

Exploring Local Elephant Knowledge in the Boteti River Region, Botswana

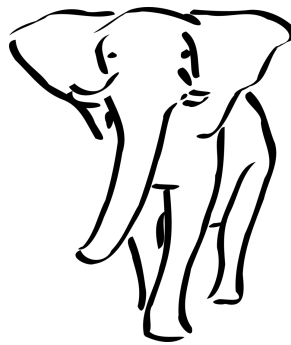
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Abstract

The African savanna elephant (*Loxodonta africana*) and humans are experiencing conflict surrounding the Makgadikgadi Pans National Park in Botswana, Africa. In 2009, at the Western border of the park, there was a resurgence of the Boteti River (Evans, 2006). Consequently, elephants and humans are competing over both land and water. There are three major elephant conservation organizations in Botswana with aims of preserving biotic life and mitigating conflict due to resource competition. Elephants for Africa (EFA) studies the social dynamics, environmental influences, and behavioural patterns of elephants. One of the gaps within elephant conservation research is the under-utilization of local ecological knowledge (LEK). LEK is important to explore as it often complements scientific ecological knowledge (SEK). Using an approach that uses LEK as a tool in social science research is advantageous due to the researcher's ability to gather information about an area's current ecological condition. In comparison, a scientific research approach generally takes more time and is less cost-effective in gathering the same targeted data. Coupling LEK with scientific inquiry, however, optimizes data collection and is an example of an interdisciplinary approach that is lacking in conservation management. Preserving ecological knowledge and conserving wildlife could be eased through the amalgamation of social science and conservation biology disciplines. This research study is conducted in affiliation with EFA and explores local elephant knowledge, specifically in Moreomaoto and Motopi (Boteti villages). Using a series of key informant discussions, in-depth interviews, and focus groups, qualitative data were collected in the research study area. Data reveal that there is local elephant knowledge within Boteti that compliments previously gathered SEK. Utilizing LEK as a tool in conservation management could help in alleviating the tensions of resource competition.

Keywords: Elephant Conservation, Local Ecological Knowledge, Human-Animal Relationships, Environmental Education, Human-Elephant Resource Competition, Multidisciplinary Research

Foreword

This Major Paper contributes to the requirements of my Master of Environmental Studies (MES) degree and Environmental Sustainability Education Diploma within the Faculty of Environmental and Urban Change program at York University. I joined the Lives of Animals Research Group in 2019, under the supervision of Dr Alice J. Hovorka, to contribute to social science research in the context of human-wildlife relations. This Major Paper seeks to address the questions: What local ecological knowledge (LEK) exists concerning the African savanna elephant (*Loxodonta africana*) in Motopi and Moreomaoto communities? and how will LEK aid in mitigating human-wildlife resource competition? To answer these questions, I conducted the “Exploring Local Elephant Knowledge in the Boteti River region, Botswana ” research study taking on the role as its Principal Investigator. This Major Paper reflects my acquired knowledge from the research study, satisfies all components of my Plan of Study (POS), and the following learning objectives outlined within my POS. First, I explored elephant knowledge from a local perspective to better understand strained relationships that include conflict mitigation strategies and alternative approaches to facilitate coexistence. For instance, incorporating LEK investigations enriched my research approach. My largest focus was how people and animals are increasingly coming into conflict with one another (Human-Wildlife Relationships-Objective 1). Second, I explored the relationship between local communities and elephants in Motopi and Moreomaoto. I analyzed the differences between LEK and SEK and how each (together and separately) can contribute to elephant conservation research (Elephant Conservation in Rural Botswana- Objective 1). Finally, I explored human-elephant relations in Botswana and how they can be better improved with the proper integration and access to environmental education (EE). Through proper access to EE, I understood how relations can improve human-elephant conflict (Environmental Education and Human-Wildlife Conflict-Objective 3). The components and learning objectives outlined in my POS underpinned my research study and Major Paper. I explored local knowledge of elephants in Boteti River region villages and to what extent LEK can contribute to SEK (and vice versa). I propose the amalgamation of SEK and LEK in future research through innovative collaborations sharing similar research aims. I also propose revisions of the environmental education (EE) curriculum in Motopi and Moreomaoto primary schools. Finally, I recommend a toolkit of new conflict mitigation strategies through locally run initiatives.

Components: *Local Ecological Knowledge is Social Science Research, Elephant Conservation in Rural Botswana, Environmental Education*

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Just as elephants are ecological keystones, they are keystones to a greater awareness. They are ambassadors in a sense. Ambassadors of an ancient order of empathy, which is fundamentally connected to our well-being.

- Alan McSmith

Chapter 01. Introduction

Human-wildlife relationships refer to the overall connection that humans have with wild animals. (Mwangi, 2015). Human-wildlife relationships are deeply entangled within one another. Major components of these relationships characterize human existence which is evident through their interactions. In recent years, there has been a strong focus on the negative interactions between humans and wildlife (or human-wildlife conflict) (Nyhus, 2016). Competition over resources, such as land, water, and food create divisiveness and threatens humans, wildlife, economies, ecosystems, and social structures (components of human existence) (Nyhus, 2016). Although there are approaches applied to lessen conflict, until human-wildlife interconnectedness is realized, problems will persist (Mwangi, 2015). One of the largest gaps in conservation research is the lack of attention given to those directly impacted within areas of conflict (Davis, A., & Wagner, J. R., 2003). This research examines local elephant knowledge in two Boteti villages in Botswana: Motopi and Moreomaoto. The questions “what local ecological knowledge (LEK) exists considering the African savanna elephant (*Loxodonta africana*) in Motopi and Moreomaoto communities? and “how will LEK aid in mitigating human-wildlife resource competition?” are the questions answered in the research study. Positive advances of human-wildlife relationships are conceptualized in this study in hopes of continuing conservation efforts and facilitating human-elephant coexistence. This is realized by exploring LEK and previously collected scientific ecological knowledge (SEK) of elephants in Botswana, Africa. The study aims to break down human-wildlife research barriers by investigating LEK alongside SEK and thus emphasizing the importance of spearheading interdisciplinary and community-engaged approaches in research.

One of the most prominent social issues impacting the country of Botswana, are increasing elephant populations. Elephants, though facing extinction predictions by 2040, continue to maintain and grow their outstanding population in Botswana. Elephant research in Botswana is important for global conservation purposes, the preservation of vital ecosystems, and the well-being of human populations. Moreover, elephants are influential to the savanna through their grazing habits (Savanna, 2019). Although helpful to ecosystems, elephants raise equal environmental and social concern through their destructive and invading behaviours. For instance, in the Boteti River region of Botswana, elephant populations are encroaching on human settlements (albeit humans are encroaching on elephant habitats too) and problems are escalating. There has been

considerable scientific and social research conducted in the area, but a local elephant knowledge study has not been exclusively explored (Nett, 2015). Social science literature thus advocates for alternative (all-encompassing) approaches of research to ease strained human-wildlife relationships and assist in conservation efforts (Naiman, 2005), (Drew & Henne 2006).

Human-elephant relationships are tense due to intricate histories and the use of the megafauna amidst political warfare and thus they maintain their vulnerable status. Botswana is viewed as a model for their elaborate conservation efforts (Fraser, 2012). In 2011, “the most ambitious ecological experiment on the planet” was established: the Kavango Zambezi Transfrontier Conservation Area. This treaty attempts to protect a quarter of a million elephants over the area of 170,000 square miles. The countries that are involved in the treaty include Angola, Botswana, Namibia, Zambia, and Zimbabwe and boundaries are set near the points where borders converge. This project is set within the context of many environmental and socio-political challenges such as increasing tourism, best practices in conservation, and natural resource management tactics (Fraser, 2012). Tense human-wildlife relationships will not be a problem assuming that wildlife and natural resources continue to disappear. Natural resources and wildlife are vulnerable and diminishing at a rapid rate due to human activities and environmental changes (Branco, et al., 2019). To assist in mitigating these problems, incorporating LEK within conservation research studies brings forth useful local perspectives and aims to preserve biotic life.

Human-wildlife conflict threatening wildlife has been traditionally researched through scientific approaches. SEK’s data sources are measurable and conclusions are supported by concrete evidence. SEK contributes largely to the advances in conservation biology and can complete LEK research through more substantiated insights (Evans, 2011). SEK offers more than just baseline knowledge for researchers and can stand alone in research. Like any other approaches, however, there are certain limitations within SEK. For instance, certain topics that are out of reach using a SEK approach. This includes studies that examine untestable knowledge, falsifiable information, or have components that cannot be observed or repeated. The untestable knowledge typically informs cultural values or morals grounded in social science research. The crossover between untestable knowledge and testable knowledge is where LEK bridges knowledge gaps (Drew & Henne, 2006).

It has been noted that incorporating LEK within respective research practices has paramount significance (Davis & Wagner, 2003). For instance, LEK can often fill in the gaps that scientific data collection does not reveal (Erena, 2018). Local knowledge holders are connected to the land in which they live through their dependencies on it. Environmental dynamics of the land in which local people reside are well known and integrated within culture. External and government stakeholders who take on

conservation projects typically have less first-hand knowledge of the land. They do, however, have the capacity and resources to implement policies and designate land use and protection (Erena, 2018). This research study is unique whereby EfA already has a well-established relationship with the community. EfA's expertise and past research in the study area will help to guide communities in appropriately using resources supported by biological investigations. A synergistic approach (conservation biology and social science) to research could contribute further to sustainable and long-term positive change for both humans and elephants. A research study was conducted outside Mozambique's Gorongosa National Park test of community-based strategies for mitigating human-wildlife conflict around protected areas, specifically human-elephant conflict. Local community members spearheaded mitigation strategies (beehives fences) at their more noted elephant crossing points. Results "provide experimental evidence that working with local communities to modify both animal behavior and human attitudes can mitigate conflict at the human-wildlife interface" (Branco, et al., 2019). LEK does not produce enough substantiated evidence to stand alone in research so the collaboration of other approaches (such as SEK and LEK) is highly recommended for a greater scope of the problem (Naiman, 2005). At times, LEK can contradict SEK which can cause contention among approaches. Considering LEK's expansive investigative boundaries-there are no limits-the amount of information collected can sometimes overwhelm researchers with the amount of raw data produced. The last issue with LEK as a data source is the requirement to identify key informants. This can present a challenge to researchers if there has been no prior research conducted in the study area (Davis, & Wagner, 2003). LEK is deeply embedded in community practices, attitudes, and relationships. These dynamic systems of knowledge are essentially an accumulation of first-hand experiences that validates specific information regarding rapidly changing environments. To offset issues in LEK it is recommended that research is complemented with other disciplines such as conservation biology whereby SEK can be synchronously pursued or compared in analysis (Fernández-Llamazares, et al., 2015).

Natural resource management and conflict resolution are generally explored through SEK concepts aimed at improving sustainability, however, LEK can improve resiliency of social-ecological structures. (Cebrián-Piqueras, et al., 2011). SEK and LEK are in unique positions to address one another and if exercised strategically (and collaboratively) discipline synthesis could be capable of protecting wildlife (Drew & Henne, 2006). Although there have been major barriers for synergistic collaborations, they both function at the core of both social and environmental realms within their disciplines. Cultural differences, communication difficulties, and epistemological origins have challenged collaborations in the past (Brosius, 2006). The more collaborative work bridging together SEK and LEK has the potential to break down these differences between and resolve

something larger than either (such as harmonizing human-wildlife relations) (Chan, 2017). Environmental education (EE) works in the preservation and maintenance of environmental integrity of local knowledge. The implementation of EE as a tool has the potential to mobilize social science research for successful and future conservation outcomes (Blumstein & Saylan 2007).

Through the proper implementation of environmental education, the habitats of vital wildlife can be adequately preserved (Coleman, 2017). This is because environmental education as a process informs people on how to tackle large issues concerning the environment. Through the integration of EE in conservation research studies-taking an interdisciplinary approach-an effective wildlife management can be sustained. Sustainability of wildlife management will be achieved due to the accurate awareness that humans will have (through EE) of wildlife and thus understand their roles in the non-human world. The polarity that constructs Euro-Westernized perceptions of nature is the destructive force in human-animal relationships (Bennison, 2010). Ideologies that separate nature and culture cause social conflict and break the delicate balance of coexistence which distances humans from nature. This is unproductive as they are inherently connected (Culture and Nature, 2010). With proper and sustainable environmental education, there is room to repair traumatic histories, equalize nature and the non-human, and preserve the natural world for future generations (Blumstein, 2007). Environmental education contributed greatly to the research study. Specifically, EE was explored through a series of focus group discussions with local primary school teachers. Prompting questions were asked aiming to understand what elephant knowledge is taught within school and what they feel lacks within documents. This research strategically prioritized these investigations to gain a greater understanding of what future generations are learning about problems related to their environments and if they are being taught on ways to engage with preservation methods (Chan, 2017).

Chapter 02. Conceptual Framework & Literature Review

Environmental conditions in the Boteti River region are rapidly experiencing biodiversity loss. This is due to major (naturally occurring) environmental changes, human activities, and elephant presence. Immediate natural resource management (NRM) action could alleviate human-elephant resource competition and maintain ecological integrity. This research study integrates LEK with pre-existing data sets collected from SEK studies to reveal information regarding human-elephant relations. (Naiman, 2005). The disciplines that I am drawing on are biological sciences (SEK) and social sciences (LEK). This research study is grounded in social science exploring components of interdisciplinarity research, LEK, SEK, and environmental education which are reviewed below. The interdisciplinary approach of this research study is validated within the conclusions of this Major Paper. The reason for reviewing the following literature shows the legitimacy of LEK and SEK within both social science research and conservation biology. It also advocates strongly for the integration of proper environmental education in areas of human-wildlife resource competition. Environmental education is first explored and then LEK in conjunction with scientific ecological knowledge. Finally, the importance of an investigation spearheaded through multidisciplinary avenues in other conservation research is revealed within the following scholarly reviews.

First, an interdisciplinary model is woven into the research study which “involves drawing appropriately from several disciplines (or separate branches of learning or fields of expertise) to redefine problems outside of normal boundaries and reach solutions based on a new understanding of complex situations” (Naiman, 2005). This approach attempts to unveil a critical understanding of local elephant knowledge which, in a broader context, aims to advance human-wildlife relations. Furthermore, scholarly literature in relation to human-wildlife research widely recommends an interdisciplinary approach for a wider scope of results. A study was conducted by the University of Edinburgh in association with Botswana College of Agriculture exploring vegetation dynamics in relation to livestock (Kgosikoma, 2012). The research explores pastoralists’ (farmers) perceptions and their understanding of vegetation dynamics to help reduce land degradation. This inclusive approach led researchers to a comprehensive understanding of the topic and the conclusions were striking. They concluded that the best approach in handling land degradation, reducing harmful human-induced effects, and natural environmental occurrences (such as rainfall, overgrazing, bush encroachment, poor land management practices, and fires), were to use traditional ecological knowledge inquiries in collaboration with scientific approaches. Local community members in areas of high conflict are often overwhelmed by the presence of researchers and their perspectives are often ignored (Kgosikoma, 2012). Similar thinking is lacking in conservation due to single

discipline approaches in research (Kopnina, H., & Cherniak, B., 2015). With interdisciplinary approaches, more

expertise can be applied within biology conservation initiatives for more progressive sustainability. The emergent recognition for mixed methods in conservation management is continuously gaining momentum in academia (Erena, 2018). The integration of the acquired local elephant knowledge this research study could be useful in NRM practices going forward and a model for other studies considering an interdisciplinary approach (Phuthego & Chanda 1970).

Secondly, is the integration of LEK which, too, considers progressive biological sustainability. It is defined as “knowledge, practices, and beliefs regarding ecological relationships that are gained through extensive personal observation of and interaction with local ecosystems, and shared among local resource users” (Charnley, 2008). All-encompassing research approach that incorporates LEK data sources has the potential to better represent people’s lives to their present-day environment. LEK in social science research can reveal aspects of the natural world stemming from observations, experiences, and generational knowledge transmission (Charnley, 2008). LEK data have the potential of reflecting a specific area's ecological condition and can offer researchers baseline information of a particular environment. Although LEK is not substantial enough to stand alone, it is still emerging in social science due to its utility and cost-effectiveness. Local people benefit through the incorporation of this exploration due to the potential employment opportunities they can gain from involvement. Furthermore, the agency local communities gain from having input of land-management through sharing their LEK is priceless. Policy makers can then implement change bearing in mind local perspectives (Echeverri et al., 2018). The considerations for local ecological knowledge are innovative in research as they equalize power relations. This is done through the open-ended question asked to local meetings, and free-flowing exchanges. The involvement of communities is widely underrated in social science research yet there has been success in terms of NRM. For instance, marine protected areas in Papua New Guinea are an area of ecological concern for preservation reasons (for both land and aquatic life). The community’s involvement in conserving marine life was the largest factor in their conservation success. The publication evaluates islanders social role in reef ecosystem management practices and depicts the mutual benefit locals realise from compliance to PA regulations (Cinner, et al., 2005). Researchers such as Dr. Mara Goldman can also advocate for the importance of conducting LEK studies. Maasai tribes have been scrutinized for their lion hunting practices when livestock is threatened. Her research examines human-lion conflict through the exploration of human-lion relationships in rural communities. The aim of her research highlights the complexities of Maasai perceptions of lions and how this corresponds positively to lion conservation (LEK). Community attitudes towards lions are prioritized in her research which allows for better explanations as to why conflict exists, assists in the development of appropriate conservation strategies, and breaks down social misconceptions that scientific inquiry does not reveal (Goldman, 2010). Another example is found deep within the Turkwel Riverine Forest in Kenya which is managed by

rights; any outsider requires permission. Should environmental conditions decline then the government assists. The ecological integrity of this space is commendable (Eren, 2018).

