

Investigating Best Practices of Conservation Education for the African Wildlife Foundation

By

Christine Sarikas

Katlyn May

Tori Kleinbort

Dr. Pamela George, Advisor

May 2014

Masters project submitted in partial fulfillment of the
requirements for the Master of Environmental Management degree in
the Nicholas School of the Environment of
Duke University

2014

Table of Contents

Abstract	1
I. Introduction	2
The History of the African Wildlife Foundation	3
The Current AWF Conservation Schools	4
<i>Environmental, Educational, and Social Context of Manyara Ranch Primary School</i>	7
II. Methods and Materials	8
Positionality	8
Research Challenges	10
Conceptual Framework	10
Research Questions	12
Review of Relevant Literature	13
Interviews.....	13
Data Analysis	15
III. Literature Review	16
Definitions of Conservation and Environmental Education	16
History of Conservation and Environmental Education	18
The role of the Curriculum.....	19
<i>Implementation Tools</i>	19
<i>Service Learning and Fieldwork Experiences</i>	21
The Role of Teachers	23
<i>Teacher Training</i>	23
<i>Teacher Attitudes</i>	25
<i>Teacher Education and Career Paths</i>	25
The Role of the Community.....	27
<i>Buy-in and Support</i>	27
<i>Collaboration</i>	29
Barriers to Successful Conservation Education	30
<i>Shortcomings in Teacher Training</i>	30
<i>Programs Fail to Match Local Context</i>	31
<i>Lack of Resources</i>	31
<i>Absence From National Curriculum</i>	32
State of Education in Africa.....	33
<i>Teaching Methods</i>	33
<i>Curriculum Organization</i>	34
IV. Results and Observations	37
Drivers and Impediments to Successful Conservation Education Curricula	37
<i>Drivers of Successful Curriculum</i>	37
<i>Impediments to Successful Curriculum</i>	44
Characteristics of Exemplary Curricula	55
<i>Tailored to the school</i>	55

<i>Incorporated local beliefs</i>	56
<i>Coordinated with national curriculum</i>	57
<i>Exposed students to nature</i>	57
Lessons Learned from Developing EE in Africa	58
<i>Build Teacher Capacity</i>	58
<i>Collaborate</i>	59
<i>Monitor and Evaluate</i>	61
<i>Develop a Sustainable Program</i>	62
V. Recommendations and Discussion	64
Recommendations	64
<i>Recommendation 1: Improve Teacher Capacity</i>	64
<i>Recommendation 2: Develop Partnerships</i>	66
<i>Recommendation 3: Emphasize Regionally-Specific Curricula</i>	67
<i>Recommendation 4: Emphasize Monitoring and Evaluation</i>	68
<i>Recommendation 5: Take a Long-Term View</i>	68
Conclusion	70
VI. Acknowledgements	70
VII. Literature Cited	71
VIII. Appendices	76
Appendix A	76
<i>Tier 1 Interview Protocol</i>	76
Appendix B	78
<i>Tier 2 Interview Protocol</i>	78
Appendix C	81
<i>Conceptual Framework</i>	81
Appendix D	82
<i>Hierarchical Node Structure</i>	82
Appendix E	84
<i>Examples of Exemplary Environmental Education Materials</i>	84
Appendix F	86
<i>Case Study: Building a School and Developing Curriculum in Southwest Uganda</i>	86
Appendix G	111
<i>Technology Reference Graph</i>	111
Appendix H	112
<i>Word Cloud Drivers</i>	112
Appendix I.....	113
<i>Word Cloud Impediments</i>	113

Abstract

Effective conservation education has the ability to improve educational opportunities and expand environmental support in places where it is implemented. The African Wildlife Foundation (AWF) was founded in 1961 to promote wildlife conservation, land and habitat protection, community empowerment, and economic development across Africa (AWF, 2012). Until recently, AWF had not ventured into the formal education realm and, while they do not currently own or operate schools of their own, the organization is working to develop conservation education curricula to help support its mission. AWF will construct new schools and improve the infrastructure of existing schools to create effective learning environments for conservation topics. This study seeks to provide AWF with expert opinions and related curricular developments to help support their efforts at improving conservation education in Sub-Saharan Africa.

