaboration between armed forces and communities. • Eco-tourism enterprise development.	• Decrease in poaching. • Increase in wildlife populations. • Increase in engagement of locals in conservation. • Destruction of 12 poachers camps. • Increase in investments into community development. • Micro-businesses operating at profit.	• Heavily reliant on donor funding. • Downturn in tourism affects success. • Protecting rangers and protectors from poachers.

Black Mamba Conservation Initiative (BMCI) and Makuleke Ecotourism Project (MEP):

The BMCI is based on a community engagement approach that strives to increase species protection from poachers and illegal hunting practices. The success of the initiative derives from the creation of alternative livelihoods by providing women a means of income and access to fieldwork. The benefit of their experiences is that women traditionally maintain close relations between family members, therefore their knowledge transcends into their family and community circles, multiplying environmental awareness to the communities around them (Reuter et.al, 2016). The

Black Mambas act as observers and reporters, collecting evidence of intrusion, detecting traps and detecting and exposing poacher camps and activities (Reuter et.al, 2016). Their findings are crucial to the armed response teams who follow up on their reports. Their collaboration with armed forces represents a well-functioning mechanism that engages people at both community and governmental levels.

The success of the BMCI is reportedly also due to its multi-stakeholder inclusion (Reuter et.al, 2016). The project is led in collaboration with government entities such as armed anti-poaching units and the Ministry of Tourism and Environment, tourism organizations and lodge owners, private landowners and NGO's (Reuter et.al, 2016). Similarly, the MEP's accomplishments are dependent on multi-stakeholder partnerships between community landowners, private tourism enterprises and the government authorities of Kruger National Park (UNDP, 2012).

Multi-stakeholder involvement aids in the reduction of corruption by creating transparency, and ensures distribution of responsibility where differentiating issues are dealt with by experts at every level. This implies that security aspects are handled by government forces or security companies with expertise on security matters, whereas socio-economic challenges are dealt with by tourism agencies to create jobs, or NGO's that aid in livelihood development and skills training.

The challenge in the BMCI is that it is a stand-alone initiative, making its application difficult to other contexts as there is no 'one-fits-all solution to poaching (Reuter et.al, 2016). The focus of this program has been on empowering women through the Black Mamba project, and analyzing the consequences of their involvement in conservation activities. In communities where women may have a different social-status than in South Africa, for example, where it is traditionally not accepted for women to work outside the home, applying a similar project can prove difficult.

In the timeframe between 2013 and 2015, the Black Mambas have reduced wildlife-poisoning activities by 76% and, with the aid of armed forces, destroyed 12 poachers camps within the area of their jurisdiction (Reuter et.al, 2016).

For the MEP, revenue from tourism is a vital source of funding and an important mechanism to maintain alternative livelihoods (UNDP, 2012). The long-term sustainability of the project is dependent on a variety of community-centered factors, including employment and training opportunities, grants for education and vocational training and loans for enterprise development. From a government-level,

investments into community infrastructure, such as the development of social services, schools, clinics and sanitation facilities all aid in community cohesion and the creation of social capital - thus decreasing the need to resort to poaching and wildlife trade as a source of income. The findings of the MEP or similar initiatives entail that benefits from development opportunities must flow directly back to the community in order to sustain alternative livelihoods and to maintain incentives to protect wildlife.

The MEP fosters and helps build relationships between community members and government authorities – a mechanism that is crucial for effective anti poaching strategies (UNDP, 2012). Evidence from MEP findings suggest that the communities must recognize the government as a viable partner to their development and success. Likewise, it is important that government authorities that aim to conserve and protect wildlife in their area recognize the vital role of communities for the success of such initiatives.

The MEP supports its projects by providing financial benefits through ecotourism. The project reported that since the implementation of the initiative in 2005, revenues from alternative livelihoods have been on the rise and investments into the community increased (UNDP, 2012). Micro-business initiatives have exceeded the break-even point and are operating at a profit since 2008 (UNDP, 2012). However, the MEP's capacity to sustain, enhance and expand benefits of conservation depends largely on the commercial success of the ecotourism operations (UNDP, 2012). This consequently stipulates that businesses that are dependent on ecotourism will struggle at times when tourism is low in the area, which will result in land and business owners seeking other alternatives for income, like resorting to poaching activities for sustenance.