Third, SEK or a biological science approach which is “the system of knowledge which relies on certain laws that have been established through the application of the scientific method to phenomena in the world around us. The process of the scientific method begins with an observation followed by a prediction or hypothesis which is then tested” (“Incorporating Indigenous Knowledge,” 2021). Threats to wildlife are too grave to tackle conservation projects using a single discipline. So called 'Value Added Conservation' (multidisciplinary) projects can enrich conservation plans, whereby, the depth of gathered information is greater in comparison to single discipline research (Drew & Henne, 2006). Since LEK does not produce substantial enough results, it is important to conduct scientific exploration as well. SEK data collection relies on specific approaches originating from a hypothesis. It progresses to scientific theories which are then presented as facts characterizing the natural world. This knowledge is testable and reliable. There is a misconception that science applications are used to disenfranchise local people concerning their use of resources. To neutralize this fallacy, scientific exploration, especially conservation science, needs to be more transparent. This can be achieved through the collaboration of social science and conservation biology research. This way, cross discipline publications can help to propel collaborative conservation work (Drew & Henne, 2006). This research examined previously collected SEK in the research area. The main areas of investigation are as follows: elephant social dynamics, environmental influences, and behaviour patterns. EfA has conducted scientific inquiry in Boteti villages. This research study expands SEK through the incorporation of another approach. Pre-existing research conducted by EfA has brought forth data that is advanced about the environment. This research study aims to contribute on a cultural level to EfA’s data sets and workshops. Specifically, their environmental education workshops.

The issues brought forth in the review “Saving the superstar: A review of the social factors affecting tiger conservation in India” is all too comparable to human-elephant conflict in the research study. This article explains the benefits of utilizing local populations to help manage conservation. It also advocates for the fact that government control on conservation is not always ideal, hence the success of CBNRM (community based natural resource management) practices. The author illustrates how tiger conservation in India faces an abundance of challenges in attempts to conserve and mitigate issues (Hickey, 2012). Poverty alleviation is the focus and researchers believe, in turn, it will help to conserve tigers. The thinking is that community development could lead to overall biodiversity conservation (Hickey, 2012). “Overambitious, and underachieving”—a common issue in social science research methodology proposals, hence the importance of SEK integration (Hickey, 2012).

Finally, environmental education (EE) “allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper

understanding of environmental issues and have the skills to make informed and responsible decisions” (EPA, 2020). EE is a form of education that illustrates the functionality of the natural world and the ways in which humans can sustainably manage ecosystems (Sana, 2018). Developing the skills to properly take on environmental issues is the main objective of environmental education (Stapp, 1997). Similar to any field, there are criticisms that are found within its framework and practices. There are often narrow scopes of environmental education discourses. This inspires the current theory and practice in the study through its continuation of open-ended discussions and prompted questioning (Stapp, 1997). Another criticism in environmental education are the traces of the 19th century ways in which information is delivered (Masse, et al., 2008). Things like banking models are often present in current environmental education programs (Freire et al., 2018) Breaking down these barriers could lead to a more inquiry-based form of learning, present more relatable material, and lead to an integrative approach (Freire et al., 2018). EE regimes are implemented in some conservation studies which have had successful outcomes. (Polfus, et al., 2016). Inferences taken from literature depicts how fostering positive perceptions and relationships with the natural world instills a stronger will in humanity to preserve it (Braster, 2011; Coleman, 2017; Friede, 2011; Kimmerer, 2013). This is especially applicable to the research study as shifting perceptions in areas of high contention through EE could be a potential conflict mitigation strategy between humans and wildlife. Part of shifting perspectives is through the proper transmission of environmental knowledge (or education). The idea of wilderness comes into conversation when discussing the shortcomings of environmental education. Authors Cronon, Friere, and Friedel explore the imaginative limits of human perceptions of the natural world. For instance, William Cronon’s “The Trouble with Wilderness” is an example of the disconnection that people possess with the environment. Opposed to separating people and wilderness, there needs to be a realization that they are one in the same (Cronon, 1996). For instance, many stories published in the western world leave people imagining wilderness in a romanticized way. The Jungle Book is an example of one of these narratives. These ideologies are in turn problematic for areas in high contention with wildlife because the harsh realities of living with wildlife are not depicted in full accuracy (Emel et al., 2010; Echeverri et al., 2018). Shifting human perceptions has taken precedence in wildlife and conservation research. Cronan suggests that living sustainably with the natural world and incorporating it into urban spaces would alleviate the disconnect (Cronon, 1996). Once people shift their thinking, their interconnectedness with the environment can be realized and thus conservation management is improved.

A piece of literature published in the BC Journal of Ecosystems and Management "A practitioners' Guide " outlined an approach to natural resource management advocating for a more holistic approach to

research. Through the proper transmission of knowledge and having a baseline of information for local people is cost effective, benefits conservation efforts, and is adaptable to other projects. Human-elephant conflict does not

target one all-encompassing solution, especially in the mitigation of resource competition. Maintaining environmental integrity, sustainability, and bringing awareness to environmental education is critical (Leech, 2009). Environmental interference is often debated but maintaining an ecological presence and prioritizing environmental education in school systems has had successful outcomes in NRM. Human-wildlife coexistence is, at times, a challenge to conceptualize. There must be consideration for a collaborative effort between stakeholders, scientists, and social scientists. Additionally, proper environmental education needs to be integrated into areas of ecological concern for human and environmental longevity.

In 2014, Ian Khama imposed a hunting ban in addition to a shoot to kill policy in attempts to stop illegal wildlife poaching. He administered military-grade weapons to communities and anti-poachers who lived in proximity to protected areas and national parks so that they could kill poachers on site (Baker, 2019). In 2018, when the current president Mokgweetsi Masisi was elected, both of these policies were eliminated, and he implemented a “limited culling” program. Even though the government reimburses those who are affected by elephant raids and encounters, the people of Botswana remain divided in regard to the ban. Though elephants roam in 37 different African countries, Botswana fairs well amid the 30,000 elephants lost to ivory poachers every year. Communities are also divided due to their complex relationships with elephants. Another factor worth considering is that an increase in hunting could lead to changes in elephant behaviour such as heightened fear and aggression (especially toward humans). Overall, exploring this divide has left conservationists unsure of what the best approach is and wondering if there is in fact the best approach. As other articles presented, a toolkit of sorts would be an ideal way to mitigate conflict and resource competition in elephant dominated landscapes. The elephant hunting season where 60 elephants were to be hunted commencing in April 2020 leaves many conservationists fearful that ivory will be in greater demand and illegal poaching will increase (Baker, 2019). Ultimately, hunting bans are not a great means of elephant population control nor is it an effective long-term human-elephant conflict mitigation strategy. As drought and urbanization drive elephants further south, it will be interesting to see how each individual country approaches conservation and conflict with elephants as it is quite evident that there is no easy route to coexistence.

Chapter 03. Research Design & Methodology

The research study uses an approach that integrates both conservation biology and social science. Within the following chapter I describe each variable that mirrors previously collected data set variables (social dynamics, environmental influences, behavioural patterns) by EfA. This research study was designed in this capacity so that social science and conservation biology data are measured using corresponding variables. Next, I state the study's collaborative efforts and speak to the study area itself. I then describe the data collection and analysis process, specifically touching on how data was collected (both included and not included in the sample). For instance, key informant discussions, local-in depth interviews, focus group discussions, and the environmental education component. Finally, I describe selective coding for this research study's data analysis and my data collection collaboration. The following describes why each particular technique is the best choice to answer my research questions.

3.a) Variables

EfA's team conducts valuable scientific inquiry in three major categories which reflect my selected variables. The interview guide is informed by SEK variables which summarize EfA's scope of research: elephant social dynamics, environmental influences, and behavioural patterns. Open-ended questions make-up research questions which allow for the possibility of new concepts and ideas to emerge. Key variables and interview questions for this study are based on the following concepts.

3.ai) EfA's Exploration of Elephant Social Dynamics

The social dynamics of elephants and humans are explored widely by EfA. One of their objectives is to understand elephant and human social and ecological requirements (Evans, 2019). For instance, EfA's team collected observational data on male elephants to gauge social interactions. EfA's focus is on the adolescent phase of an elephant's life which is unique to only a few mammal species (Evans, 2008). They also explore the social behaviours of male African elephants under different environmental conditions which inspired research questions in this study (Nett, 2015). In 2013, the impact on releasing captive elephants into the wild at adolescence was explored. The integration and associated social concerns with this release was studied following 3 elephants specifically. Ecological benefits from restoring flagship species that cannot naturally re-populate was clear but there needs to be more exploration on this (Evans, et al., 2013). The socio-economic status of farmers in the area are also studied in association with motivation levels to implement elephant deterrents. Crop raiding statistics, implementation costs, trends, and field values are frequently examined as well. A 'toolkit' of deterrents

is proposed as an all-encompassing way to deter elephant encounters. Though conceptually this is a good idea, the economic reality for community members is that it is not feasible. The negative and hidden impacts on community members that stem from elephant presence in the area are explored considering emotional stress, food and water insecurities, safety, lack of mobility, government tensions, and routine disruptions. Looking beyond visible impacts has been highlighted as a gap in human-wildlife conflict research (Mayberry et al., 2015). Environmental education programs run by EfA help to promote conservation practices and ease community stress. Questions in this research study are geared towards better understanding: emotional stress, food and water insecurities, safety, lack of mobility, government tensions, elephant social habits with one another, and routine disruptions. Finally, local knowledge in relation to elephant social dynamics contributes to the main sample of this research study. **Reference elephant social dynamics under Appendix A and in the subsection in-depth interviews.*

3.a.ii) EfA's Exploration of Elephants Influence on the Environment

The influences that elephants have on the environment are explored through EfA's research. Specifically, EfA explores components that affect and influence the overall health of elephants, cattle, and other biotic life in the Okavango Delta. EfA's research reveals that the social habits of female elephants lead to an increased level of parasitic exposure. Through nematode management and parasite treatment research, farmers have increased their overall annual yields through livestock preservation. Targeted selective treatment (TST) shows successful results in livestock protection against parasite transmission. EfA's research discovers an increase in parasite transmission during the rainy season. Preservation methods should be further researched as examinable samples were affected due to drastic changes in temperature (primarily heat). This should be resolved with advances in technology (Baines, et al., 2015). EfA conducts meaningful studies examining environmental influences impacting local communities, elephant landscapes, elephants, and other animals. They explore prevailing topics such as: a rise in food security due to the amelioration of crop management in the area, targeted selective treatment (TST), and an increase in parasite transmission during the rainy season. These components were kept in mind when research questions for the study were formed. Finally, local knowledge about elephant influences on the environment contributes to the main sample (Walker, et al., 2017).

**Reference elephant environmental influences under Appendix A and in the subsection of in-depth interviews.*

3.a.iii) EfA's Exploration of Elephant Behavioural Patterns

The last variable in which this research explores is behavioural patterns of elephants. The consideration of elephant behavioural is a crucial component when implementing conflict mitigation strategies in elephant dominated landscapes. EfA's research is positioned to examine male elephant behaviours in the study area.

Visual-elephant biometrics are used in research studies to distinguish how elephants identify one another. The

methods that EfA use enabled non-invasive approaches to wildlife research through imagery. Short distance or intra-herd communications are explored (Dylan, 2017). Calling behaviours are depicted in this exploration as highly influential by social affiliations and seasonal change variations. Examining elephant rumbles and communication patterns aid in the understanding of generalized social behaviours (Bowles, 2013). One behaviour is an increase in crop raids during the dry season and changes in behaviour are obvious during mating and parturition seasons (Evans & Harris, 2012). Young bulls for instance learn from older bulls and EfA's research emphasizes the importance of social interactions and aggregation (Evans, 2006). The team examines riverbank wildlife presence and describes this area to be the ideal location for social interactions to occur with the lessening of resource competition. Dr. Kate Evans and her team discover that environmental factors are responsible for micro-evolutionary adaptations in elephants—hence the importance of continued research investigations. Comparative research on male and female elephants is explored in terms of age, size, and habitat (Evans & Harris, 2012). This research determines that age and size do not affect habitat selection. Males prefer island vegetation, mopane woodlands, and habitat choices are highly dependent on social groupings. Females, however, have no particularities regarding habitat selection apart from the rainy season. Females prefer mopane woodland to gain some distance from males (Evans & Harris, 2012). These components were taken under consideration when crafting interview questions for this research study. Finally, local knowledge in relation to elephant behavioural patterns contribute to the main sample.

**Reference elephant behavioural patterns under Appendix A and in the subsection of in-depth interviews.*

3.b) Collaborations

The research study was a collaborative effort. To start, the research was supervised by Dr. Alice J. Hovorka. Dr. Hovorka is the dean of the Environmental and Urban Change program at York University and Principal Investigator of The Lives of Animals Research Group (York University-Canada <https://livesofanimals.info.yorku.ca>). This group focuses on the entanglement of human-animal relationships through vast temporalities of empirical and theoretical thought. This work takes place in Botswana, Costa Rica, and Canada. Dr. Hovorka's role in this research guided the project by offering meaningful insight while using her many years of experience in Africa. Her accumulated academic understanding of social science research, resources, and passion for impactful social and environmental change guided the research.

Dr. Kate Evans played a major role in this study. As mentioned, Dr. Evans founded the organization Elephants for Africa (EfA-Botswana <https://www.elephantsforafrica.org/>).

The organization aims to enhance human-wildlife coexistence. Specifically, Dr. Evan's team explores all

dynamics of elephants in rural Botswana. Without her team, this study would not have had access to resources, data collection, resource collaborations (Keitumetse Ngaka), access to data sets, and above all access to communities. Dr. Evan's expertise contributes largely to the materialization of this research.

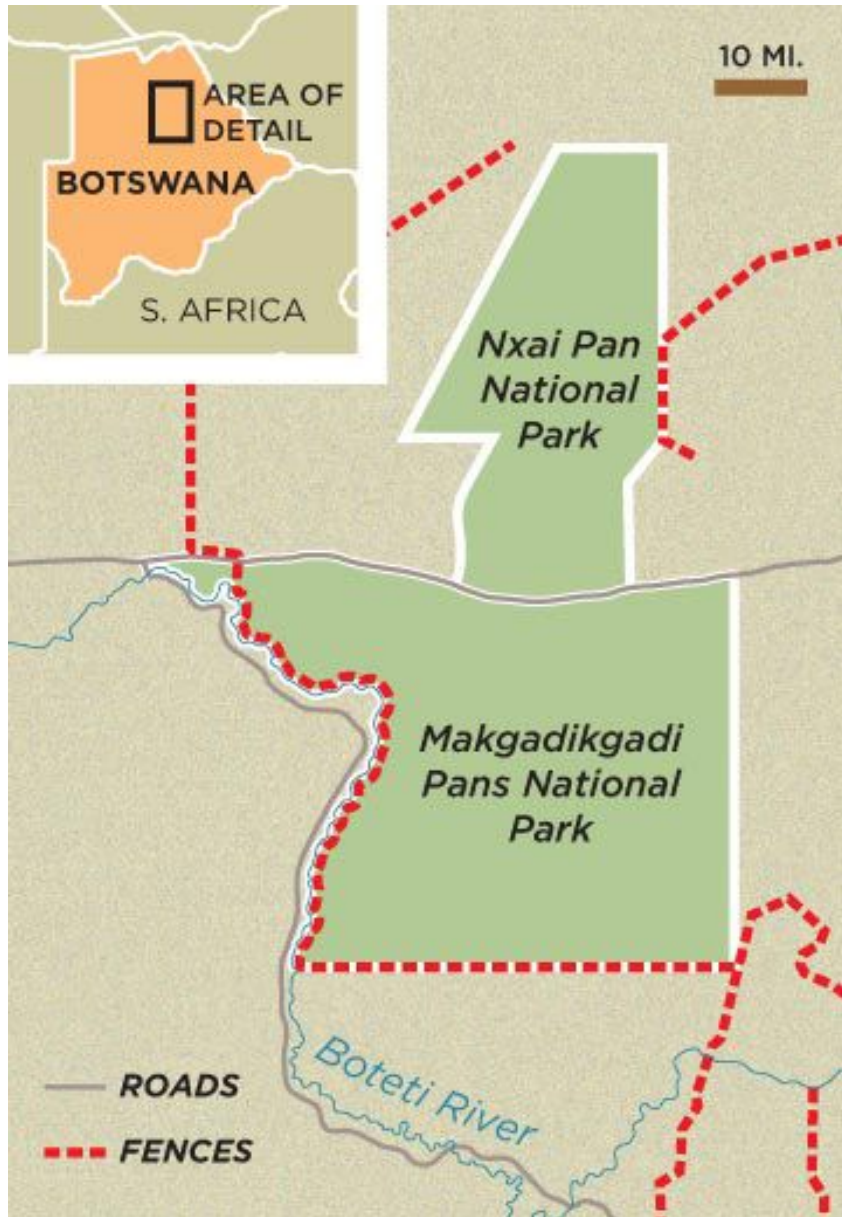
Motopi and Moreomaoto community members are the heart and soul of this study. Without their insightful input, this study would have never metastasized. Their willingness to participate in such a study is valuable and contributes greatly to the academic world. It is my hope that their communities will see benefits. Included among these members is my research collaborator Keitumetse Ngaka. His role was to conduct interviews and translate documents. Keitumetse was vital to the data collection process. Next, without the gentle grey giants that roam into Boteti villages this project would not have been possible. The African savanna elephants were the true inspiration for this study. For centuries, elephants have been mistreated, lacked agency and commodified. Giving elephants agency in conservation is the motivating force driving this study.