A review of relevant literature focusing on the successful development and implementation of conservation education curricula was conducted and analyzed. Live interviews were conducted to obtain views from conservation education experts around the world. Nineteen interviews were conducted in total. These interviews provide expert opinions on environmental education, particularly conservation, in developing nations. Additionally, these interviews highlight existing environmental and conservation education curricula that contemporary experts identify as exemplary, and they include advice and guidance from experts within the education field. Qualitative analyses of these interviews were conducted using NVivo 10 software.

Recommendations to AWF were developed based on the information reviewed throughout this process. The research shows that an emphasis on teacher capacity, community involvement, local context of curriculum, long-term project goals, and local relevance must be given significant consideration during curriculum development and implementation in order to maximize the probability of success.

I. Introduction

As home to a vast variety of ecosystems as well as some of the world's most charismatic megafauna, Sub-Saharan Africa (SSA) contains much of the earth's biodiversity. However, natural and man-made phenomena have contributed to habitat loss and species extinction, putting some of the world's most diverse areas at risk of disappearing. Education is one of the most effective ways to promote sustainable behavior and increase support for conservation and the environment. Numerous NGOs have worked towards developing environmental education (EE) programs in order to create a new generation of environmental stewards.

In order to increase environmental knowledge, awareness, and support, the African Wildlife Foundation (AWF) has developed a conservation schools program designed to provide African communities with better educational opportunities and resources as well as promoting conservation (AWF, 2012). The researchers worked with the African Wildlife Foundation, as well as international EE experts, in order to provide AWF with the background information and resources necessary to begin to construct and implement EE and conservation curricula in primary schools throughout Africa. This report contains findings from interviews with EE experts, analysis of successful EE and conservation initiatives in Africa and abroad, and recommendations to AWF for an overall strategy of conservation education.

The report begins with an introduction to AWF and their current conservation schools, as well as a literature review on both EE internationally, and the state of education in Africa. Next, it discusses methodology and then presents results and findings. The report ends with recommendations for AWF as they continue to expand and develop their conservation schools program.

The History of the African Wildlife Foundation

The African Wildlife Foundation began as the African Wildlife Leadership Foundation (AWLF) on 20 March 1961 by Russell Train, a wealthy judge and game hunter. Numerous African countries had recently gained independence, and as European park managers began to be replaced by African citizens, Train felt it was important to provide Africans with skills and training for them to become wildlife professionals (Bonner, 1993).

AWLF's first project was to help create the College of African Wildlife Management in Mweka, Tanzania. The College was developed to provide training for African wildlife managers. Other projects followed, including a scholarship program that enabled Africans to study wildlife management at American universities, the creation of the Wildlife Clubs of Kenya, and the expansion of two African parks (AWF, 2012).

In 1983, AWLF officially became the African Wildlife Foundation. The organization continued to develop and promote wildlife projects, including the creation of its "Save the Elephants" campaign, the construction of Ngulia Rhino Sanctuary in Kenya's Tsavo West National Park, and the formation of the International Gorilla Conservation Program that developed a regional strategy to protect mountain gorillas (AWF, 2012).

By the 1990s, AWF had begun to focus less on species-specific conservation and had moved to broader conservation schemes that emphasized regional habitats. In keeping with this methodological shift, in 1998, AWF launched its African Heartlands Program, which identifies "large landscapes of exceptional natural value" where the organization prioritizes conservation. These Heartland Regions often encompass several countries, and they include ecologically significant ecosystems and wildlife (AWF, 2012).

Today the African Wildlife Foundation has spent more than 50 years championing the conservation of Africa's landscapes and wildlife. They are headquartered in Nairobi, Kenya, have offices in Africa, Europe, and North America, and their staff of 150 is more than 80% African. AWF has projects in over 15 African countries, focusing on conservation at the large-landscape level and on cooperation with local, national, and regional partners. AWF's conservation initiatives are centered on three specific areas: land, wildlife, and people. Working in all three of these areas helps to promote lasting and sustainable conservation success in Africa (AWF, 2012).