N A M I B I A

Table 8.

Policies	Outcomes	Challenges
• Creation of jobs and alternative livelihoods. • Skills development. • Strengthening tourism regulations. • Boosting of numbers of rangers and eco-guards. • Introduction of rhino profile cards.	• Stronger human-wildlife bonds. • Increased interest in participation to protect wildlife. • Increase in rhino populations. • Increase in rhino tourism. • Increased opportunities for private enterprise development.	• Superstition and belief in witchcraft can hinder cooperation. • Sustainability of tourism industry. • Sustainability of project when tourism is low. • Maintaining incentive to participate before project results can be fully realized.

Rhino Custodianship Program (RCP) and The Rhino Rangers Incentive Program (RRIP):

Namibia has been experiencing an increase in poaching, even though its elephant and rhino populations remain relatively stable and on Annex II of the CITES Convention (Muntifering et.al, 2015; Hambo et.al, 2015). Both the RCP and RRIP's focus has been on monitoring and improving rhino protection initiatives with the use of modern technology and on the job skills development initiatives by engaging community members with government authorities and conservation specialists. Non-financial community-focused incentives are driven by the allocation of goods and equipment such as camping gear, uniforms and vehicles. The RCP reposts that since the provision of non-financial benefits community based monitoring of rhinos has dramatically improved quantity and quality of community engagement (Muntifering et.al, 2015) The RCP and RRIP studies suggest that security for the rhino will be increased by tightening tourism regulations and boosting the number of rangers, scouts and eco-guards that operate within the projects jurisdiction (Muntifering et.al, 2015; Hambo et.al, 2015). By involving rangers, scouts and eco-guards in eco-tourism initiatives by employing them as guides, the conservation industry becomes directly intertwined with the tourism industry, adding strategic benefits to conservation initiatives as now there are more financial opportunities tied to the rhino through rhino-tourism. The merging of the two industries also implies that revenue generated from rhino protection will not only benefit those involved in conservation, but rhino-tourism will also provide additional benefits to the broader community and allow for the development opportunities of private-enterprise.

The RCP study found that after a period of two years from the point of implementation, the project experienced a twelve-fold increase in rhino custodians who actively monitor rhinos on communal land (Muntifering et.al, 2015). Regionally, the project experienced a tripling of trained and equipped rhino monitoring personnel (Muntifering et.al, 2015). The findings of the RCP suggest that their community engagement strategy proved successful; where in 2011 no rhinos where spotted on community land compared to 272 rhino sightings in the year 2014 (Muntifering et.al, 2015). Notably, approximately 40% of the regions rhinos live on rhino custodian land, where in 2014 only 22% of poaching cases occurred within the projects premises (Muntifering et.al, 2015; Hambo et.al, 2015).

The RCP is an initiative that was created on request of community members, therefore strong local interest and support was already a driving factor from the outset. In addition, both the RCP and RRIP program are driven by locals rather than an external NGO or government agency. This direct collaboration with incentivized locals has fostered a clearer idea of the approaches needed to understanding the elements of the program that will maximize the values local people place on protecting rhinos. The findings of the RCP and RRIP also suggest that the provision of uniforms, team building events, training seminars, performance-based bonus payments and certificates of achievement in exams have helped to increase notions of pride and prestige for their role in conservation, thus fostering community enthusiasm to become a member of the RCP initiative (Muntifering et.al, 2015; Hambo et.al, 2015).

The programs both introduced rhino profile cards with information on the animals life and history to aid rangers in the identification of individual rhinos (Muntifering et.al, 2015; Hambo et.al, 2015). These types of tools do not only improve identification, but they also help to build a relationship between the rangers and the rhinos they are protecting. Naming and knowing the animal on a more personal level helps to create a stronger sense of responsibility, thereby increasing incentive to protect it.