Finally, I served as the principal investigator in the research study. For instance, strategic outlines, research plans, ethical protocols, proposals, research logistics, and constructing this Major Paper were my responsibilities in the study. Furthermore, I plan on conducting a follow-up trip to the Boteti region to meet my participants in person (one day). Due to COVID-19 travel restrictions, research was conducted remotely with a research collaborator (Keitumetse Ngaka).

3.c) Study Area

This research study was assembled and conducted from January 2020 to July 2021. Basecamp for the research study is in the Makgadikgadi Pans National Park, on the banks of the Boteti Region. Specifically, Motopi and Moreomaoto villages were the areas in which interviews and discussions took place. These villages are both North of EfA basecamp and reside on different points of the Boteti Region. Though the park attracts all kinds of wildlife, due to increased poaching activities in bordering countries, elephant presence in Botswana is increasing drastically; they have sought refuge within the borders of Botswana. In addition to outside poaching practices, prior to 2009, the Boteti River was depleted for 18 years. Due to the river resurgence, elephants have followed their ancestral pathways and returned to the body of water which was once their forefathers. The study area comprises a mostly male African elephant dominated landscape. Bordering communities come into conflict with elephants which results in a heightened competition for resources. EfA has established great relationships with surrounding communities and schools which facilitated communication with local educators to gain their valuable perspectives on LEK in curriculum documents (Evans, 2016).

Figure 1: Study Area Map of the Boteti River region Botswana, Africa (Gates, 2011)



3.d) Data Collection & Analysis

Data was collected exploring local elephant knowledge within Motopi and Moreomaoto communities in Botswana from January 2021 to July 2021. Qualitative methods were primarily used to better understand human-elephant dynamics through in-depth interviews. In-depth interviews followed semi-structured and open-ended questions with available prompts if participants needed further clarification. Key informant interviews were conducted but not included in the sample. They were used to gauge preliminary information about the elephants in the area. Focus group interviews were also conducted but not included in the sample. Focus group interviews aimed to gather more information about environmental education and place-based learning in local primary schools. Interviews were used to gain an understanding of current curriculum topics and the perceptions that primary school educators and students have of elephants. The interviews revealed existing local elephant knowledge previously undescribed in academia that have potentially produced new information.

3.di) Key Informants

The research conducted 14 key informant interviews throughout the research study timeframe and did not exceed 45 minutes. Participants were selected by EfA and village chiefs based upon their specialized knowledge (this included village chiefs themselves) (International, 1996). Informants are characterized by the following principles: they are familiar with elephant-community interactions, are currently involved with or have first-hand knowledge concerning elephants and are available for multiple sessions of interviewing (if needed). Key informant interviews occurred to attempt to establish an initial understanding of local elephant knowledge through a “guided process of mutual discovery” (Neuman, 2012). The research topic was initially analyzed through descriptive, structured, and contrasting questions that allow researchers to a) learn about the interviewee, b) build upon previously given responses, and c) discover and verify similarities and differences within answers (Neuman, 2012). Key informant interviews within the study adhere to six crucial steps. First, guiding questions were used to give the interviewer an idea of what to ask the respondents. Next, the purpose of the study was explained to the interviewee. Open-ended questions were then asked and probing techniques -such as follow-up questions- were applied where appropriate. This was to ensure that critical details were not missed and for elaboration of responses to occur. Furthermore, a summary sheet was created to organize results and extract descriptive codes as a means of sorting key terms.

Data was securely digitized. The last step in this process is to share the interpreted data with the key informants (International, 1996). The results of the key informant interviews were not included within the sample, however, they allowed researchers to grasp a substantial understanding of outstanding issues before conducting in-depth interviews. Ultimately, key informant interviews helped reveal the underlying reasons for existing conflict within the area and contributed to the exploration of local elephant knowledge (International, 1996). Verbal consent was asked from all participants before commencing interviews and COVID-19 protocols were in place.

**Reference the “Findings” section in chapter 04. for results.*

3.dii) In-depth Interviews (Sample)

In-depth interviews compose the entire research sample. Local community members from each village (Motopi and Moreomoto) were interviewed through an in-depth questioning process. The objectives of the in-depth interviews were to document what local elephant knowledge exists within the communities and how this knowledge is transmitted; this purpose was made clear to all interviewees. The results of in-depth interviews were recorded separately from the key informant interviews. Questions were asked focusing on what people know about elephant social dynamics, behavioural patterns, and environmental circumstances. Additional information was collected regarding participant demographics such as gender, age, education level, and employment (Neuman, 2012). A snowball sampling strategy was used to ensure that participants are selected from a knowledgeable predecessor initially appointed by the village chief. Once data was collected, results were analyzed using thematic coding (Neuman, 2012). This technique helped to extract overarching themes and concepts from the raw data. The next step is for the knowledge acquired from the in-depth interviews to be shared with EfA, community members, participants, village chiefs, local experts, and local schools. Verbal consent was asked from all participants prior to commencing interviews and COVID-19 protocols were in place. **Reference the “Findings” section in chapter 05. for results.*

3.diii) Focus Groups

Conducting 2 focus group interviews-one in each village-was the last step in the data collection process. 18 local primary school teachers shared their knowledge about environmental education concerning their schools, communities, students, the curriculum and more. Gaining a baseline of what is taught about elephants (or not being taught) through educator interviews contributed to the research project. As

mentioned, generational knowledge is being lost at a rapid rate. Through these interviews results were able to

assist in the preservation of this knowledge at the primary school level. Sharing the overall captured elephant knowledge and recommendations with local schools is the next step. Verbal consent was asked from all participants prior to commencing interviews and COVID-19 protocols were in place.

**Reference the “Findings” section in chapter 04. for results.*

3.div) Education Component

The education component of the study explored what elephant knowledge was taught within Motopi and Moreomaoto schools. The purpose was to determine whether LEK is being passed on to students through their formal education. Additionally, interview questions were asked to understand what elephant and conservation knowledge was lacking from the school curriculum or if there is even a desire for these subjects. Results will be passed onto EfA as their organization operates educational programs in conjunction with Motopi and Moreomaoto schools. EfA’s work mentions the deficiency in cultural knowledge about how to handle elephants due to their lack of historic elephant exposure (Evans, 2019). This contributes even more to the need for EE integration within Boteti villages.

3.e) Thematic Coding

Once in-depth interviews were conducted in both villages, data was collected and condensed, findings were analyzed, and thematic coding operations were performed to develop inferences derived from central themes and concepts. This was the elaboration phase of the data collection process while supporting all evidence found within the research study (Neuman, 2012).

3.f) Research Collaboration for Data Collection

All interviews were conducted in Setswana by a community member selected by EfA (Keitumetse Ngaka) who holds the title of “research collaborator.” Mr. Keitumetse was new to the EfA team which was beneficial as it is imperative within LEK studies that the person conducting interviews was not a known member of the EfA team. This was to avoid any biased results. Keitumetse was thoroughly briefed by researchers on the purpose of the study. They were instructed to remain objective when asking questions and trained by the research team on how to use probing techniques when appropriate. This was to ensure that critical elements within answers are not overlooked. Interviews were recorded using written documentation which was later typed, translated, and transcribed. The responses were then thematically coded to produce a precise report using inductive qualitative content

analysis. Namely, collected results were analyzed in relationality to emergent trends categorized social,

environmental, and behavioural knowledge of elephants and any potential conflict mitigation strategies. Finally, programs such as Microsoft Word, Google Drive, and Excel were used to process and track data in a secure fashion. Personal identification numbers (PINs) were also assigned to all participants to ensure the full anonymity of responses and interviewee security. Once all data was collected and compiled, copies of results were distributed to all participants and stakeholders. **See other ethical considerations in Appendix C.*

Chapter 04. Findings

Fourteen purposively selected knowledge holders shared preliminary information through open-ended interviews, including villages Chiefs and those with specialized elephant knowledge. Through a snowball sampling technique 24 additional community members were selected as participants who contributed to the main research sample (In-Depth Interviews). Finally, 18 primary school educators participated in focus group discussions to further enrich our investigation. One of the major gaps in social science research is the lack of local knowledge incorporated in research practices. Exploring local ecological elephant knowledge through these three mentioned pathways gives community members agency and allows researchers new insight that may have otherwise never been discovered.

4.a) Key Informants

14 key informant interviews were conducted in two Boteti villages: Moreomaoto and Motopi. Key informants were identified as such due to their status and knowledge (or experiences) pertaining to the research topic. I used semi-structured interview questions to gain a preliminary understanding of existing local ecological elephant knowledge and to explore underlying issues in each village. Moreomaoto was selected due to the past scientific research carried out in the village. Oppositely, there has been minimal research conducted in Motopi which is why it was also selected as an area for my research focus. The purpose of my social research in the villages was to gain new and contrasting or complementing information from previous scientific inquiry. Both villages were selected due to their geographical location and large elephant populations. Interviews were conducted with arbitrators, tour guides, chiefs, consultants, and farmers. The information gathered from key informant interviews is portrayed in the following paragraphs.

In Motopi, 57 percent of key informants do not believe elephants to be problematic and a minority 43 percent, believe that there are issues associated with elephants in their village; land-use competition and crop raids were most often mentioned. In Moreomaoto, 29 percent of key informants do not believe elephants to be problematic, 14 percent of key informants believe that there are issues associated with elephants, and 57 percent of key informants feel neutral about elephants. A respondent who does not believe them to be problematic says: “we do not have any problem with these elephants.

They are like our cattle. They too do not have any problem with us” (Respondent 1075). Elephant presence is strongly associated with fear and trouble due to their crop raiding behaviours; “elephants trouble me especially by raiding my crops” (Respondent 9871). Lack of access to education, not capitalizing on natural resources, and other wild animals are also described. There is a strong desire for education within communities “we lack educated people therefore the decisions made are poor” (Respondent 1983).

All key informants (100 percent) in Motopi agree that elephant-induced environmental changes are major and 86 percent believe the changes are negative. This is illustrated in the following quote: “people in Motopi do not like elephants. Elephants raid their crops. Elephants occupy a lot more space than people” (Respondent 8884). The majority of key informants in Moreomaoto, 86 percent agree that elephant-influenced environmental changes have been major, and 14 percent are neutral about the changes. 42.9 % believe changes are positive, 28.6 percent are neutral, and 28.6 percent believe them to be negative. Farmer’s view their current reliance on environmental conditions as insufficient, “there is a lack of rainfall for ploughing and we do not do artificial irrigation” (Respondent 5353). All of Motopi respondents 100 percent, claim to have strong relationships with nature and all key informants 100 percent, claim to have a poor relationship with elephants “there are so many elephants so we are always living in fear” (Respondent 7912). In Moreomaoto, the majority of key informants, 75 percent, have a strong relationship with nature and the minority 25 percent have poor relationships with nature. Key informants are divided on their feelings about elephant populations, 28.6 percent have strong relationships with elephants (all farmers), 42.9 percent feel as though they have poor relationships with elephants and 28.6 percent of key informants felt neutral about the situation. Motopi and Moreomaoto key informants observe elephants to prefer areas that are dense in bush, clearings, shaded areas, and water. One respondent share that “elephants mostly open up the thick bushes. We are happy now that we can have firewood” (Respondent 1075). Elephant knowledge acquired by key informants is observational and thorough local information sharing sessions. Almost unanimously, key informants agree that people and elephants coexist well (well: 71 percent, neutral: 14 percent, do not coexist well: 14 percent). Most feel as though coexistence is achievable with 57 percent sentiment and a close, but a minority did not at 43 percent believe it to be achievable. In Motopi, the majority 71 percent, believe that LEK considerations should be incorporated in future research studies, 29 percent were unsure. All key informants in Moreomaoto, 100 percent believe that LEK considerations should be incorporated in future research studies.

Elephant knowledge acquired are both observational and thorough local information sharing sessions. With an obvious change in perceptions over time, human-elephant conflict is becoming better. This is primarily to do with the proper transmission of ecological knowledge and EfA efforts. For instance, “there is a problem with wild animals but now it is becoming better” (Respondent 1075).

4.b) In-depth Interviews

Data findings from in-depth interviews are divided into three major sections reflecting main variables stemming from scholarly SEK-based literature on human-elephant interactions, namely, social dynamics, environmental influences, and behavioural patterns. The LEK sample is collected from local community members in Motopi and Moreomaoto. The sample consists of 24 participants and is not a comparative study between villages. Rather, its sample draws on 2 communities living in areas of high conflict with elephants. Participants are viewed in this study as knowledge holders due to their years of experience and observations of elephant

4.bi) Social Dynamics

Social dynamics of elephants were explored to further consider elephant-community relationships. Investigating the complexities of elephant and human sociality could have the potential to mitigate conflict by creating a complete baseline for future researchers. For instance, social dynamics previously explored by EFA focus on social-economic factors surrounding crop raids, farmer motivation levels to implement elephant deterrents, emotional stress, food and water insecurities, safety concerns, government tensions, and so forth. Within the social dynamic section of this study, questions focused on participant social perceptions, relationships, and experiences with elephants, especially, how elephants interact with one another. 33% of participants describe elephant social behaviours in the data as destructive, 21 percent describe them as friendly, 16.6 percent describe them as aggressive, 16.6 percent as afraid, and 12.5 percent as circumstantial. Fencing options are most frequently found in data as a conflict mitigation solution. Fencing is wanted due to fear and the destructiveness of elephants. For instance, “elephants here are more free to roam around than us people. So they should be fenced in order to not come to our village” (Participant 3243). Those who view elephants as friendly (a close second to those who view them as destructive) recommend different fencing options. For example, “we should fence them in an area near our village. They are important for tourism. Our kids should also have that chance to see them in the future” (Participant 4144). 70.8% of participants (the majority), have social knowledge of elephants through observation, 20.8 percent have gained their knowledge from elders, 4.2 percent of knowledge is experiential, and 4.2 percent are unsure. 95.8% of participants (the majority) have a strong desire to build positive relationships with elephants. 4.2 percent (a minority) have no interest. This quote reveals that this participant has assumptions about the village that are not true as the data above reveals most members of the community want to build good relationships. “Most of us in the village do not want to build relationships with elephants. We do not get enough compensation for what has been destroyed by elephants, so we do not

appreciate their presence. The relationship is negative. They destroy our properties, and we get peanuts (little compensation)" (Participant 9961). The participant's claim is valid, and intervention is clearly needed, however, the emphasis on perception is crucial here. Those who have no interest typically desire government intervention as a conflict mitigation solution. For instance, "I can only coexist with them on condition. If they were not troubling us like by raiding our crops. In this case then I would say you must take them back into the park. Our government should fence our fields. Or we give up on ploughing, the government should give us some food baskets" (Participant 7381). 79% of current relationships with elephants are negative while 12.5 percent others are positive percent, and 8.3 percent feel neutral about the relationships. The following quotes were typical and recurring responses to community-elephant relationship questions: "The relationship is negative. They destroy our crops in the fields. Their destruction of trees is very frustrating. I think they are now worse" (Participant 0793). 62.5% of participants have a desire to learn more about elephants and 37.5 percent do not 37.5. Those in Moreomaoto had a greater understanding of elephants. The majority of those who are willing to learn about elephants are important as the following quote depicts the benefits of positive perceptions and having an abundance of knowledge. "We love elephants in Moreomaoto. We can possibly get jobs from lodges because of these elephants. It is a good and mutual relationship. Our brothers and sisters are working in the tourism sector because of these elephants. This relationship has always been there" (Participant 9829 (Moreomaoto)). Finally, elephant socialization among elephants was well described. 25% of participants describe elephant socialization with elephants as friendly, 12.5 percent as circumstantial, 12.5 percent as territorial, 12.5 percent as competitive, 4 percent playful (when young), 4 percent are travelling together, and 29 percent are unsure.