The Current AWF Conservation Schools

The African Wildlife Foundation has recently built and/or structurally improved two primary schools, both with a focus on conservation. The first is the Lupani Primary School, located in the Sekute community of Zambia. The second is the Manyara Ranch Primary School in northern Tanzania (see map below). The national education systems, the natural environment, and the social context of these areas affect both the schools and the education that students receive (AWF, 2012).



Map of AWF Heartlands and Current Primary Schools

Environmental, Educational, and Social Context of Lupani Primary School

Located within AWF’s Kazungula Heartland near the city of Livingstone, Lupani Primary School is situated near Zambia’s southern border, close to both Zimbabwe and Botswana. The people of the Sekute Chiefdom in this area, where the illiteracy rate is 80%, previously had only a dilapidated mud building as their sole primary school. AWF funded the creation of the new, modern Lupani Primary School, which opened in 2011 (AWF, 2012).

Lupani Primary School is located in a region dominated by woodland savanna and seasonal monsoons. Victoria Falls, the Zambezi River, and large wetlands are located nearby. The rainy season lasts from November to April, and little to no rain falls in June, July, and August. This area contains two significant wildlife corridors and is the site of large animal migrations. Numerous large animal species make their home in this area, including lions, zebras,

giraffes, and buffalo. This area also contains the largest concentration of elephants in Africa. As a result of this abundance of wildlife, the area contains several national parks, including Kazuma Pan National Park, Hwange National Park, and Chobe National Park (Shumba & Carlson, 2011).

In Zambia, primary school lasts for seven years, junior secondary school lasts two years, and senior secondary school is an additional three years (World Bank, 2008, p. 55). Completion of grade nine is considered to provide a student with a relatively sufficient education, however; education is only free through primary school (grade 7), after which time many Zambian children drop out due to financial constraints. Approximately 60% of Zambian children complete primary school, less than 40% complete junior secondary school, and only about 12% graduate from senior secondary school (World Bank, 2008). For those who complete secondary school, there are three main universities and several technical schools in Zambia that they can attend to further their education. Zambia has an adult literacy rate of approximately 80% (UNICEF, 2011).

Zambia is one of Sub-Saharan Africa's most urbanized countries, with 44% of its population living in urban areas. However, the region still has large, sparsely populated rural regions, including where the Lupani Primary School is located. Zambian schools are additionally challenged with students' diverse cultural and linguistic backgrounds. Approximately 72 different ethnic groups exist in Zambia, with nearly 90% of Zambians belonging to nine primary ethnolinguistic groups. Zambia's official language is English, which is also the primary language of instruction in schools. However, various indigenous languages, such as Nyanja, Bemba, Tonga, and Kaonde, are also spoken by large groups of people within the country. In total, 73 languages are spoken in Zambia (UN, 2012).

Environmental, Educational, and Social Context of Manyara Ranch Primary School

The Manyara Ranch Primary School is located in a remote region of northern Tanzania, within AWF's Maasai Steppe Heartland Region. In 2011, AWF built a new Information Technology (IT) building for the school, which previously had no access to computers. It also provided computer training for teachers, made infrastructure improvements to the school, and helped to incorporate a conservation curriculum (AWF, 2012).

The area surrounding Manyara Ranch Primary School is dominated by savannas, but the region also has the Simanjiro Plains, Tarangire National Park, and Lake Manyara National Park. This area boasts a high concentration of wildlife including elephants, leopards, hippo, and flamingos. The dry season lasts between mid-June and mid-October, and March is generally the wettest month. Habitat fragmentation is a growing concern that threatens the abundant diversity that exists within this area (AWF, 2012).