Since the implementation of rhino custodianship programs, tolerance towards poaching has reduced (Muntifering et.al, 2015; Hambo et.al, 2015). Community members aid with the recording and reporting of criminal or suspicious activity to the appropriate official agencies (Muntifering et.al, 2015; Hambo et.al, 2015). This engagement between communities and officials helps to align enforcement based and incentive based strategies as locals become more willing to work with law enforcement authorities and detect and report instances of poaching. According to the RCP, the increase in the reporting and recording of sightings of both rhinos and criminal activity, suggests that there is an improvement in community level pro-rhino attitude and conservation incentive (Muntifering et.al, 2015). However, both the RCP and RRIP reported challenges in sustaining local incentive and support while training was ongoing, primarily at times when the project was in its roll-out phase and the financial benefits and enterprise development opportunities were not fully realized and appreciated (Muntifering et.al, 2015; Hambo et.al, 2015). This stipulates that the community-driven demand for rhino protection is financially incentivized rather than

driven out of interest for species conservation. Thus, tourism-dependent projects run the risk that at times when tourism is low, the revenues will not be enough to maintain desired income levels. With the increasing price for ivory and rhino horn, the appeal of poaching is likely increase as people seek out alternative income generating activities.

Domestic Dimension

Domestic, socio-economic issues that drive poaching require community participation in conservation initiatives. Considering the assumption of financially motivated rational choice, from a rationalist perspective, it can be assumed that people are driven to poach by mainly financial incentives to increase their 'utility' or 'happiness', especially when living in conditions of socio-economic inequality and poverty. Notably however, the findings in the cases of South Africa, Kenya and Namibia suggest that the cultural value of the animals to national heritage must also be considered. Non-financially driven incentives to protect elephant and rhino populations, such as the prestige associated with protecting this heritage, or the human-wildlife bond created through conservation initiatives, must also be accounted for as factors motivating people to engage in protecting them.

The case studies found that providing rangers and eco-guards with non-financial incentives such as uniforms, tools, camping gear and vehicles aided in keeping motivation to participate high. However, rather than being driven by concern for biodiversity, these 'non-financial' incentives nevertheless represent incentives driven by material gains to increase utility as assumed by rational choice. Although this is not necessarily a negative aspect, it stipulates that people can be encouraged to participate in conservation if they are able to gain utility from receiving basic resources such as uniforms, tools and materials as a type of incentive payment for their involvement. Furthermore, a sense of prestige also becomes associated with wearing rangers uniforms, especially as norms towards wildlife conservation change within communities (King & Craig, 2015; Cottar, 2015). This fosters incentive to become a ranger or protector, whilst also developing a sense of unity through the involvement of different tribes under a common purpose. As wildlife protection rather than poaching becomes a norm, the social stigma of poaching becomes strengthened as well. As prescribed in pathway one in the Theory of Change (TOC), communities

are effective mechanisms for strengthening disincentives of poaching through the application of social sanctions against poachers or by joining conservation activities as rangers, scouts and eco-guards (Biggs et.al, 2016). In the cases of South Africa and Namibia, where conservation projects were either requested by community members (Namibia), or where protection incentives at community level were particularly high (Namibia and South Africa), poachers are mainly externally hired outsiders and middlemen. However, in the cases of Tanzania and Kenya where projects are primarily implemented and governed by NGO's or local authorities aiming to educate and engage community members, poachers are mostly locals financed by outsiders. This difference stipulates that the success of anti-poaching strategies is to some extent dependent on the norms within society, and whether these have evolved to where poaching is stigmatized within communities, or whether financial incentives of poaching are still able outweigh these social norms – or be lucrative enough to push individuals to go against the norms within their community. The growing demand for ivory and rhino horn from Asia represents a risk to the maintenance of these norms. As the price for these bush commodities increases, so may incentives to turn to poaching when the revenues generated by engaging in poaching outweigh the revenues from eco-tourism, land leasing and protection. Thus the development of community driven solutions to poaching is becoming increasingly more necessary for successful and sustainable conservation strategies.