Figure 2: Elephant Socialization Knowledge Sources

Boteti Villages: Elephant Knowledge Sources

Motopi & Moreomaoto In-Depth Interview Results

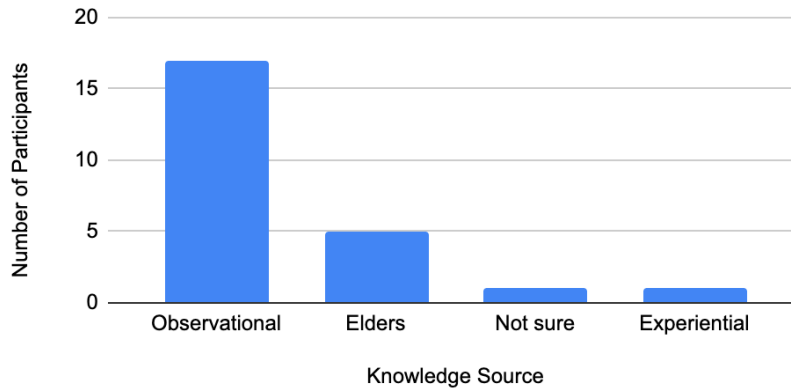
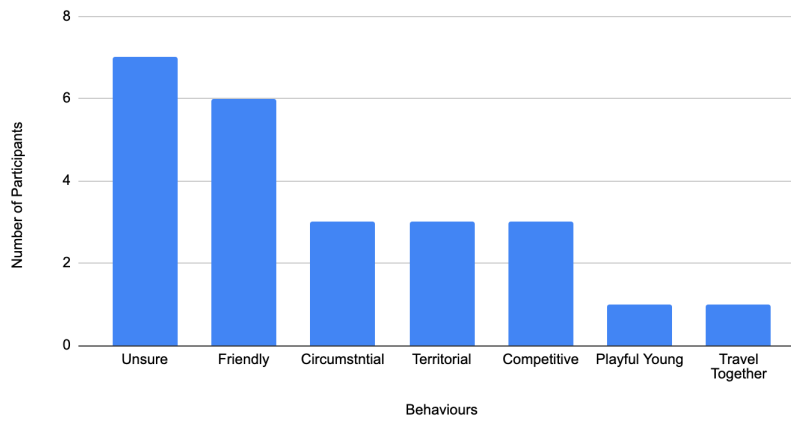


Figure 3: Elephant Socialization with other Elephants

Boteti Villages: How Elephants Socialize with Elephants

Motopi & Moreomaoto In-Depth Interview Results



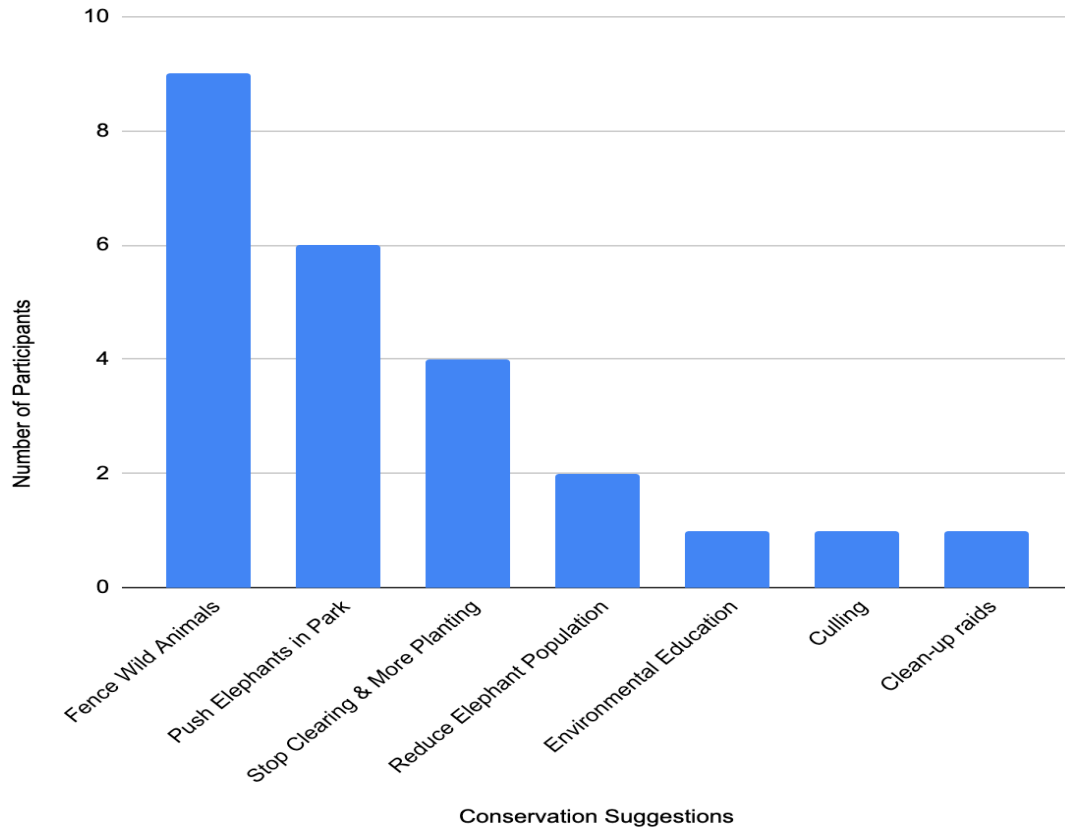
4.bii) Environmental Influences

Next, the research team focused their efforts on the environmental influences that impact current living conditions of Boteti villages. Villages are strongly dependent on natural resources, therefore, understanding environmental pathways was crucial to the team. All participants describe their environmental elephant knowledge stems from observations. All participants have seen the environment change in both positive and negative ways. For example, participants see benefits of elephant plant/tree destruction for firewood and fruit gathering: “Elephants have broken down trees and plants which helped uplift our lives such as blue sour plum and *grewia flava*” (Participant 7260 Motopi). Other participants are feeling stressed and fear for the future generation and the state of resources “elephants have uprooted some plants which they like very much such as blue sour plum and *grewia flava* and we do not know whether our children will ever find them”(Participant 9228). LEK has revealed species in need of preservation that SEK has not outlined (cross reference species Table 6 with national status). All participants have seen their environment influenced by elephant presence. With an increase in elephant population and constant environmental changes, participants are having a challenge anticipating seasonal variations. For example, “we are never sure of anything nowadays since the seasons have completely changed. We sometimes get rainfall during winter. Elephants are running short of food and maybe that is why they destroy our trees” (Participant 738). The destruction of plants and trees is described 41 percent of the time as an elephant behaviour in association with the environment. Next, elephants are described 37.5 percent of the time as having tendencies to roam. 8.3% of participants describe elephants residing in proximity to water sources, 8.3 percent state that they move seasonally, and 8.3 percent see an increase in elephant deaths in periods of drought. 50% of daily tasks influenced by the environment are associated with seasonal variation. Currently, 33.3 percent of participants believe that elephant populations in their villages are high, 33.3 believe them to be normal, and 33.3 low. 66.6% and the most influential elephant behaviour on plant life is tree clearing, 16.6 percent note an increase in plant growth due to clearing, 16.6 percent agree that their livestock benefit from elephant fruit scraps, and 2.3 percent are unsure. 47% of participants think that conserving their ecosystem requires wildlife fencing. 25 % of participants believe that pushing elephants back into the park is the best strategy for ecosystem conservation, 16 percent state that the elimination of bush clearing, and more planting efforts are necessary for preservation, 4 percent think it is environmental education, 4 percent is cleaning-up crop raids, and 4 suggest elephant culling. It is obvious in the following quote that participants want to see immediate and drastic action. “Elephant population is too high. Government should allow us to kill these elephants and we can sell anything like tusks for our benefit” (Participant 2494).

Figure 4: Ecosystem Conservation Strategies in Boteti Villages

Boteti Villages: Ecosystem Conservation Strategies

Motopi & Moreomaoto In-Depth Interview Results



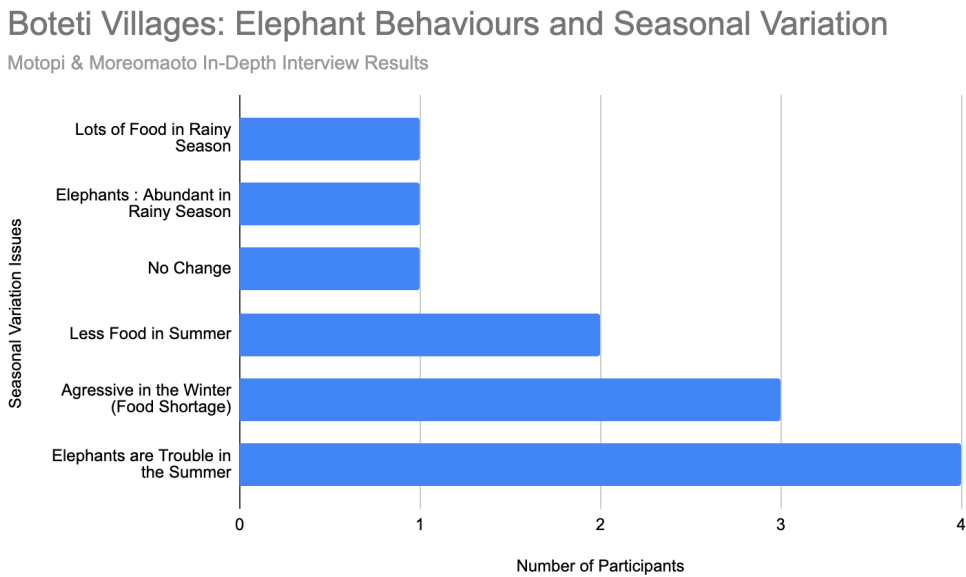
4.biii) Behavioural Patterns

Finally, elephant behavioural patterns were previously explored by EfA. With SEK data sets in mind, this research study critically investigated general elephant behaviours, how elephants interact with one another, and their habitat selection tendencies. Elephants in Boteti villages are described 29 percent of the time as aggressive, 29 percent as circumstantial, 20 percent as friendly, 4.5 percent as loving, 4 percent as dangerous, and 12.5 percent of participants are unsure. The circumstantial elephant behaviours that are described in the data can be associated with the following behaviours in order from most to least mentioned. Elephants display unpredictable behaviours, are well behaved when in a group (particularly female elephants), are aggressive when alone, are angry when a female is present (particularly male elephants), and are happy when they are relaxed. 53.8 % of crop raids are influenced by elephant behaviours. Other daily tasks influenced by elephant behaviours include 11.5 percent of participants agreeing that there is an inability to move/travel due to fear of elephants, 11.5 percent are limited in ploughing fields due to (crop raid) debris, 11.5 percent experience issues associated with livestock, 3.8 percent see an increase in wind due to the destruction/clearing of trees, 3.8 percent experience an increase in property damage, and 3.8 percent feel the need to travel further for firewood. 37.5% of participants can identify female and male elephants, 37.5 percent cannot, and 25 percent are unsure. Villagers are knowledgeable in identifying female and male social behaviours and continue to advocate for government intervention. For instance, “only the presence of the female tends to change the behavior of the group. It makes the dominant male fight out the weaker males. They are peaceful here whereas those outside are aggressive. We should protect our properties and since we are poor, the government should assist us” (Participant 0793). 66.7% (the majority) of participants believe elephant behaviours to be the same outside the villages as inside 66.7 percent, 20.8 percent are unsure, 8.3 percent describe elephants as peaceful within their village, and 4.2 percent describe elephants as aggressive outside of the village.

All participants believe that elephant behaviours have remained the same for the years they have resided in their village, in turn, their behaviours are detrimental to socio-economic status of villagers “we are failing to plough because of them and at the end we depend only on buying food. There is no change” (Participant 3939). There is a strong call for action due to the increasing issues in elephant behaviours in villages due to the increase in populations not necessarily due to aggression but over resource sharing. “Elephants raid our crops and nowadays we cannot plough because we are always afraid. The situation is now getting worse” (Participant 4009). Moreomaoto should be examined further in terms of their knowledge and greater tolerance for elephants. This can be achieved through the

integration of environmental education in classrooms and narrowing the scope of curriculum documents with the assistance of EE resources. “The new generation should be taught about elephants at length. Since people do not like reading, there should be programs on the television which specialize on elephants”(Participant 4490).

Figure 5: Elephant Behaviours and Seasonal Variation in Boteti Villages



4.c) Focus Group Interviews

Focus group interviews were conducted in Motopi and Moreomaoto to explore the academic transmission of LEK in hopes that valuable information would emerge. Respondents were strategically selected due to their profession (local primary school educators), geographic location, and knowledge of the primary school curriculum. For instance, educators provided insight into what environmental education (EE) expectations are written within curriculum documents in addition to their own EE teaching practices. Findings from the focus group discussions revealed emergent information which could have the potential to spearhead new human-elephant conflict mitigation initiatives within Boteti schools. Focus groups consisted of 18 primary school teachers residing in Motopi (n=8) and Moreomaoto (n=10). Questions focused on both teacher and student perceptions of and relationships with elephants, how elephant knowledge is taught, what it is taught, and explored if educators felt as though any topics were lacking within the curriculum. The goal of the open discussion was to gain a

better understanding of what/how future generations will be taught about living with elephants and if there should be any adjustments to the current education curriculum. Knowledge holders such as those who participated in focus group interviews should be considered in future research studies regarding elephants for the following reasons.

In Motopi, educators describe their curriculum as broad and express their lack of input. Environmental preservation and elephant conservation is taught in schools, but educators believe that guided tours through the park and more curriculum flexibility would be beneficial to students. Elephants are feared by teachers and students due to their destructive tendencies and size. Elephants are also perceived as calming, entertaining, and a good source of income (through tourism). Teachers also instill in their students that elephants must be protected. Both students and teachers alike thrive for coexistence in Motopi and have high hopes for the future of eased coexistence and effective conservation initiatives. In Moreomaoto, elephants are seen as disruptive and are feared. Educators teach students about all wildlife, but their curriculums do not specify any elephant specific information. Students in Moreomaoto perceive elephants to be dangerous but are also encouraged to coexist with them. Wildlife and tourism is generalized within curriculum documents which is an aspect that educators hope to change. Elephants are seen as a threat to the environment (plant life, cattle security, and crops). Finally, teachers believe that there would be a significant benefit for students to travel into national parks for visceral experiences.

These academic knowledge holders are valuable to the communities as they are instilling social change in future generations. They are instructing them on how to deal with big social conflict which is relevant to where they live. The consensus from both villages was that curriculums need to have more flexibility so that educators can instruct their students more thoroughly about elephants. Next, a growth mindset regarding elephants must be instilled in students for them to want to preserve them going forward. Additionally, conflict mitigation and proper elephant education should be taught (including annual trips to Makgadikgadi Pans National Park to experience elephants). Finally, for coexistence to occur, environmental education should be prioritized and refined in curriculum documents.

Chapter 0.5 Discussion & Conclusion

The above detailed findings reflect the local elephant knowledge held by residents of Boteti Villages, namely Motopi and Moreomaoto. The findings reveal local elephant knowledge in terms of social dynamics (human and elephant, and elephant and elephant), environmental influences of elephants, and behavioural patterns of elephants. Next, this chapter discusses LEK in relation to SEK. Following, is the exploration of how LEK can assist human-wildlife resource competition. Additionally, respondent suggested conflict-mitigation strategies are listed. Finally, my recommendations and final thoughts conclude this major paper. The final output of this research study advocates for a stronger multidisciplinary approach in conservation research. The divided direction that both villages envision for coexistence does not allow me to make one recommendation. Instead, I am recommending a community lead organization that allows them to have agency on their own land so that collective and more unanimous strategies can be presented to village chiefs. Additionally, infographics, revisions of the local school curriculums, and more visceral experiences in environmental education classes will aid in mobilizing local elephant knowledge. In the interim, toolkits of deterrents should continue (chili bombs, field watchmen, elephant workshops, noise makers, and so forth). In the future, fencing the village and their associated costs should be explored further. Local community gardens too, would be wise to implement for food security reasons.

5.a) Local Knowledge of Elephant Social Dynamics

There is a strong understanding of elephants and their social dynamics within Boteti villages which was acquired mainly through observation. Communities personify elephants often whereby they describe the African savanna elephant as complex animals capable of intricate emotion. After having spent over a decade with elephants, community members have acquired a special skill set for identifying elephants and their social habits. For example, participants describe dangerous elephants as outliers and other elephants as friendly. Those who present as more dangerous can be easily identified by communities: elephants accompanied by calves, male elephants (bulls), injured elephants, and elephants from different herds. Communities note that all elephants want space, however, female elephants that travel in small groups are friendlier, have better social graces, and are therefore more tolerant of human presence. This does not mean to say that bulls are not social. They are simply more particular about their social circles according to participants. The ability to identify elephants and dangerous encounters help





community members to diminish their negative elephant engagements. Communities fear elephants because of their unpredictability but also love and acknowledge them as part of their lives; relationships are ambivalent. For instance, elephant presence causes challenges such as completing daily tasks, impacts income, threatens food and water security, and causes emotional stress. Furthermore, communities have experienced the dangers elephants can pose to people when threatened and the environmental impacts due to their unpredictability and destructive nature. Contrarily, communities understand the value of elephants to the ecosystem and the income opportunity through things such as tourism. Though community-elephant relationships are negative, participants have a strong desire to learn and to achieve positive relationships. Moreomaoto participants have a stronger acceptance for elephants. They describe their relationships as fearful in the beginning but with time and education, they became less afraid; their perspectives have shifted beyond tolerance. Relationships in Moreomaoto should thus be treated as a model for other communities. This actively demonstrates the willingness and need for environmental education workshops and future conflict mitigation efforts.