In Tanzania, there are seven grades of primary school, four grades of junior secondary school, and two years of senior secondary school (World Bank, 2008, p. 55). Kiswahili is the language of instruction for public primary schools, while the majority of private primary schools are taught in English. Although the elimination of tuition for primary schools in 2002 led to a massive increase in the number of students enrolled, families are still responsible for paying for uniforms, school supplies, and examination fees. Primary education is now compulsory for all Tanzanian children who have reached the age of seven. The Tanzania Institute of Education is primarily responsible for developing the curricula used in schools. Despite the fact that the agriculture sector employs 80% of the workforce in Tanzania, and accounts for 48% of the country's GDP, Tanzanian schools recently dropped agriculture lessons from secondary schools in an attempt to create a more modern curriculum (World Bank, 2008).

Tanzania is home to over 120 ethnic groups, one of which, the Maasai, is the dominant ethnic group in the area surrounding Manyara Ranch Primary School. Swahili is the country's national language, but both Swahili and English are classified as official languages. The use of English in daily life has declined in Tanzania over the past few decades; however, it is still used in universities and higher courts. Tanzania has a literacy rate of 73% (UNICEF, 2011).

In order to develop environmental and conservation curricula that will be effective and sustainable in African primary schools, AWF will need to recognize and work to mitigate challenges associated with educators, teaching methods, and resources.

II. Methods and Materials

In order to build an understanding of best practices in conservation education, the researchers chose to use a literature review and series of expert interviews to produce recommendations for the African Wildlife Foundation (AWF) and its conservation schools program. The team focused on literature that pertained directly to conservation education, or education in Africa, and used it to inform the selection of experts to interview. The conservation schools project is relatively new, and AWF does not yet have a formal document that recommends and supports certain strategic choices for how to implement its programs throughout Sub-Saharan Africa. This project will be used as a set of formal recommendations, based on academic literature and expert testimonies, for how best to proceed in implementing conservation education programs

Positionality

Positionality is how a researcher identifies religiously, sexually, nationally, academically, ethnically, or socially, among others, and how that identity might impact how research is undertaken. The three researchers on this project have a certain combination of some of these social and cultural identities, which inherently affected how they viewed the project, as well as how they interpreted the data they collected. The relevant aspects are described below.

The research team worked on the project remotely from Duke University in North Carolina while in pursuit of Master's degrees in Environmental Management. Consequently, while each team member came to Duke with a unique background in environmental topics, all three researchers were already knowledgeable on a broad range of ecological and conservation issues and theories. Additionally, each researcher has had some degree of experience with environmental and conservation education prior to working on this project, including creating, teaching, and disseminating education materials and curricula.

All three researchers are Caucasian females in their early to mid-20s, and were born and raised in the United States. All three are native English speakers, and that proved sufficient for completing the research and analysis, as no foreign language competency was required. None of the researchers had visited an African nation before completing this project, but all three have experience working abroad on environmental issues in other developing and non-western countries. While this experience gave the researchers somewhat of a foundation in conservation and education internationally, none of the researchers had any direct experience with conservation education in the social, political, or ecological contexts of a Sub-Saharan African country. Thus, the research team acknowledges that much of this project was conducted through a western, academic lens.

Research Challenges

Limited funding prevented the three researchers from visiting any of AWF's current or potential conservation school sites. This constrained the researchers' contextual knowledge of the areas for which they were making recommendations, and forced them to rely solely on their previous knowledge of conservation education when choosing the literature, and likely impacted their choice of experts with whom to work.

Limited time to complete the research and analysis constrained the amount of data the team could collect and review. The team could use only interviews to collect data, and could not go beyond more than two rounds of "snowball" contact referrals. A snowball referral occurred any time an interviewee suggested that the researchers specifically contact another expert in the field of conservation education, because the interviewee thought the recommended expert would be especially useful to the project. Whereas additional interviews, surveys, or content analysis of exemplary education materials would have likely enhanced the output of this project, the researchers, as full-time students, were logistically constrained. The output that the researchers have produced, however, is an appropriate preliminary product for future analyses of the topic, aiding the AWF's schools program, and subsequent curricula development.