From the findings in the aforementioned case studies it can be stipulated that the most important element for success of community driven incentives is the provision of alternative livelihoods. This follows pathway two of the TOC, which encourages enterprise development and the support of initiatives that generate financial benefits for local communities (Biggs et.al, 2016). This includes the development of the ecotourism industry and the training and education of locals as either guides or rangers, or both. The output of this is that communities are able to capture greater benefits from wildlife, whether financially or non-financially. Thus, through the assumption of rational choice, conserving wildlife adds greater financial value to elephants and rhinos as a living commodity, and in return, people's utility from keeping populations alive is increased through ecotourism and employment initiatives. The outcome of this is that communities will have greater incentive to protect wildlife. As such, the best solution to tackling incentives to poach at the community level is through the provision of economic alternatives. The evidence of

this is presented in the findings of all the case studies, through the successful establishment of ecotourism enterprise or land leasing initiatives that generate alternative sources income.

Furthermore, the findings of the studies indicate that local engagement in poaching is due to a manifestation of other issues such as lack of purpose and lack of good relationships between authorities and communities (Swai & Lotter, 2015; King & Craig, 2015; Cottar, 2015; Muntifering et.al, 2015). In order to fulfill purpose within communities, conservation projects must ensure that ownership remains within communities and offers possibilities for engagement in initiatives by providing alternative land use. Conservancy land is traditionally owned by local communities that preserve a strong cultural right over the land and its management. In order to foster strong cooperation between communities and authorities, NGO's and government must be recognized as a viable partner in improving livelihoods rather than as an outside entity threatening to take control over their land (Muntifering et.al, 2015; Hambo et.al, 2015; King & Craig, 2015; Cottar, 2015;). Similarly, authorities must also recognize communities as a valuable partner to the success of conservation initiatives. Working towards a common cause enhances incentive to participate in wildlife protection and helps to ensure that the anticipated outcome is sustained. Conservancies can cover hundreds of kilometers of land – areas that are too large for authorities to control without the aid of the locals that are already available on the land (Roe, 2015). The employment of community members as rangers, observers and reporters does not only create alternative livelihoods, but also increases government awareness of the activities on conservancy land. The engagement of community members and their collaboration with authorities allows for access to areas where traditional law enforcement may not have access, as reflected in the findings of the Kenyan case study (King and Craig, 2015). With the establishment of strong community-government relationships, activities on conservancy land will thus become more transparent and easier to monitor and manage. It is crucial that conservation strategies do not exclude locals, but are managed through high levels of community engagement with integrated support from government and law enforcement specifically to aid in addressing the driving factors that are outside the capacity of community members – such as the increasing armed violence of poachers.

In addition, there is an increasing need to militarize anti-poaching strategies because conservation and security concerns are becoming further integrated.

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Poachers, represented by outsiders, are often affiliated to terrorist organizations or criminal syndicates. In response, government and conservationists are turning towards strategies of contemporary warfare to be able to meet the increased violence of poachers (Duffy, 2016).

The benefits of top-down solutions, such as increased security and militarized responses, are that threats of violent killings of rhino's and elephants are directly met by equal means of protection. By protecting species populations, locals are indirectly protected from economic insecurity as the iconic species attract tourists, therefore adding to the stability and development of the eco-tourism industry.

However, conservation by the use of increased militarized means also creates a security threat. As derived from the findings in the cases, people who go to conservatories to poach are oftentimes outsiders who are equipped with military grade weaponry and technology – and who thus must be met by similar means to deter them from poaching. Due to the lucrative nature of the industry, it can be stipulated that the violence of poachers is not likely to decrease; therefore conservationist-poacher clashes are likely to add to a notion of regional instability. In effect, this can deter tourists' willingness to participate in ecotourism in the region due to a fear of escalating security threats. As a result, the ecotourism industry is likely to suffer, which will damage community development and can negatively affect the success of bottom-up solutions because incentives to engage in wildlife protection change. As such, although necessary, increasing the militarization of anti-poaching strategies can lead to undesired negative externalities in the socio-economic dimension of conservation.

Another problem of increasing military responses to poaching is that the strategy does not tackle poaching effectively because it does not address mechanisms to strategically combatting cross-border movements of poachers, nor does it address socio-economic solutions to the bottom-up drivers of poaching. Instead, top-down investment in surveillance and technology, and the development of intelligence led-strategies, acts as counterproductive distractions to addressing the socio-economic issues at community level (Duffy, 2016; Douglas & Alie, 2014). Thus, focusing solely on security strategies is not a comprehensive solution to poaching because it fails to address the socio-economic solutions to poaching by locals. Applying this type of approach at community level will likely increase poverty and inequality due to lack of government investment in wildlife-based enterprise opportunities.