5.b) Local Knowledge of Environmental Influences

According to participants, the environment in Boteti villages has experienced drastic change over the last decade due to elephants. Local people are concerned about the elephant-induced, negative environmental implications. Respondents in the study describe an impressive profile of flora species that are potentially at risk of extinction due to elephant behaviours. Loosening soil, uprooting plants, and destroying trees are some of the most common behaviours that have led to Boteti environmental degradation. **Reference Table 6: Flora Classified as an Environmental Concern in Boteti Villages*

Another local environmental obstacle pertains to crops. Elephants are drawn to farmer's crops-which are then destroyed-coupled with changes in seasonal variation make ploughing next to impossible. Crops are not generating the same annual yields as they could be due to overgrowth of weeds from a lack of ploughing. Ploughing is not happening to the same degree due to the fear of an elephant encounter. Not to mention, climate change makes seasons increasingly more unpredictable for farmers. During the dry season elephants are in search of food and become more destructive and aggressive. During the rainy season, there is an increase in elephant populations due to the abundance of food in fields which results in more human-elephant conflict. Livestock, ecosystems, farmers, and elephants are all suffering. With little to no government support after elephant raids, there are less farmers producing crops and therefore food insecurities are significant. Finally, participants have noted that elephants are masters at discovering water sources. Therefore, any kind of underwater storage or natural water sources are often destroyed. Artificial irrigation is not economically feasible either. Farmers feel as though they are in an impossible situation dealing with poverty and conflict.

Table 6: Flora Classified as an Environmental Concern in Boteti Villages

Flora Classified as an Environmental Concern in Boteti Villages			
Common name	Scientific name	Status	National criteria
Blue Sour Plum	 <i>Ximenia americana</i>	Native	Least Concern
Grey Raisin	 <i>Grewia hermannioides</i> Harv.	Native	Least Concern
Brandy bush	<i>Grewia flava</i>		
Camel Thorn	 <i>Vachellia erioloba</i>	Native	Least Concern
Shepherd Tree	 <i>Boscia albitrunca</i>	Native	Least Concern
Other mentions: Bushes, Fruit, Trees, Crops, Riverbanks, Anthrax Disease			

One participant shares that people in their community need better knowledge sharing methods. They state that having ecological elephant knowledge is key to thriving in their communities and they give an interesting example. The participant shares that sometimes elephants can contract Anthrax disease. This typically occurs after the elephant has ingested soil or dirt contaminated with bacteria. Though the disease is not viral or contagious, once consumed people are at risk for contracting Anthrax disease and it is fatal. Elephants who die during droughts are thought to have died mostly from a lack of water when in fact some of them are ingesting large amounts of contaminated dirt and soil as opposed to a clean drinking source. Therefore, when coming across an elephant carcass during the dry season, their bodies should be burned so that zoonotic transmission does not occur (in humans or other animals). This is the type of knowledge that this study aimed to seek and will advocate for. Knowledge holders in rural communities such as this one have valuable information to share and should be included and explored in future research studies going forward especially concerning wildlife conservation.

5.c) Local Knowledge of Behavioural Patterns

Some respondent's have the ability to identify the sex of elephants. Some by spoor, size, the company they keep, or simply behaviours in general. This is important because respondents are less afraid of elephants traveling in small groups (typically females) and can be more cognizant of what could be trailing in proximity to elephants. Next, all participants agreed that there are not significant changes in elephant behaviours that they have observed in the last ten years. Behaviours of elephants (for the most part) are consistent inside and outside of the village, but day roaming is increasing. This actively demonstrates that there is an increase in comfortability that elephants possess within Motopi and Moreomaoto villages. This is accredited to their growing populations and thus elephants feel more secure in larger numbers. Finally, cattle, lions, and buffalo are repeatedly mentioned as moving parts in resource competition discussions. According to participants male elephants and lions have disagreements often and buffalo were animals that participants were wanting to discuss further. This should be explored in future research studies.

According to participants, the indicator of an elephant fight is largely associated with loud trumpeting and typically this occurs at night. The most dominant male fighting for the attention of the females will fight off weaker males in competition. Their unpredictable nature and "moodiness" are what frightens people. Participants share this kind of knowledge at community meetings (kgotla) to keep others safe.

5.d) LEK + SEK in the Research Study

It is clear with EfA's work that SEK can stand alone in conservation research. LEK can facilitate access to more information but cannot gather enough substantiated information by itself. Its usefulness, however, is validated within the study. For instance, the observations that participants make about disappearances of biotic life are not supported by biological science. Plant species mentioned by respondents were cross referenced with national statuses and are classified in the category of "least concern." The limitation within SEK research only comes to fruition when there is a problem (such as a species vulnerability status). With habitual LEK investigations, species all over the world can be flagged preventatively. In this example, elephants uproot fruit and plants during the dry season when there are food shortages. These species are thus at risk due to the increase of elephant populations and destructive elephant behaviours. LEK's exploration into biotic life of local concern thus becomes a preventative approach in NRM as opposed to a corrective one. This research study's data demonstrates LEK's capacity to embrace large bodies of examinable knowledge. Combining LEK with SEK is appealing as they only contribute to one another even if they contradict each other (such as the vulnerability statuses of plants).

In advocating for multidisciplinary approaches, the social dynamics described in EfA and other literature are consistent with my data findings. Findings describe emotional stress and fear of participants and present the hidden impacts of elephant presence. EfA literature illustrates this exact information. Another social dynamic finding that is echoed within LEK and SEK is the importance of perception shifts. Both approaches have similar research aims and offer complimenting results from the opposite discipline. For example, Moreomaoto communities are significantly more accepting of elephants in comparison to Motopi. One primary school educator went as far to state that elephants are their totem. With a more tolerating mindset, villages may feel more at peace with coexistence (as shown in Moreomaoto). Next, elephant behaviours were mirrored largely with EfA data in this study. Participants share how elephants interact with one another and they describe them as highly social animals. They often compare elephants to humans and how they carry themselves within herds. This includes things like the evidence of their love towards each other, their communication skills (described in literature as low-frequency rumbles), their night-time fighting endeavours, their competitive trumpets in comparison to their friendly greetings and so on. Additionally, LEK findings depict the same claims in terms of crop raids: elephants have tendencies to crop-raid when there is an abundance of crops in farmers' fields. SEK reveals more about male elephant sociality such as young bulls learning from older bulls and the importance of young elephant aggregations. This information mirrors EfA's data sets and actively

demonstrates the accuracy of using LEK in offering a more widespread (and local) perspective.

A Moreomaoto focus group participant states that elephants are their community's totem. Historically, a totem was a tool used to hide a chief from its enemies and if that totem was harmed in any way, misfortune would be bestowed upon those who harmed it. Totems in Botswana are given copious amounts of respect to the tune of the utmost protection of that animal at all costs. Totems can be unique to different tribes and uphold the highest symbolic significance. Namely, with the exploration of different totems in areas of conflict, the willingness to participate in conservation management efforts is increased. Communities are thus active agents in protecting wildlife (Tseladikae, 2020).

5.e) How will LEK aid in Mitigating Human-Wildlife Resource Competition?

The respondents in the village are viewed as knowledge holders (in this research study) and they believe that with continuous elephant knowledge sharing practices, resource competition could diminish. People will be better informed should LEK sharing occur and thus better equipped to live among elephants. For instance, more widespread knowledge of what to do in avoiding conflict-as mentioned by respondents (such as an awareness of elephant conglomeration patterns)- could lessen negative interactions. The same mindset is imagined through environmental education in local primary schools. The well-being of their children in terms of existing in the same space as elephants without injury or fear was a large concern for respondents. With a better understanding of elephants at a young age coupled with the skills developed in tackling environmental issues, future generations are set-up in the best way to coexist with elephants.

Large advocates for the implementation of environmental education are focus group respondents (or local educators). They want access to more elephant information for their students due to the scarcity of it within curriculum documents. How educators believe this to come to fruition is through park tours, curriculum expansion, teaching coexistence strategies, and transportation for field trips to study wildlife (place-based education). Place-based education is the critical component here. For example, learning about subjects and global issues in an outspread fashion is not contributing to student education. First, there must be a cultivation and understanding of their own culture, community/social issues, ecological surroundings, or environment. Once this knowledge is assumed, only then can the broader curriculum topics have relevancy. Educators have high hopes for the futures of their students. They believe that students will learn to channel their current fears of elephants to love. Educators aim for students to find an acceptance of elephants if anything for the vitality and prosperity of ecosystems. Educators assume that students will continue to come into conflict with elephants but also have hope that mitigation strategies will become more concrete and effective in the future.

Elephants though tolerated and loved even are leaving communities in poverty and in dire need of intervention. The anger towards elephants is almost unanimously driven by fear. Respondents have a great baseline understanding of elephants and their behaviours, but they would like to continue to learn.

LEK should be incorporated into future conservation projects that aim to alleviate human-wildlife resource competition. This study shows the accuracy in LEK as it produced similar data as SEK. In rural areas, with access to little resources or researchers LEK would be an acceptable approach. This would give researchers a baseline understanding of the issues, it is cost effective, and all inclusive. Beyond that, information produced could help other communities to effectively manage their natural resources resulting in less competition.

Finally, collaborating in a multidisciplinary approach in conservation will allow researchers the opportunity to expand their collectable data. Other disciplines may not carry the same limitations and can extend their research into the collaborators gaps. This is evident with SEK and LEK in social science research and conservation biology. There is a collective hope and desire to cultivate better relationships with elephants in the research study area. The perceptions that respondents bear for elephants is inspiring (especially in Moreomaoto). Conflict mitigation strategies that emerged from the data is as follows: fencing options, an increase in environmental education, government incentives for CBNRM, culling, capitalizing on natural resources, tourism, village fencing, elephant monitoring, agro-tourism, hunting-tourism, community education (to shift mindsets), park isolation, crop fencing, and a tool-kit, government subsidized fencing, pushing elephants back into protected areas, the incorporation of LEK, monitoring of fields during ploughing season, and sharing profits from tourism initiatives to alleviate financial burdens from crop raids. One respondent suggests something quite innovative. As opposed to fencing elephants, this participant suggests the solution to their village's issues are with the people and elephants. Their conflict mitigation solution was to thus fence villages. This way, local people have control on tourism, can see elephants from a far, and keep their homesteads secure. With the breadth of these suggestions, considerations for local perspectives could be integrated into current initiatives assisting in the mitigation of human-wildlife resource competition.

5.f) Recommendations

After completing this research study, it is my recommendation that LEK is incorporated into future research studies that explore human-wildlife resource competition. It is also my recommendation that areas of ecological concern should use a mix-methods approach for assistance in conservation management (LEK+SEK). Areas that do not have access to SEK research can use LEK approaches to gain a concrete baseline understanding of ecological information, concern, and create a starting point for conflict mitigation. Areas that have access to both (SEK and LEK), would benefit from a combined approach to maximize results.

My recommendation to EfA is to continue LEK studies as means of connecting with communities, understanding current environmental conditions, and helping to shift perceptions of elephants (especially in Motopi). Doing so will allow for more fluid knowledge transmission to other community members. Next, it is my recommendation that local knowledge produced from this study is taken under consideration in conservation practices. For instance, monitoring of the above-mentioned flora could be beneficial for the mitigation of biota loss in the future. The continuation of workshops, elephant discussions at kgotla meetings, and knowledge distribution throughout villages would maximize education and safety. Listening to the wants and needs of community members will contribute to the overall success of coexistence projects. For example, if communities are willing to compromise with land sharing while continuing current deterrents, stakeholders can actively work towards the implementation of more permanent solutions (such as fencing or government subsidy) then coexistence could be facilitated. I recommend examining buffalo, lions, and the socio-economic status of farmers, within Boteti villages.

Significant change will take time and effort. Therefore, as interim deterrent strategies I suggest: incorporating environmental education in primary schools to ensure the longevity of ecological knowledge, incorporating fundraising events within schools for the purchase of transportation for field trips into national parks, writing a collective letter from teachers to government regarding curriculum changes, writing out collective community strategies or solutions create one collective goal, the continuance of shifting perceptions of elephants, creating well defined village borders lined with chili peppers, carrying elephant deterrents (chili “bombs,” pots and pans, air horns), taking advantage of seasonal variation and low elephant presence to maximize crop success, environmental education workshops attendance, and community-led initiatives. For instance, local community members could spearhead fundraising projects for community initiatives. The formation of a community-led outreach committee could be a good place to start. This is because, historically, governments have not been overly helpful in this process so why not take immediate action? The committee could comprise a panel of those dedicated to making impactful change within their communities concerning elephant conflict (farmers, key informants, community members, teachers, students, and so forth). After establishing outreach goals, organizing community fundraising events (spearheaded by the “human-elephant coexistence committee”) may be a good way to save funds for collective community outreach goals. These goals could include a collective resource pool to assist in teaching environmental education (purchasing of EE resources), or planting a community garden secured in a greenhouse (which would require extensive research) but ease food insecurities. Other community fundraising goals could include fencing options, cover current deterrent costs (such as chili pepper), building patrolling towers, or employing night-time elephant watchmen all to help diminish raids and conflict. Finally, it is my recommendation that a stronger focus on local elephant knowledge at the primary school level could help to facilitate the comprehension and overall awareness of their current

environmental conditions. There needs to be major changes in the curriculum in terms of narrowing the scope of EE. The benefits in curriculum shifts could promote critical thinking among learners due to a stronger relatability in materials. The transferability of skills learnt about human-elephant relationships could translate well from one social and environmental issue to larger ones they may face in the future.

5.g) Final Thoughts

The elephant recolonization of the Boteti River- ahistorical landscape- has resulted in both humans and elephants battling over available resources. Elephant conservation, though a priority in Botswana, is also a global issue. The information above contributes to a more environmentally conscious future and the visions for it through the collective of elephant conservation and social thought. Specifically, imagining the future of the natural world navigated through meaningful discussion and effective conservation management. In a world full of complicated social constructs, shedding light on environmental injustices through proper environmental education is key. Additionally, proper conservation management practices are needed but through greater interdisciplinary approaches. These factors could lead to potential improvements in the field by shifting environmental attitudes and perceptions in a more accurate direction. This study reveals information that has the potential to create a more peaceful space for humans and wildlife to exist. This study brings forth a call for immediate action and government intervention in combination with mixed approaches (LEK+SEK). Communities are in desperate need of tangible results. Through the sharing of LEK in schools and at community meetings, Boteti villages will be better equipped to mitigate future conflict with the African savanna elephant. Ultimately fostering positive perceptions and relationships with the natural world instills a stronger will in humanity to preserve it. Empowering local communities who are suffering due to wildlife conflict is worthy of consideration in any research study going forward. LEK is truly the underestimated approach to conservation management and the preservation of vital wildlife. It is our job as academics to commit to those in need and to propel impactful change. This research study was personally humbling and made me realize that this research study is truly larger than any one elephant.

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Appendix A: Interview Questions

Key Informant Interview Questions

Elephants for Africa Research Project: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta africana*) Resource Competition in Botswana, Africa

Interview Type: Key Informant Interview Questions

Interview Time: 20 minutes (minimum) - 45 minutes (maximum)

Interview Number: _____

Village (circle one): Khumaga or Moreomaoto

PIN: (_ _ _ _)

Date: _____ **Time:** _____

Purpose of the Study:

The purpose of this study is to examine what local ecological elephant knowledge exists within your communities. You were selected as a “Key Informant” to assist us with some very important and preliminary information. The responses that you share with Elephants for Africa will be included in our sample and will allow us to gain an initial understanding of your perspective of elephants in your community. We aim to unveil what ecological relationships exist between elephants and community members. We want to know what beliefs, practices, and knowledge of ecosystems are present through community member experiences, observations, and interactions with local elephants. The hard scientific data that was previously collected in the area heavily researched environmental influences, behavioural patterns, and the social dynamics of elephants. We would now like to use the same variables in exploring local ecological elephant knowledge. Our hopes are to reveal any new information to assist in finding conflict mitigation, coexistence, and resource competition alleviation strategies and to improve

Elephants for Africa Community Coexistence Project.

KEY INFORMANT INTERVIEW QUESTIONS

The following interview questions will be both closed and open-ended. All participants will be required to verbally consent to interviews and interview parameters prior to commencing the questionnaire. “C” — Closed Questions “O” — Open-Ended Questions

Preliminary Questions

1. Where were you born?
2. In what year were you born?
3. What village do you currently live in?
4. How many years have you lived in the area?
5. Are you currently employed? If so, what is your current employment?
6. What is your highest level of education?
7. Please describe your relationship with the community.
8. Are there any challenges that face your community? If so, what are they?
9. How would you describe your relationship with nature?

 Prompt: Stong, Neutral, Poor: Why?
10. How would you describe your relationship with elephants?

 Prompt: Stong, Neutral, Poor: Why?

Guiding Questions

1. Can you tell me about the elephants that reside within your community? (O)
 - a. Can you tell me about the elephants that reside outside of your community?
 - b. What have you seen or experienced?

Prompt: What are typical behaviours of elephants in the community and outside of the community? Are these good, neutral, or bad behaviours? Why?