Conceptual Framework

The team relied on a conceptual framework (Appendix C) to divide areas of focus and organize the research process. Before any research or data collection was conducted, the team created a framework to ensure that once the work began, it would have a relatively consistent research focus. Although the current conceptual framework was the result of multiple rounds of editing, the final product is a direct representation of the research goals. There are three larger

themes, supported by two smaller themes, which inform the recommendations made to AWF toward the eventual implementation of its conservation curricula. By establishing clear thematic sections that the researchers could each focus on independently, the framework helped to determine how to structure the literature review. After completing the literature review, the research team used the conceptual framework as a foundation for its interview protocol, and eventually its node structure in the NVivo analysis software.

The three large themes were:

1. Effective Conservation Education Initiatives. Where are there examples of conservation education programming success around the world? This includes the developed and developing world, rural and urban areas, and Africa specifically.
2. Expert Opinions on Effective Conservation Education Initiatives. What are the impediments to, and drivers of a successful conservation education program? This focused specifically on rural, developing, and African programs.
3. Exemplary Conservation Curricula. Where are examples of effective conservation curricula found around the world, particularly in developing, rural, or African countries?

The two smaller themes were:

1. Exemplary field-based and outdoor activities. What are examples of hands-on tools that educators can use to teach conservation topics? Where are they found? When are they effective?
2. Sub-Saharan Africa. Where are characteristics of the locations where AWF works? What are the social, political, and ecological factors that are unique to these countries?

Research Questions

The overall aim of the research project is to explore and determine best practices in conservation education and to present a set of recommendations for AWF to inform their future environmental education projects and programs. This project will serve as a foundation for AWF as it proceeds with its conservation schools initiatives, both by building and rebuilding schools, as well as infusing conservation topics into the curricula. The information in this document will help guide AWF with what to strive for and what to avoid when bringing conservation to the formal education system in Sub-Saharan African schools and communities.

The research questions were based on the conceptual framework and original research goals.

They are:

- 1) What are the conservation education initiatives internationally, which are successful?
- 2) What do experts (educators, school leaders, program directors, and other researchers) believe are the impediments to and drivers for successful conservation education programming?
- 3) What are examples of exemplary conservation curriculum efforts in developing countries?
- 4) What are examples of exemplary outdoor activities?
- 5) What are optimal strategies for AWF to launch its conservation primary schools?

The team did not alter these questions significantly as the research progressed beyond the initial project proposal. Both the literature and interviews with conservation education experts provided answers to all of these questions, though at varying degrees of depth. For example, questions of critical variables and those of involving impediments and drivers often produced

lengthier responses and more data than questions identifying examples of exemplary curricula or outdoor activities.

Review of Relevant Literature

A review of the relevant literature was the first stage of data collection. The team completed the review over the span of three months, from June to August 2013. The aforementioned conceptual framework allowed the team to divide the project into thematic sections for independent research over the summer. One researcher focused on the Sub-Saharan Africa and field-based activities themes. The other two researchers each independently researched the three larger themes, and combined their findings later in the writing process.

The research focused on literature from previous environmental education research, but was not limited geographically. In order to have a solid understanding of conservation education in African countries, the team also needed to know what the state of the field was internationally. The literature included previous environmental and conservation education research, reports from successful and unsuccessful initiatives, and Africa-specific works. When applicable, the team tried to choose papers that were frequently referenced within the field, or that were written by authors who were frequently referenced within the field.

Interviews

The research from the literature review informed the selection of potential interview subjects. The team chose interviewees based on their contribution to the field of conservation education, how often they appeared in the literature, and how relevant their work was to this project. After creating a list of 20-25 interviewees, the researchers contacted them, and secured

the participation of 16 experts in this project. Prior to conducting any interviews, the team developed an interview protocol, created directly from the conceptual framework and research questions, to ensure consistency in the interviews so that the data could be effectively compared for analysis later. The team reviewed its list of contacts and addressed the variability among the experts' level of experience that was directly related to this project. An additional protocol was created, so that interviewees could be divided into "Tier 1" and "Tier 2" contacts, based on how applicable their work and experience was to the current project (See Appendix A).