Furthermore, investing in primarily security strategies can increase collusion with government and authorities and foster the prevalence of criminal networks as people seek alternative sources of income and enterprise if the industry from conservation is not properly developed (Duffy, 2016; Douglas & Alie, 2014; Hambo et.al, 2015).

International Dimension

Although the case studies do not address the mechanisms by which to tackle the threat of poaching by outsiders and criminal syndicates on an international scale, the findings suggest that poaching driven by external actors require different solutions than poaching driven by community members, thereby supporting H2 of this study.

Whilst bottom-up solutions can deter incentives to poach at community level by tackling socio-economic issues, the threats by outside actors require government-driven solutions that address the security risks these external actors impose.

Responses to organized transnational criminal networks that engage in poaching require international cooperation and the deployment of armed forces. Kenya and Tanzania have porous borders, neighbored by some of the world's most fragile states (Haas, & Ferreira, 2016). The security implication is that illegal activity can flow uncontrolled between states, specifically between Somalia, South Sudan and the DRC through to Kenya, and Tanzania (Schiffman, 2014). This strongly undermines the success of bottom-up initiatives. As a solution, the additional employment of community members as border patrol officers could aid with the management of this issue.

If the cross-border flows of outsiders and their illegal activity is not adequately managed, then the presence of outsiders promising financial rewards for poaching to locals is likely to increase as well. This is supported in the cases of Kenya and Tanzania, where issues of porous borders are reported to be a driving factor influencing the prevalence of poaching (King & Craig, 2015; Cottar, 2015). The increased presence of outsiders also heightens the risks of engaging in wildlife protection, which can deter locals from becoming rangers, scouts and protectors. As a solution, the involvement of international NGO's and donors is crucial for the success of conservation programs because they are able to offer the financial and non-financial incentives that encourage community participation. In the case of Tanzania, the findings suggest that community engagement can be maintained as long as the

rewards outweigh the risks and that community members are quick to receive compensation for losses, whether financial or non-financial (Muruthi, 2015; (Swai & Lotter, 2015; Roe, 2015).

Even though countries like Kenya and Tanzania have taken a public stance on fighting the illicit industry through the burning of tonnes of confiscated ivory and rhino horn, the increasing size of the seizures by authorities reflects that poaching in the region is not under control or decreasing, despite conservation efforts (Ewing et.al, 2014). The volume of illegal ivory and rhino horn trade has tripled since 1998 (Ewing et.al, 2014). Comprehensive top-down solutions to the international movement of poachers have not yet been developed, and poaching is likely to continue to escalate if these issues are not adequately addressed.

The revenues from ivory and rhino horn have been linked to the funding of criminal syndicates and terrorist organizations, such as Al-Shabaab, Boko Haram, the Janjaweed or the Lord's Resistance Army (LRA) (Poe, 2014). The operational income from ivory and rhino horn is used to obtain weapons, which ultimately fuels the conflict and insecurity that originally allowed for opportunities of poaching to occur – as a result, causing a steady cycle of violence (Ewing et.al, 2014; Vira et.al, 2014). The security implication of this is that if these organizations continue to obtain income from the high-valued ivory and rhino horn, it will likely contribute to regional instability, which in effect is likely to deter tourists from visiting the region and thus decrease valuable revenues from tourism. Consequently, it is probable that this will challenge the success of socio-economically focused conservation programs that are largely dependent on the ecotourism industry. As such, combatting high levels of ivory and rhino horn trade in Kenya and Tanzania requires a strong government crackdown on corruption, crime and terrorism; and an increase in the deployment of border patrol, police and armed forces at the porous borders to fragile states. Comparatively, in South Africa and Namibia, where there is relative political stability and lower corruption rates, elephant and rhino poaching is largely kept in check (Schiffman, 2014). The success of their conservation efforts is reflected in the species CITES Annex II status. This has been achieved through aggressive patrolling, development of community-based conservation initiatives, harsh fines and imprisonment and a crackdown on corruption by authorities (Schiffman, 2014).