2. What have you noticed about how elephants interact with each other? (O)
 - a. What have you noticed about how elephants interact with humans (or the community)?
 - b. What have you noticed about how elephants interact with other animals?
 - c. How did you come to know this?

Prompt: Do elephants have positive, negative, or neutral interactions with other elephants? How so? Do you think these are normal, abnormal, or neutral interactions for elephants?

3. What have you noticed about elephant habitats? (C)
 - a. What have you noticed about how elephants behave according to their habitats?
 - b. Have there been any changes to their habitats?
 - c. Would you say these changes are major, slight, or no change?
 - d. If there have been changes in their habitat has this affected elephant behaviours?

Prompt: Have you noticed any changes in the environment? Have these behaviours positively or negatively affected due to habitat/environmental changes?

4. What behavioural patterns have you noticed surrounding elephants? (O)
 - a. Where are elephants most prominently drawn-to in your community?
 - b. Do elephant behaviours change when there are other elephants around?
 - c. Do elephant behaviours change when there are humans around? How did you come to know this?

Prompt: Are there spots of high elephant congregation? Are they more aggressive, less aggressive, or neutral around other elephants? Are they more aggressive, less aggressive, or neutral around other humans?

5. Where did you learn most of your elephant knowledge? (C)

Prompt: Perhaps in school, from a friend, from other community members, EfA, village chiefs...and so forth.

6. What are the relationship dynamics of elephants and community members? (O) *Prompt: Does the community like elephants? Is the community indifferent about elephants? Does the community dislike elephants? Does the community give elephants an appropriate amount of space? Do elephants give the community an appropriate amount of space?*

7. Do you think your community would benefit from facilitating coexistence?

(C) a. Why?

Prompt: What would make living with elephants easier/better? Are there any initiatives that you want to see implemented within your community? (For example, more community seminars on elephants).

8. Does your community share elephant knowledge? (C)

a. How is this knowledge transmitted?

b. Is this knowledge beneficial, neutral, or not beneficial?

c. Who benefits (or not) from this knowledge?

Prompt: How is knowledge shared in your community? (Doesn't necessarily have to be regarding elephants).

9. Do you think that local ecological knowledge should or should not be incorporated into research studies regarding elephants? (C)

Prompt: Would you like to participate more often, less often, or the same amount in terms of research studies? Why?

10. Can you think of any human-elephant conflict mitigation strategies? (O)

Prompt: What would make living with elephants easier for your community? Do you have any

strategies that you think of?

Is there anything else that you would like to share regarding elephants? (O)

Thank you for your time.

Interview Questions

Local/In-Depth

Elephants for Africa Research Project: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta africana*) Resource Competition in Botswana, Africa

Interview Type: Local/In-Depth Interview Questions

Interview Time: 20 minutes (minimum) - 45 minutes (maximum)

Interview Number: _____

Village (circle one): Khumaga or Moreomaoto

PIN: (_ _ _ _)

Date: _____ **Time:** _____

Purpose of the Study:

The purpose of this study is to examine what local ecological elephant knowledge exists within your communities. You were selected as a “Local/In-Depth” participant to assist Elephants for Africa with some very important information. The responses that you share with the team will be included in our main sample and will allow us to gain a thorough understanding of your perspective(s) on elephants within your community. We aim to unveil what ecological relationships exist between elephants and community members. We want to know what beliefs, practices, and knowledge of ecosystems are present through community member experiences, observations, and interactions with local elephants. The hard scientific data that was previously collected in the area heavily researched environmental

influences, behavioural patterns, and the social dynamics of elephants. We would now like to use the same variables in exploring local ecological elephant knowledge. Our hopes are to reveal any new information to assist in finding conflict mitigation, coexistence, and resource competition alleviation strategies and to improve Elephants for Africa Community Coexistence Project.

Local/In-Depth Interview Questions

Elephants for Africa Research Project: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta africana*) Resource Competition in Botswana, Africa

The following interview questions will be both closed and open-ended. All participants will be required to verbally consent to interviews and interview parameters prior to commencing the questionnaire. “C” — Closed Questions “O” — Open-Ended Questions

Preliminary Questions

1. Where were you born?
2. In what year were you born?
3. What village do you currently live in?
4. How many years have you lived in the area?
5. Are you currently employed? If so, what is your current employment?
6. What is your highest level of education?
7. Please describe your relationship with the community.
8. Are there any challenges that face your community? If so what are they?
9. How would you describe your relationship with the environment?

Prompt: Stong, Neutral, Poor: Why?

10. How would you describe your relationship with elephants?

Prompt: Stong, Neutral, Poor: Why?

Social Dynamics

1. What do you know about elephants residing in the area?

a. How did you come to know this? (O)

Prompt: Can you tell me any stories about elephants in your area and how they interact with one another? How do you know this?

2. Please describe your social experiences with elephants? (O)

Prompt: Have you ever had any elephant interactions? Have people in your community had any elephant interactions? If so, were the interactions positive, negative, or neutral? What have you witnessed about how elephants interact with each other?

3. Do you want to coexist with elephants? If so, what measures should be taken for peaceful co-existence with elephants? (C)

Prompt: Do you think it is possible for your community and elephants to live in the same place? How would this be possible?

4. What do you think about elephant presence in your village?

a. What specifically and why? (O)

Prompt: Are you happy, unhappy, or neutral about the elephants? Why do you think about this?

5. Do you have a similar relationship with elephants as in your village or do they differ? a. How would you describe your relationship?

b. Positive or negative relationships?

c. What are the indicators of this positive or negative relationship? Has this relationship always been this way? (O)

Prompt: Have your relationships/village relationships always been (positive or negative) with

elephants? Will it always be this way? Why?

6. Would you be interested in learning more about elephants? If so, what specifically and why?

(C) Prompt: If there were more opportunities, resources, and workshops about elephants and would you attend?

7. How did you learn about elephants?

a. Who taught you?

b. Do you teach others about elephants? (O)

Prompt: Learn in school, by observation, or through stories spread through your communities?

8. Do you wish that elephants had a different relationship with your community? *Prompt: If negative, do you wish they were positive (or vice versa)?*

Environmental Influences

1. What do you know about elephants in relation to the environment?

a. How did you come to know this? (O)

Prompt: With the changing seasons, temperatures, and climate do elephants adapt or change? How do you know this (school, observation, or stories)?

2. What environmental factors influence your day-to-day tasks? (C)

Prompt: Do the changing of seasons, temperatures, or climate influence the ways in which you complete your daily activities?

3. What changes with seasonal variation?

a. How do elephants fit into this equation? (C)

Prompt: During the rainy season and dry season have you noticed any changes with elephant behaviours, sociality, or engagement with each other and your community?

4. What measures should be implemented to ensure environmental longevity and the conservation of species within your area? (O)

Prompt: Are there any conservation initiatives that you want to see in your community? How do you imagine natural resources around you being preserved (rivers, land...etc.)?

5. Are elephant populations too low, normal, or high in your area?(C)

Prompt: Do you think that it is possible to control elephant populations in your village? How? Do you think that they should be controlled by your community or government? If answered yes, please explain how?

6. Has your land or village been impacted by elephant presence? How? How did you come to know this? (O)

Prompt: Have elephants positively or negatively affected your community? If so, how? How do you know (observations, stories, workshops, or school)?

7. Are flora or fauna affected by elephants? (C)

a. How are they affected?

b. How did you come to know this?

Prompt: Are plant and animal life in your community affected by elephants? How do you know (observations, stories, school, workshops..etc.)?

8. Has the environment changed ever since you resided in the area? (C)

a. How did you come to know this?

Prompt: What have you noticed about the climate, soil, and other living things that surround you? Have they always been in this state? How do you know (observations, stories, workshops, or school)?

Behavioural Patterns

1. What do you know about elephant behaviours? (O)

a. Have they always behaved this way?

b. How have you come to know this?

Prompt: Is there anything that you have noticed about elephants and how they behave in general? Have these behavioural patterns changed or remained the same? How do you know (observations, stories, workshops, or school)?

2. In what ways do elephants impact your life? (O)

a. Has this varied over your residency?

Prompt: Do elephants contribute positively, neutral, negatively, to your life? Can you please give an example? Has this always been the case? If not, what has changed?

3. How do elephants socialize and interact with one another? (O)

a. Why do they do this?

b. How did you come to know this?

Prompt: What have you noticed about elephants and how they act with each other? Why do you think they act this way? How do you know (observations, stories, workshops, or school)?

4. Can you identify male and female elephants? (C)

Prompt: How do you know this (observations, stories, workshops, or school)?

5. What can you tell us about elephant habitats? (C)

a. How did you come to know this?

Prompt: Do elephants prefer shade over the sun (or vice versa)? Do they congregate away from bodies of water or near them? Do they live among other animals or avoid them? Do they live near or away from trees and other vegetation? How do you know (observations, stories, workshops, or school)?

6. Have elephant behaviours changed or remained the same since you have resided in the area? a. If yes, how so?

b. What have you noticed about elephant behaviours within the village and outside of

the village? (C)

Prompt: In what way do elephants act? Are they destructive, respectful of space, calm, wild, in control, not in control, happy, unhappy, and so forth. Does this behaviour change depending on where they are? If yes, how? How do you know (observations, stories, workshops, or school)?

7. What have you noticed about elephant behaviours within the village and outside of the village? (O)

Prompt: Do elephants act differently in the villages and outside of the villages? Or does their behaviour remain consistent? How do you know (observations, stories, workshops, or school)?

8. What suggestions would you have to facilitate cohabitation with elephants? (O) *Prompt: What could make living with elephants easier for both humans and elephants alike? Are there ways in which community members, EfA, or the government could make this happen?*

Is there anything else that you would like to share regarding elephants?

(O) Thank you for your time.

Interview Questions

Focus Groups

Elephants for Africa Research Project: : Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta africana*) Resource Competition in Botswana, Africa

Interview Type: Focus Group Interview Questions

Interview Time: 20 minutes (minimum) - 45 minutes (maximum)

Interview Number: _____

Village (circle one): Khumaga or Moreomaoto

PINS: (____), (____), (____), (____), (____), (____), (____), (____), (____), (____)

Date: _____ **Time:** _____

Purpose of the Study:

The purpose of this study is to examine what local ecological elephant knowledge exists within your communities. You were selected as a “Focus Group” participant to assist Elephants for Africa with some very important information. The responses that you share with the team will be included in our sample

and will allow us to gain an understanding of a primary teacher's perspective of elephants in your community. We would like to ultimately know what elephant and ecological knowledge is being taught or is not being taught within primary schools. We aim to unveil what ecological relationships exist between elephants and community members. We would like to know what beliefs, practices, and knowledge of ecosystems are present through community member experiences, observations, and interactions with local elephants. The hard scientific data that was previously collected in the area heavily researched environmental influences, behavioural patterns, and the social dynamics of elephants. We would now like to use the same variables in exploring local ecological elephant knowledge. Our hopes are to reveal any new information to assist in finding conflict mitigation, coexistence, and resource competition alleviation strategies. Finally, we hope to find out what information exists and does not exist in schools and hopefully assist you further in guiding future generations with the information they need to coexist with elephants in your community and to improve Elephants for Africa Community Coexistence Project.

FOCUS GROUP INTERVIEW QUESTIONS

Elephants for Africa Research Project: : Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta africana*) Resource Competition in Botswana, Africa

The following interview questions will be both closed and open-ended. All participants will be required to verbally consent to interviews and interview parameters prior to commencing the questionnaire. “C” — Closed Questions

“O” — Open-Ended Questions

School Teacher Interview Questions (Focus Group) (O)

1. Today’s topic is elephants. How do you feel about elephants? (O)
2. What words come to mind when you think about elephants? (C)
 - a. Why?

Prompt: What words would you use to describe elephants? What words do you often use when talking about elephants in your community? Why?

3. What do you know about elephants? (O)
 - a. How did you come to know this?

Prompt: Do you have any stories about elephant encounters? If so, is there anything that you learned about elephants from this encounter?

4. How do your students perceive elephants? (O)

a. Why?

Prompt: Do your students like, dislike, or are indifferent? Why?

5. What do you teach students about elephants? (C)

a. Why?

Prompt: Do you have a lesson or unit dedicated to elephant education? What are the units taught surrounding environmental education?

6. Do elephants and the community have positive, negative, or neutral relationships?

(C) a. Why?

Prompt: Can you think of an instance that illustrates this negative/positive relationship?

7. What are the largest issues (if any) facing your communities in regards to elephants? (O)

a. Why?

Prompt: Is there any fear of elephants? If yes, why? Do most of the community feel this way? Is there a strong dislike for elephants? If answered yes, why and how could this relationship be improved?

8. What strategies would facilitate coexistence among elephants and community members? (C)

Prompt: Does your community feel safe and comfortable living with elephants? If not, what could help your community feel safe or comfortable living with elephants? If so, is there anything you would like to see implemented to improve or maintain your sentiments?

9. How would you describe the environmental education curriculum?

(O) a. Is outdoor education part of the curriculum?

b. Do students learn outside of the classroom?

c. Does anyone else teach the students besides their teachers?

Prompt: Typically found in science/geography/history...etc. Is there anything lacking from the curriculum? Is the curriculum not/too saturated? Why?

10. What is being taught within your schools regarding: (C)

- a. Conservation
- b. Wildlife
- c. Elephants
- d. Ecosystems and ecosystem management

Prompt: Should there be more, less, or the same amount of information within the curriculum in regards to environmental education? Why?

11. How would you imagine your students and their future relationships

- with:
- a. Elephants
 - b. Nature
 - c. Each other

Prompt: Is coexistence a realistic possibility? Is coexistence far from a realistic possibility? Will relationships stay the same? How will relationships change? Why?

12. What did you learn about elephants in school? (C)

- a. If so, what did you learn?
- b. If so, have you used this knowledge (has it helped you)?
- c. If not, do you wish you had?

13. Did you learn about elephants outside of school? (C)

- a. If so, what did you learn?
- b. If so, have you used this knowledge (has it helped you)?
- c. If not, do you wish you had?

Is there anything else that you would like to share regarding elephants?
(O) Thank you for your time.

Appendix B: Informed Consent Forms

**Note: Acquiring the signature of participants is not always achievable. In these circumstances, verbal consent will be accepted after the purpose of the research and potential risks are fully disclosed to the participants.*

Study name: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa

Institution Address: Faculty of Environmental Studies and Urban Change, 137 Health, Nursing & Environmental Studies Building York University, Toronto, Canada M3J 1P3

Researcher: Stephanie P. Bell

Role: Master of Environmental Studies-Graduate Student (York University)

Email/Phone Number: bells935@gmail.com / 519-831-2005

Number of interviewees: _____.

Date: _____.

Name of participant: _____.

Expected interview duration: 45 minutes.

Purpose of the research: I am conducting this research for the purpose of completing my final Major Research Paper required for the fulfillment of my Master's degree at the Faculty of Environmental Studies and Urban Change at York University, Canada. Additionally, I am conducting the research to achieve my Environmental Education and Sustainability diploma at York University within the same faculty. My research project is grounded in social science under the supervision of Dr. Alice J. Hovorka and Dr. Kate Evans. The final outputs of the research will be a major research paper, a curriculum document, and a published academic research paper. This study will examine local ecological knowledge (LEK) present within the Motopi and Moreomaoto villages bordering the Makgadikgadi Pans National Park. This study aims to find strategies within LEK practices, specifically to mitigate human-elephant conflict, to facilitate coexistence, to actuate harmonious living, to give local communities a platform to share valuable knowledge, and to propel elephant conservation practices and social science research.

What you (the participant) will be required to complete:

You are invited to participate in an interview that will be conducted at a mutually agreed upon time and location. The interview is informal and based on the themes outlined above. You will be asked to respond to a series of interview questions and provide the interviewer with honest and detailed responses. Permission to participate in the study, take notes in a notebook, and take a photograph of the participant will be asked prior to commencing interviews.

Participant Risks: There are no foreseeable risks or discomforts from your participation in this research study. You have the right to refuse the answering of any questions, and/or withdraw from the interview at any moment in time. You also have the right to refuse any question. If you choose to withdraw from the study prior to completion, the recorded data will then be destroyed.

Benefits of the research and benefits to you:

This study will hopefully be empowering, will give you a platform to share ideas/thoughts/knowledge, share critical knowledge to be re-integrated within local education systems, you will be an actor in important social change, you will receive refreshments and snacks at the time of the interview, and finally, a shared meal will be hosted as a thank you once the interview process is complete.

Voluntary participation:

Your participation in the study is voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York

University either now, or in the future. You can stop participating in the study at any time and for any reason. Your decision to stop participating, or refusal to answer any particular questions, will not affect your relationship with the researchers, EFA, or York University. In the event you withdraw from the study, all associated data collected will be immediately destroyed.

Confidentiality:

The information derived from the interviews will be analyzed and then depicted within a major research paper, published academic paper, and a curriculum document. All information that you supply during the study will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected through handwritten notes. Your data will be safely stored in a password-protected folder/locked facility and only research staff will have access to this information. The data will be stored for a minimum of two years and will be destroyed thereafter. Confidentiality will be provided to the fullest extent possible by law. Finally, PINS will be assigned to participants to ensure full anonymity. The research study has been reviewed and approved by the FES Human Participants Research Committee on behalf of York University.

Questions about the research:

If you have any questions about the research in general or about your role in the study, please contact my Supervisor, Dr. Alice J. Hovorka by e-mail (ahovorka@yorku.ca) or myself (bells935@gmail.com). This research has been reviewed and approved by the FES Research Committee, on behalf of York University, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Research Tower, York University 416-736-5914 or at ore@yorku.ca.

Legal rights and signatures: I, _____ (please print), consent to participate in this research study conducted by Stephanie P. Bell, Dr. Alice J. Hovorka, and Dr. Kate Evans. I have understood the nature of this project and I wish to participate as an interviewee. My signature below indicates my consent and I am aware that I am not waiving any of my legal rights by signing this form. Additionally, I agree to allow digital images or photographs to be taken in which I appear to be used for teaching purposes, appear in scientific presentations and/or publications with the understanding that I will not be identified by name. Finally, I am aware that I can withdraw this consent at any time without penalty or judgment and all recorded information at that time will be destroyed.

Signatures:

Researcher: _____ **Date:** _____ **Time:** _____ .

Participant: _____ **Date:** _____ **Time:** _____ . **Principal**

Investigator: _____ **Date:** _____ **Time:** _____ . *Thank you on*

behalf of: Stephanie P. Bell, Dr. Alice J. Hovorka, Dr. Kate Evans, Elephants for Africa, and York University Faculty of Environmental Studies and Urban Change.

Appendix C: Ethical Considerations



**OFFICE OF RESEARCH ETHICS (ORE)
ETHICS APPROVAL**

Certificate #: 2021 - 116 Approval Period: 03/31/21-03/31/22

bells935@gmail.com

**3rd Floor,
309 York Lanes**

4700 Keele St.
Toronto ON
Canada M3J 1P3 Tel 416 736 5914 Fax 416
736-5512 www.research.yorku.ca

**To: Stephanie Bell – Graduate Student
Environmental Studies & Urban Change**

From: Alison M. Collins-Mrakas, Sr. Manager and
Policy Advisor, Research Ethics (*on behalf of
Veronika Jamnik, Chair, Human Participants Review
Committee*)

Date: Wednesday, March 31, 2021

**Title: Exploring Local Ecological Knowledge as a
Means of Mitigating Human African Savanna
Elephant (*Loxodonta Africana*) Resource
Competition in Botswana, Africa**

Risk Level: Minimal Risk More than Minimal Risk

Level of Review: Delegated Review Full Committees should be reported to the Office of Research ethics Review (ore@yorku.ca) as soon as possible.

I am writing to inform you that this research project, **“Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (Loxodonta Africana) Resource Competition in Botswana, Africa”** has received ethics review and approval by the Human Participants Review Sub-Committee, York University’s Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines.

Note that approval is granted for one year. Ongoing research – research that extends beyond one year – must be renewed prior to the expiry date.

Any changes to the approved protocol must be reviewed and approved through the amendment process by submission of an amendment application to the HPRC prior to its implementation.

Any adverse or unanticipated events in the research

For further information on researcher responsibilities as it pertains to this approved research ethics protocol, please refer to the attached document, **“RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE”**.

Please note that prior to commencing any research activities, researchers are advised to review the latest updates on research involving human participants at:

<https://www.yorku.ca/research/researchers-faqs/>

Should you have any questions, please feel free to contact me at: 416-736-5914 or via email at:

acollins@yorku.ca.

Yours sincerely,

Alison M. Collins-Mrakas M.Sc., LLM

Sr. Manager and Policy Advisor, Office of Research Ethics

RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE

Upon receipt of an ethics approval certificate, researchers are reminded that they are required to ensure that the following measures are undertaken so as to ensure on-going compliance with Senate and TCPS ethics guidelines:

- 1. RENEWALS:** Research Ethics Approval certificates are subject to annual renewal. **Failure to renew an ethics approval certificate or** (to notify ORE that no further research involving human participants will be undertaken) will result in the **closure of the protocol**. No further research activities may be undertaken until such time as a new protocol

has been reviewed and approved. Further, it **may result in suspension of research cost fund and access to research funds may be suspended/withheld ;**

2. AMENDMENTS: Amendments must be reviewed and approved **PRIOR** to undertaking/making the proposed amendments to an approved ethics protocol;

3. END OF PROJECT: ORE must be notified when a project is complete; Failure to submit an “End of Project Report” **may result in suspension of research cost fund and access to research funds may be suspended/withheld.**

4. ADVERSE EVENTS: Adverse events must be reported to ORE as soon as possible;

5. AUDIT:

- a. More than minimal risk research may be subject to an audit as per TCPS guidelines;
- b. A spot sample of minimal risk research may be subject to an audit as per TCPS guidelines.

FORMS: As per the above, the following forms relating to on-going research ethics compliance are available on the Research website:

- a. Renewal
- b. Amendment
- c. End of Project
- d. Adverse Event

Informed Consent Form

Key Informant Interviews

(Exclusively experienced members in the Community)

Note: Acquiring the signature of participants is not always achievable. In these circumstances, verbal consent will be accepted after the purpose of the research and potential risks are fully disclosed to the participants. Consent forms will be translated into the appropriate local language. Key Informant participants will not be permitted to participate in Local/In-depth interviews or Focus Group interviews.

Date: March 26th, 2021

Study Name: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa

Researchers: Stephanie P. Bell- Faculty of Environmental Studies and Urban Change, 137 Health, Nursing & Environmental Studies Building York University, Toronto, Canada M3J 1P3

Email/Phone Number: bells935@gmail.com / 519-831-2005

Name of Person Conducting Interview: Keitumetse Ngaka - research@elephantsforafrica.org

The research assistant conducting your interview today will be required to sign a confidentiality agreement prior to conducting your interview. This is to ensure that your responses given remain secure.

Purpose of the Research: I am conducting this research for the purpose of completing my final Major Research Paper required for the fulfillment of my Master's degree at the Faculty of Environmental Studies and Urban Change at York University, Canada. Additionally, I am conducting the research to achieve my Environmental Education and Sustainability diploma at York University within the same faculty. My research project is grounded in social science under the supervision of Dr. Alice J. Hovorka and Dr. Kate Evans. The final outputs of the research will be a major research paper, a curriculum document, and a published academic research paper. This study will examine local ecological knowledge (LEK) present within the Khumaga and Moreomaoto villages bordering the Makgadikgadi Pans National Park. This study aims to find strategies within LEK practices, specifically to mitigate human-elephant conflict, to facilitate coexistence, to actuate harmonious living, to give local communities a platform to share valuable knowledge, and to propel elephant conservation practices and social science research.

What You Will Be Asked to Do in the Research :

Participants are invited to participate in a research study examining local ecological elephant knowledge. Your interview will be conducted at a mutually agreed upon time and location. The interview is informal and based on the themes outlined above. A COVID-19 screening questionnaire will be asked prior to beginning the interview. Next, the interviewer will read the consent form to the participant and reiterate the purpose of the study. Participants will be asked to respond to a series of interview questions and provide the interviewer with honest and detailed responses. Permission to participate in the study, take notes in a notebook will be asked prior to commencing interviews. The estimated duration of interviews is 20 minutes and will not exceed longer than 45 minutes. You will be asked to answer a series of questions as openly and honestly as possible. Refreshments, snacks, and a certificate will be provided to you. Finally, a shared meal will be hosted once COVID restrictions are lifted to show gratitude and thank you for your participation.

Risks and Discomforts:

We do not foresee any risks or discomfort from participants in the research. There are no foreseeable risks or discomforts from participation in this research study. Participants have the right to refuse the answering of any questions, and/or withdraw from the interview at any moment in time. They also have the right to refuse any question. If they chose to withdraw from the study prior to completion, the recorded data will then be destroyed.

Benefits of the Research and Benefits to You:

This study will hopefully be empowering to participants as this study is a platform to share ideas, thoughts, knowledge, and to share critical information that has the potential to be re-integrated within local education systems. Participants will be contributing to important social change within their communities. It will also allow them to share ideas in a social setting among peers. The largest benefit to participants will be the potential conflict mitigation strategies developed from the results. Finally, participants will

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receive refreshments and snacks at the time of the interview and a shared meal will be hosted as a thank you once the interview process is complete and COVID restrictions are lifted. Other than snacks, refreshments, and a shared meal, as a final form of inducement, participants will receive a certificate of completion for their participation in the study.

Voluntary Participation and Withdrawal:

Your participation in the study is voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future. You can stop participating in the study at any time and for any reason. Your decision to stop participating, or refusal to answer any particular questions, will not affect your relationship with the researchers, EFA, or York University. In the event you withdraw from the study, all associated data collected will be immediately destroyed.

Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer, to stop participating, or to refuse to answer particular questions will not influence the treatment you may be receiving, the nature of the ongoing relationship you may have with the researchers or study staff, nature of your relationship with York University either now, or in the future. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. Should you wish to withdraw after the study, you will have the option to also withdraw your data up until the analysis is complete.

Confidentiality: All information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected by hand written notes. Your data will be safely stored in a locked facility. It will be stored in a locked room, cabinet, in a remote location. Only research staff/research team members will have access to this information. After 2 years time the data will be destroyed through the

means of clearing external harddrive devices. Confidentiality will be provided to the fullest extent possible by law.

Future research purposes:

The data collected in this research project may be used – in an anonymized form - by members of the research team in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our institutional REB. Any secondary use of anonymized data by the research team will be treated with the same degree of confidentiality and anonymity as in the original research project. The information derived from the interviews will be analyzed and then depicted within a major research paper, published academic paper, and a curriculum document. All information that you supply during the study will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected through handwritten notes. Your data will be safely stored in a password-protected folder/locked facility and only research staff will have access to this information. The data will be stored for a minimum of two years and will be destroyed thereafter. Confidentiality will be provided to the fullest extent possible by law. Finally, PINS will be assigned to participants to ensure full anonymity. The research study has been reviewed and approved by the FES Human Participants Research Committee on behalf of York University.

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact Stephanie Bell either by telephone at 519-831-2005 by e-mail (bells935@gmail.com). This research has received ethics review and approval by the Human Participants Review Sub-Committee, York University’s Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Kaneff Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ (*fill in your name here*), consent to participate in Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa) conducted by *Stephanie Bell* I have understood the nature of this

project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

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Signature Date

Participant

Signature Date

Principal Investigator

Consent to waive anonymity

I _____ consent to the use of my name in the publications arising from this research.

Signature Date

Participant Name: ORE – Updated 2020

Informed Consent Form

Local/In-Depth Interviews
(Exclusively Community Members)

Note: Acquiring the signature of participants is not always achievable. In these circumstances, verbal consent will be accepted after the purpose of the research and potential risks are fully disclosed to the participants. Consent forms will be translated into the appropriate local language. Local/In-Depth

interview participants will not be permitted to participate in Key Informant interviews or Focus Group interviews.

Date: March 26th, 2021

Study Name: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa

Researchers: Stephanie P. Bell- Faculty of Environmental Studies and Urban Change, 137 Health, Nursing & Environmental Studies Building York University, Toronto, Canada M3J 1P3

Email/Phone Number: bells935@gmail.com / 519-831-2005

Name of Person Conducting Interview: Keitumetse Ngaka - research@elephantsforafrica.org

The research assistant conducting your interview today will be required to sign a confidentiality agreement prior to conducting your interview. This is to ensure that your responses given remain secure.

Purpose of the Research: I am conducting this research for the purpose of completing my final Major Research Paper required for the fulfillment of my Master's degree at the Faculty of Environmental Studies and Urban Change at York University, Canada. Additionally, I am conducting the research to achieve my Environmental Education and Sustainability diploma at York University within the same faculty. My research project is grounded in social science under the supervision of Dr. Alice J. Hovorka and Dr. Kate Evans. The final outputs of the research will be a major research paper, a curriculum document, and a published academic research paper. This study will examine local ecological knowledge (LEK) present within the Khumaga and Moreomaoto villages bordering the Makgadikgadi Pans National Park. This study aims to find strategies within LEK practices, specifically to mitigate human-elephant conflict, to facilitate coexistence, to actuate harmonious living, to give local communities a platform to share valuable knowledge, and to propel elephant conservation practices and social science research.

What You Will Be Asked to Do in the Research: Participants are invited to participate in a research project examining local ecological elephant knowledge. The interview is informal and based on the themes outlined above. A COVID-19 screening questionnaire will be asked prior to beginning the interview. Next, the interviewer will read the consent form to the participant and reiterate the purpose of the study. Participants will be asked to respond to a series of interview questions and provide the interviewer with honest and detailed responses. Permission to participate in the study, take notes in a notebook will be asked prior to commencing interviews. The estimated duration of interviews is 20

minutes and will not exceed longer than 45 minutes. You will be asked to answer a series of questions as openly and honestly as possible. Refreshments, snacks, and a certificate will be provided to you. Finally, a shared meal will be hosted once COVID restrictions are lifted to show gratitude and thank you for your participation.

Risks and Discomforts:

We do not foresee any risks or discomfort from participants in the research. There are no foreseeable risks or discomforts from participation in this research study. Participants have the right to refuse the answering of any questions, and/or withdraw from the interview at any moment in time. They also have the right to refuse any question. If they chose to withdraw from the study prior to completion, the recorded data will then be destroyed.

Benefits of the Research and Benefits to You: Include a statement regarding any benefits of the research as well as benefits to the research participants.

This study will hopefully be empowering to participants as this study is a platform to share ideas, thoughts, knowledge, and to share critical information that has the potential to be re-integrated within local education systems. Participants will be contributing

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to important social change within their communities. It will also allow them to share ideas in a social setting among peers. The largest benefit to participants will be the potential conflict mitigation strategies developed from the results. Finally, participants will receive refreshments and snacks at the time of the interview and a shared meal will be hosted as a thank you once the interview process is complete and COVID restrictions are lifted. Other than snacks, refreshments, and a shared meal, as a final form of inducement, participants will receive a certificate of completion for their participation in the study.

Voluntary Participation and Withdrawal:

Your participation in the study is voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future. You can stop participating in the study at any time and for any reason. Your decision to stop participating, or refusal to answer any particular questions, will not affect your relationship with the researchers, EFA, or York University. In the event you withdraw from the study, all associated data collected will be immediately destroyed.

Your participation in the study is completely voluntary and you may choose to stop participating at any

time. Your decision not to volunteer, to stop participating, or to refuse to answer particular questions will not influence the treatment you may be receiving, the nature of the ongoing relationship you may have with the researchers or study staff, nature of your relationship with York University either now, or in the future. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. Should you wish to withdraw after the study, you will have the option to also withdraw your data up until the analysis is complete.

Confidentiality: All information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected by hand written notes. Your data will be safely stored in a locked facility. It will be stored in a locked room, cabinet, in a remote location. Only research staff/research team members will have access to this information. After 2 years time the data will be destroyed through the means of clearing external harddrive devices. Confidentiality will be provided to the fullest extent possible by law.

Future research purposes:

The data collected in this research project may be used – in an anonymized form - by members of the research team in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our institutional REB. Any secondary use of anonymized data by the research team will be treated with the same degree of confidentiality and anonymity as in the original research project. The information derived from the interviews will be analyzed and then depicted within a major research paper, published academic paper, and a curriculum document. All information that you supply during the study will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected through handwritten notes. Your data will be safely stored in a password-protected folder/locked facility and only research staff will have access to this information. The data will be stored for a minimum of two years and will be destroyed thereafter. Confidentiality will be provided to the fullest extent possible by law. Finally, PINS will be assigned to participants to ensure full anonymity. The research study has been reviewed and approved by the FES Human Participants Research Committee on behalf of York University.

Questions About the Research?

If you have questions about the research in general or about your role in the study, please feel free to

contact Stephanie Bell either by telephone at 519-831-2005 by e-mail (bells935@gmail.com). This research has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Kaneff Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ (*fill in your name here*), consent to participate in Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa

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) conducted by *Stephanie Bell* I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature Date

Participant

Signature Date

Principal Investigator

Consent to waive anonymity

I _____ consent to the use of my name in the publications arising from this research.

Signature Date

Participant Name:

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Informed Consent Form

Focus Group Interviews
(Exclusively Primary School Teachers)

Note: Acquiring the signature of participants is not always achievable. In these circumstances, verbal consent will be accepted after the purpose of the research and potential risks are fully disclosed to the participants. Consent forms will be translated into the appropriate local language. Please note that confidentiality cannot be guaranteed during the focus group discussions. Focus Group interview participants will not be permitted to participate in Local/In-depth interviews or Key-Informant interviews.

Date: March 26th, 2021

Study Name: Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa

Researchers: Stephanie P. Bell- Faculty of Environmental Studies and Urban Change, 137 Health, Nursing & Environmental Studies Building York University, Toronto, Canada M3J 1P3

Email/Phone Number: bells935@gmail.com / 519-831-2005

Name of Person Conducting Focus Group Interviews: Keitumetse Ngaka - research@elephantsforafrica.org The research assistant conducting your interview today will be required to sign a confidentiality agreement prior to conducting your interview. This is to ensure that your responses given remain as secure as possible.