The eradication of iconic species and the funding of terrorist organizations and criminal networks from the ivory and rhino horn trade is not only an African issue, but one with international implications.

The following tables below provide an overview of the findings. The table demonstrating the findings can be understood using the grid below:

Table 9.   G R I D

	PROBLEM	PROBLEM
PROBLEM	Solutions	Solutions
PROBLEM	Solutions	Solutions

Table 10.   F I N D I N G S O VE R VI EW

	DOMESTIC	INTERNATIONAL
SOCIO-ECONOMIC	Solutions mainly require bottom-up initiatives with government support and investment. This includes: • Increasing the economic value of protecting wildlife through ecotourism. • Enhancing human bonds with wildlife through animal profiling. • Provision of non-financial incentives to participate in protection. • Creating alternative livelihoods by hiring locals as rangers, scouts and guards. • Creating alternative livelihoods by hiring locals in eco-tourism enterprises. • Social sanctions by communities against poachers. • Changing norms to favor protection by increasing economic value of species.	Although this aspect is not within the scope of this thesis, solutions to socio-economic drivers on an international scale entail policies and initiatives that reduce the demand from Asia (National Geographic Press, 2015). Mechanisms by which demand can be reduced include: • Government led awareness campaigns. • Tightening law enforcement efforts. • Fighting corruption. • Strengthen public education programs dismissing the traditional beliefs regarding the use of ivory and rhino horn. • Prohibiting the sale and purchase of ivory on Asian markets. • Taking advantage of the Internet and social media to stigmatize buying the commodity. • Collaborating with international organizations and treaty bodies to aid with combatting the trade. • Reducing the perception of ivory as a status symbol. • Increasing fines and imprisonment for people who are caught buying and selling ivory.

Table 10. (Continued)

	DOMESTIC	INTERNATIONAL
SECURITY	Solutions mainly require top-down initiatives paired with community participation. This includes: • Involving tribes in monitoring and protecting species. • Government protection of locals who participate in protection. • Fostering collaboration between authorities and community members to allow access to community land. • Intelligence gathering initiatives by both authorities and communities. • Increased investment in military grade technology and weapons. • Increased investment in armed forces and police training. • Increasing investment in training of rangers, both armed and unarmed. • Harsher punishment for poaching. • Government crackdown on corruption. • Increasing international NGO, think-tank and donor involvement.	Solutions require predominantly top-down initiatives that are able to meet the increased security threats by outsiders. This includes: • Enhanced cooperation between states to monitor and control borders in order to curb the illegal flow people and contraband. • Deployment of armed forces. • Employment of community members from different tribes and states to collaborate in border patrol activities. • Investment in anti-terror initiatives. • Harsher punishment for poaching. • Government crackdown on transnational corruption. • Increasing involvement of international organizations and think tanks. • Increase cooperation with international policing agencies. • Increase investment in research to determine a clear framework on the interlinking relationships between poachers, criminal organizations and buyers.

CONCLUSION

The findings of this study suggest there is no panacea to the poaching problem. The phenomenon is a complex issue that requires a multifaceted strategy to combatting it. On the one hand, socio-economically focused approaches are more successful at reducing poaching at the *community level* than solely security focused strategies, thus supporting H1 of this study. As such, the findings of the case studies