Purpose of the Research: I am conducting this research for the purpose of completing my final Major Research Paper required for the fulfillment of my Master's degree at the Faculty of Environmental Studies and Urban Change at York University, Canada. Additionally, I am conducting the research to achieve my Environmental Education and Sustainability diploma at York University within the same faculty. My research project is grounded in social science under the supervision of Dr. Alice J. Hovorka and Dr. Kate Evans. The final outputs of the research will be a major research paper, a curriculum document, and a published academic research paper. This study will examine local ecological knowledge

(LEK) present within the Khumaga and Moreomaoto villages bordering the Makgadikgadi Pans National Park. This study aims to find strategies within LEK practices, specifically to mitigate human-elephant conflict, to facilitate coexistence, to actuate harmonious living, to give local communities a platform to share valuable knowledge, and to propel elephant conservation practices and social science research.

What You Will Be Asked to Do in the Research: Participants are invited to participate in a research project examining local ecological elephant knowledge. Specifically, what elephant knowledge is being taught in local schools. The interview is informal and based on the themes outlined above. A COVID-19 screening questionnaire will be asked prior to beginning the interview. Next, the interviewer will read the consent form to the participant and reiterate the purpose of the study. Participants will be asked to respond to a series of interview questions and provide the interviewer with honest and detailed responses. Permission to participate in the study, take notes in a notebook will be asked prior to commencing interviews. The estimated duration of interviews is 20 minutes and will not exceed longer than 45 minutes. You will be asked to answer a series of questions as openly and honestly as possible. Refreshments, snacks, and a certificate will be provided to you. Finally, a shared meal will be hosted once COVID restrictions are lifted to show gratitude and thank you for your participation.

Risks and Discomforts: fort from participants in the research. There are no foreseeable risks or discomforts from participation in this research study. Participants have the right to refuse the answering of any questions, and/or withdraw from the interview at any moment in time. They also have the right to refuse any question. If they chose to withdraw from the study prior to completion, the recorded data will then be destroyed.

Benefits of the Research and Benefits to You:

This study will hopefully be empowering to participants as this study is a platform to share ideas, thoughts, knowledge, and to share critical information that has the potential to be re-integrated within local education systems. Participants will be contributing to important social change within their communities. It will also allow them to share ideas in a social setting among peers. The largest benefit to participants will be the potential conflict mitigation strategies developed from the results. Finally, participants will receive refreshments and snacks at the time of the interview and a shared meal will be hosted as a thank you once the interview ORE – Updated 2020 process is complete and COVID restrictions are lifted. Other than snacks, refreshments, and a shared meal, as a final form of inducement, participants will receive a certificate of completion for their participation in the study.

Voluntary Participation and Withdrawal:

Your participation in the study is voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future. You can stop participating in the study at any time and for any reason. Your decision to stop participating, or refusal to answer any particular questions, will not affect your relationship with the researchers, EFA, or York University. In the event you withdraw from the study, all associated data collected will be immediately destroyed.

Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer, to stop participating, or to refuse to answer particular questions will not influence the treatment you may be receiving, the nature of the ongoing relationship you may have with the researchers or study staff, nature of your relationship with York University either now, or in the future. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. Should you wish to withdraw after the study, you will have the option to also withdraw your data up until the analysis is complete.

Confidentiality: All information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected by hand written notes. Your data will be safely stored in a locked facility. It will be stored in a locked room, cabinet, in a remote location. Only research staff/research team members will have access to this information. After 2 years time the data will be destroyed through the means of clearing external harddrive devices. Confidentiality will be provided to the fullest extent possible by law.

Please note that confidentiality cannot be guaranteed during the focus group interviews.

Future research purposes:

The data collected in this research project may be used – in an anonymized form - by members of the research team in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our institutional REB. Any secondary use of anonymized data by the research team will be treated with the same degree of confidentiality and anonymity as in the original research project. The information derived from the interviews will be analyzed and then depicted within a major research paper, published academic paper, and a curriculum document. All information that you supply during

the study will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected through handwritten notes. Your data will be safely stored in a password-protected folder/locked facility and only research staff will have access to this information. The data will be stored for a minimum of two years and will be destroyed thereafter. Confidentiality will be provided to the fullest extent possible by law. Finally, PINS will be assigned to participants to ensure full anonymity. The research study has been reviewed and approved by the FES Human Participants Research Committee on behalf of York University.

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact Stephanie Bell either by telephone at 519-831-2005 by e-mail (bells935@gmail.com). This research has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Kaneff Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ (*fill in your name here*), consent to participate in Exploring Local Ecological Knowledge as a Means of Mitigating Human-African Savanna Elephant (*Loxodonta Africana*) Resource Competition in Botswana, Africa

) conducted by *Stephanie Bell* I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature Date

Participant

Signature Date

Principal Investigator

Consent to waive anonymity

I _____ consent to the use of my name in the publications arising from this research.

Signature Date

Participant Name:

ORE – Updated 2020

Covid-19 Specific Consent Information

Research involving Face-to-Face Contact with Human Participants

NOTE: The research assistant (Keitumetse Ngaka) will read this document in full and ask for a participant's signature prior to commencing the interview process. Verbal confirmation will be accepted where a written signature cannot be acquired. Masks and sanitizers will be provided for all participants and must be used by participants and researchers alike. The following forms are not part of the study.

This screening tool is used to ensure the health and safety of all participants and staff. COVID-19 has presented additional risks and challenges to conducting face-to-face research. Please read or listen to the following COVID-specific consent information prior to signing this document.

Section A. York University COVID-19 Protocol

1. You are under no obligation to participate and there will be no negative consequences if you change your mind about participating in the research. If at any time you feel pressured to participate, please contact the senior researcher Dr. Alice Hovorka (eucdean@yorku.ca). Your safety and comfort are of paramount importance.
2. Take appropriate precautions (e.g. face-covering / cloth mask) if taking public transportation and entering public indoor spaces.

3. Physical distancing will be maintained, at all times, and if not possible wear a face covering / cloth mask. Otherwise we will provide you with PPE.
4. We will be collecting personal contact information that we must retain to follow up with you and/or conduct contact tracing if you may have been exposed to COVID-19 in coming to the research site.
5. Contact information will be kept separate from data collected through the research study to allow for de-identification of the research data.
6. You maintain your right to withdraw from the study at any time, including research data (if applicable). If you do withdraw, we will continue to maintain your contact information and will only give it to Occupational Health (Botswana equivalent) if required for contact tracing.
7. We cannot guarantee anonymity as the personal contact information identifies you as a participant. 8. When visits are indoors, the team will abide by capacity limits ensuring everyone's safety.

Personal Contact Information for Contact Tracing:

Please fill in the following information. Should an outbreak occur we will contact you with the information you provide below. Should you experience any symptoms please seek medical attention, contact the research team, and self isolate.

Name: _____

Phone number (work/home): _____

Address: _____

Village (circle one): Khumaga Moreomaoto

Other comments on how to best reach you: _____

Section B.

Covid-19 Screening Questionnaire

The following questions will be asked as a screening tool to ensure that our researchers, participants, and yourself are safe in light of the current COVID-19 pandemic. Please answer the following questions

truthfully. Seek immediate medical attention if you have serious symptoms. Always call before visiting your doctor or health facility. People with mild symptoms who are otherwise healthy should manage their symptoms at home. On average it takes 5–6 days from when someone is infected with the virus for symptoms to show, however it can take up to 14 days. Please answer yes or no to the following questions.

1. Have you been in close or direct contact with a confirmed COVID-19 case in the last 14 days?
2. Have you traveled outside of the country within the last 14 days?
3. Have you experienced any of the following symptoms in the last 14 days?
4. Are any of your social circles at high risk for contracting/negative outcomes with COVID-19 (e.g., elderly, immunocompromised)?

Fever

Dry cough

Tiredness

Aches and pains

Sore throat

Diarrhoea

Conjunctivitis

Headache

Loss of taste or smell

A rash on skin, or discolouration of fingers or toes

Difficulty breathing or shortness of breath

Chest pain or pressure

Loss of speech or movement.

If you answered “yes” to any of the above, we will have to unfortunately but immediately stop the interview process. Please understand this is for the safety of our staff, other participants, and for your own health and safety. Our recommendations are that you seek immediate medical attention.

Waiver:

The risks of participating in the study if answered “no” are low-minimal considering your lack of symptoms, contact, and travel history. Furthermore, please ensure you keep your PPE on at all times

during the interview and please sanitize your hands before we begin. If you answered “no” please provide us with a signature acknowledging that you understand the potential risks of contraction by participating in this face-to-face interview. This signature also acknowledges that York University, EfA, and the research team is not liable should medical attention be needed after this interview.

Thank you for your time.

Name (print name): _____

Signature: _____

Participant gave verbal consent (circle one): YES NO

Date: _____

Section C

Attn* Ethics Review Committee

Please find the following COVID-19 protocols outlined on the government of Botswana website below. <https://www.gov.bw/about-covid-19>

Summary of current COVID-19 Botswana Protocols:

The country has adopted the following as prevention and control strategies since February 2020; i. Public education through the use of mass media and

other forms of education

ii. Screening at all points of entry for early detection, diagnosis and treatment.

iii. Advised self-quarantine for suspected cases as well as rapid specimen collection for testing

iv. Isolation for suspected cases or symptomatic individuals following screening at designated health facilities followed by contact tracing instituted to ensure that the virus does not spread.

v. Social distancing where the public is advised to take measures to reduce contact in malls, shops, work, gyms, places of worship etc.

vi. Community lockdown where training institutions and other places that gather large numbers of people are closed or there is restricted movement. This includes restricting and preventing travel within or outside the country. vii. Current cases: 37, 559, and 32, 550 recovered. It is best to adhere to precautions and remain mindful that there may not be as many tests being conducted.

Researchers will self monitor for 14 days leading up to the commencement of the interviews (March 8-22nd), and will continue throughout the data collection process. Should any researcher feel ill or

experience any of the COVID-19 symptoms listed above, they will self isolate and delegate duties to a team member. Researchers will keep PPE on at all times and sanitize hands before and after each interview. Materials will not be shared among participants. Researchers will maintain a minimum distance of 6 feet from participants at all times. Finally, researchers will conduct a self assessment prior to conducting interviews (everyday) of the data collection process.

Health and Safety Form

Infection Control Procedure

COVID-19 Prevention:

- Researchers and participants will have their temperatures taken daily
- Researchers and participants will be required to wear masks
- Researchers and participants will be required to socially distance
- Researchers and participants will be required to sanitize hands

Safety measures in place:

-Participants will be asked a series of COVID-19 questions prior to commencing the interviews -Researchers will self-monitor for 14 days leading up to the commencement of data collection -If possible, researchers will receive a negative COVID-19 test prior to commencing data collection

-Researchers will be required to change and wash clothing from data collection days prior to collecting data the following day.

Contact Tracing:

-Participants are required to share contact information in the case of a COVID-19 outbreak for contact tracing

-Participants are encouraged to self-isolate and to seek medical attention should they have any symptoms of COVID-19

-Participants will be given EfA's, York's, and PI's, contact information should they get a positive COVID-19 result.

COVID containment plan:

-Should a primary researcher contract COVID-19, duties will be delegated to another researcher and they will self-isolate.

-Should a participant contract COVID-19 the appropriate tracing measures will be conducted and those participants or researchers who were in direct contact will be contacted and encouraged to get a COVID-19 test

The safety of our participants and research team alike is our highest priority. We feel as though this research can be successfully accomplished keeping in mind the health and safety of participants and researchers. Appropriate safety precautions are being taken at the EfA camp (field site) to ensure everyone's health and safety.

Certificate of Participation

This Certificate is Proudly Presented to



*Thank you for your participation in a York University
Environmental Studies & Urban Change
Research Project*



Keitumetse Ngaka

Interviewer



Exploring Local Ecological Knowledge as a Means of Mitigating
Human-African Savanna Elephant (*Loxodonta africana*)
Resource Competition in Botswana, Africa

Research Coordinator Collaboration Statement

In light of current travel restrictions, the proposed research will be collected by a research coordinator appointed by EfA. The coordinator and I will meet virtually weekly and be in constant communication through email, Whatsapp, Zoom, and so forth. The research coordinator and I will collaborate on the data collection and analysis process by working through the interview guide as a team to bring potentially meaningful results to Khumaga and Moreomato communities. We will collaboratively work on a grant chart (timeline) together as a working document to ensure that each step of the research process is a collective effort. Before commencing the research process, I would also like to acknowledge my positionality. I am a third-generation French-Canadian white female, currently residing in the ancestral homelands of the Anishinaabek Peoples. Specifically, I am instituted on the traditional territory of the Mississaugas of the Credit First Nation.

I would also like to acknowledge my biases and state that my research collaborator and myself will work objectively and holistically within the communities. I want to acknowledge the potential biases in the study as well. First, the research collaborator works for EfA who has a vested interest in the community. This being said, participants may feel as though they need to respond in a way that will satisfy EfA's intervention initiatives. To avoid these types of responses, there will be a disclaimer read to

participants at the beginning of the questionnaire which will state that their responses will not affect their relationships with EfA. This will ensure that responses come through in their truest form. Furthermore, open-ended questions will be asked in Setswana with the use of prompts (where appropriate) to ensure that questions are answered in full, we gain the most information as possible, and the most accurate information. I would also like to acknowledge my cultural biases. I will move in the direction of cultural relativism by having an awareness of my cultural assumptions in addition to maintaining unconditional and positive regard for the cultural dynamics within the study area. My research coordinator and I are working collaboratively and openly to help close this gap (Sarniak, 2015).

I plan to approach the proposed research with the best practices possible and actuate an equalized working relationship with my EfA research coordinator. I am aware of the lack of attentiveness to communities that researchers have demonstrated in the past. I am also aware that some of these researchers have entered into a study area, utilized valuable resources, and have left without a lasting impact. Due to my vested interest, I plan to respectfully enter into the study area, use as few resources as possible, and build meaningful and lasting relationships with the research team, EfA, the participants, villages and community members, and the elephants (from a safe distance). I plan to approach the proposed research and relationships through both a humanitarian and conservationist lens. We are exploring the research problem using a holistic approach. For instance, during and after the study, the research team and I will provide support to community members that take into consideration all of their needs (for instance their wellbeing: emotionally, socially, spiritually, and so on). I also know that the proposed research topic could be potentially emotion-evoking, therefore, a careful and respectful approach is necessary. Their wellness will be our priority and we will appropriately ask quality questions (in a well-constructed order) while remaining aware of our biases. Due to the particular positionality that we are working from, biases will be minimized within the research findings. Furthermore, I plan to distribute my findings—after the research process is complete—to those who are interested. For instance, I have an interest in the proposed research, EfA, the communities, and elephants; I am dedicated to the utmost well-being of this community. Finally, I will get permission from village chiefs before commencing the research process and ultimately take direction from EfA as they have built amazing relationships with the community, understand cultural alignments, and village and elephant dynamics.

Interview Guide

Key Informant/Local/In-depth Interviews

1. Ensure that the Research Coordinator and Stephanie are connected via video chat, phone, or have messaged about the interview in advance.
2. Please greet participants in a calm and welcoming fashion and ask if they would like their picture taken. This step is completely optional and photographs will only be used for reference purposes and to send back to participants post data collection.
3. Please read the informed consent forms or have the participant read the forms (if able). Ensure that the purpose of the project is clear and that there will be no judgments nor implications on relationships with EfA or researchers. Finally, reiterate that the participant can stop the interview at any time and their previous answers will be destroyed without question.
4. Please ask the participant the interview questions using written (or typed) notation to record answers only. Please do not use a recording device.
5. Please notify the participant of the date and time for the participant appreciation meal (date pending). Inform them that they will be contacted for result distribution, their photograph, and to keep up-to-date with elephant information through EfA workshops and infographics in the library.
6. Thank the participant for their answers, give them a thank you card (see below), and wish them well.
7. Please report back with an update, questions, comments, suggestions, or concerns to Stephanie after each day of interviewing.
8. Give yourself a high-five because you just made it through a long day of interviews and your hard work is valued and appreciated!

Focus Group Interviews

1. Ensure that you and Stephanie are connected via video chat, phone, or have messaged about the interview in advance.
2. Please greet participants in a calm and welcoming fashion and ask if they would like their picture taken. This step is completely optional and photographs will only be used for reference purposes and to send back to participants post data collection.
3. Please read the informed consent forms or have the participant read the forms (if able). Ensure that the purpose of the project is clear and that there will be no judgments nor implications on relationships with EfA or researchers. Finally, reiterate that the participants can stop the interview at any time and their previous answers will be destroyed without question.

4. Please ask the participants the interview questions using written (or typed) notation to record answers only. Please do not use a recording device.
5. Please notify the participant of the date and time for the participant appreciation meal (date pending). Inform them that they will be contacted for result distribution, their photograph, and to keep up-to-date with elephant information through EfA workshops and infographics in the library.
6. Thank the participant for their answers, give them a thank you card (see below), and wish them well.
7. Please report back with an update, questions, comments, suggestions, or concerns to Stephanie after each day of interviewing.
8. Give yourself a high-five because you just made it through a long day of interviews and your hard work is valued and appreciated!