indicate that under the right conditions socio-economically driven strategies can be highly effective solutions to reducing the incentive by locals to poach. However, the development of concrete security driven strategies to reduce the illegal movements and activities of outsiders is also crucial for the success of community driven solutions. Poaching and the illegal wildlife commodity trade have significant negative impacts on communities who are affected by the insecurity created through this industry. In addition, the insecurity created through the strengthening of violent militarized responses to poaching negatively affects community development and the success of bottom-up solutions. In order to develop effective community management strategies, top-down solutions must also identify and draw a distinction between poverty driven crimes of need and crimes of greed driven by criminal syndicates. The former can be successfully combatted through an inclusive framework of socio-economic strategies as demonstrated in the findings of the case studies. If communities recognize the financial value of wildlife populations, the incentive to engage in combatting poaching and protecting species will be higher in return. However, if local communities do not participate in wildlife management, and conservation generates no socio-economic benefits, incentives for illegal use will be higher as well. Even the most well-resourced top-down enforcement strategies will struggle to control poaching if they do not receive community support and active participation. The findings of the case studies demonstrate a strong alignment with the pathways as described in the TOC, thus suggesting that the preconditions and assumptions as provided by the theory are a good indication of best practice regarding community driven solutions. It is therefore crucial to maximize the development of socio-economic strategies to strengthen the incentives that drive communities to protect endangered species populations – not just to benefit themselves, but for their future generations, for the international community and for the preservation of biodiversity.

Furthermore, there is an urgent need for future studies to establish transparent and concrete links between terrorism and the ivory and rhino horn trade to enhance cooperation and engagement by the international community. It is evident that the revenues from ivory and rhino horn help fund criminal syndicates and terror organizations that carry out activities which threaten international security. This problematic security dynamic should add a sense of urgency for the international

community to combat the drivers of poaching on both the supply and demand side of the phenomenon.

The findings suggest that international security and conservation concerns are becoming further integrated and thus require solutions that address the drivers both domestically and internationally. As such, solutions to the socio-economic and security dimensions that drive poaching are not mutually exclusive. The movement of criminal activity across porous borders negatively impacts the success of community driven initiatives. Members of criminal syndicates offer relatively high financial rewards to locals to encourage them to engage in wildlife tracking and poaching activities. In addition, cross border movements of criminals seeking to obtain revenue from ivory and rhino horn add to domestic instability by clashing with rangers, police and armed forces. As a result, this adds to a notion of insecurity and can deter tourists from participating in wildlife tourism initiatives in the area, severely affecting the success of bottom-up solutions and damaging the opportunities for alternative livelihoods provided by the ecotourism industry. With the failure of alternative livelihood opportunities, locals may gain incentive to participate in illicit activities such as poaching to generate income, thus further contributing to the vicious cycle of violence and poverty that affects both people and wildlife.

The complexity of combating poaching and its affiliated industries requires close cooperation between conservationists, NGO's, international organizations, government agencies and research institutions because solutions to the various dimensions require an interdisciplinary effort with an integrated approach. The European Parliament produced a resolution on wildlife crime in 2014, which includes government-level support on wide ranging initiatives from intelligence gathering, strengthening of enforcement, revised penalties for poachers, trade moratoria and judiciary system reform (European Parliament, 2014). Notably however, out of the thirty propositions only one initiative was directed towards communities and the promotion of alternative livelihood strategies.

The findings of this study highlight the importance of developing community driven strategies in order to create a more inclusive approach to conservation initiatives that both protects wildlife and fosters local development. Traditional focus by researchers on law enforcement mechanisms and the demand side drivers must shift to include strategies that enhance economic development through the support of alternative livelihoods that reduce local incentive to poach. Adding financial benefits

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to keeping wildlife alive will encourage its protection. There is no blueprint approach that establishes a concrete framework on community engagement strategies and which documents and evaluates the effectiveness of bottom-up solutions in any kind of systematic way. This thesis aims to encourage future researchers and policy makers to increase their focus on the socio-economic drivers of poaching and the respective top-down or bottom-up solutions.

Finally, the findings indicate that there is a significant relationship between poaching and terrorism as the revenues from ivory and rhino horn fund the criminal syndicates that carry out terror activities (Poe, 2014; Kalrom et.al, 2013). Escalating terror threats will not only affect the success of bottom-up solutions to the socio-economic drivers of poaching on a domestic scale but also have international repercussions. It is evident that combatting the cross border movement of external actors and their illicit activities requires international cooperation and government driven solutions. However, there is a lack of research and literature that establishes a clear framework on the mechanisms by which these actors and syndicates are interlinked, where exactly they operate and the financial flows that fund their activities. Hopefully, the findings of this thesis will encourage future research to develop on bridging this knowledge gap as it is impossible to successfully counter the problem of poaching and the affiliated international crime if it is not fully understood.

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