Tier 2 contacts were considered to have more experience directly relevant to this project, and were asked ten questions, including impediments and drivers to successful programming, and requested examples of exemplary programs and curricula. Tier 1 contacts were considered to have less directly useful experience, perhaps they only worked in conservation in the developed world, and so the protocol was shorter and asked only five questions. These questions were intended to utilize the expert's knowledge of the broader conservation education field, in order to determine how they might complete this phase of the team's research, if they were tasked with the same project. Questions included, "What would you consider the most important questions to ask conservation education experts? If you were tasked with this project, whom would you seek out to talk to on the matter?" Tier 2 interviewees were considered to have more directly relevant expertise for this project, for which the initial protocol would suffice (See Appendix B). Both protocols probed for more specific information within the broader themes of the framework, including asking interviewees about past conservation education work that has been successful and which effectively garnered community support. Additionally, researchers queried these experts on the current state of environmental education in Africa and advice for curricula implementation by an organization like AWF.

The researchers had originally planned to conduct between nine and twelve interviews, accounting for schedule conflicts or other declines from the original list of 20-25 potential interviewees, but ended up securing 16 initial participants. They also utilized a “snowball” method, both to reach more experts, and to ensure that they truly talked to the most important experts. By asking both the Tier 1 and Tier 2 interviewees whom they would identify as a helpful person to contact for this project, the list of interviews snowballed, so that the team completed 19 interviews in total. There were 12 “snowball” contacts, or experts that were referred to as helpful resources during interviews with one of the other 19 interviewees. Of those twelve, five experts were both on the original list of 16 experts, *and* were identified in one of the 19 interviews as an important person to talk to, which prevented a large snowball effect, but ensured that the team truly talked to some of the most important people in the field of conservation education. Interviewees’ consistently referring the team to other interviewees was a good indicator that the proper experts had been contacted. Interview lasted between 30 and 120 minutes, and were recorded and transcribed into Microsoft Word documents.

Data Analysis

Interview transcriptions were uploaded into NVivo 10 for coding and qualitative data analysis. The team created a hierarchical node structure based on the conceptual framework and interview protocols to organize the interview responses according to these themes. Once the final structure was established, each researcher coded the same interview transcript independently to test the reliability of the coding, and the applicability of the node structure. The team compared results and determined that reliability was achieved if all members (3 out of 3, 100%) agreed on coding. Coding this first interview helped to ascertain which *child* and *grandchild* nodes needed to be added, deleted, or moved, within the structure.

The creation of *child* and *grandchild* nodes within the hierarchical structure was an iterative process that all members of the research team contributed to throughout the coding process, beyond just the first reliability test round. These subnodes helped to capture more specific themes within the broader coding categories. An example of this structure is the *parent* node “Impediments” which contains a child node “Sanctions and Bureaucracy,” which contains two grandchild nodes, “Political Barriers,” and “Institutional Barriers.” The largest, or parent nodes were divided among the researchers so that each team member coded each interview, for a different set of nodes. One researcher coded for all “Drivers,” one researcher coded for all “Impediments,” and the last researcher coded for all “Lessons Learned,” and “Exemplary Curricula.” The three databases were merged into a master NVivo file for data analysis, where the team used a combination of word frequency, matrix, and text search queries to determine important patterns and trends within the interviews. Each researcher completed analyses according to the nodes that she coded for, so all researchers analyzed at least some portion of all interviews.

III. Literature Review

Definitions of Conservation and Environmental Education

William B. Stapp, a leading environmental education specialist, provided a succinct definition for Environmental Education in his article entitled *The Concept of Environmental Education*. “Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems and motivated to work toward their solution” (Stapp, 1969, p. 34). He goes on to

detail the “objectives of environmental education” within this text. The main objectives, Stapp asserts, address the interconnectedness of human lives in the context of the natural world. Specifically, Stapp states, “A clear understanding that man is an inseparable part of the system, consisting of man, culture and the biophysical environment, and that man has the ability to alter the interrelationships of this system” (Stapp, 1969, p. 34). An even more universally recognized definition of environmental education can be found embedded within *The Belgrade Charter*, “Environmental education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones” (UNESCO-UNEP, 1976, p. 2).

While environmental education can be understood to convey general knowledge, there is a unique sector of environmental education focused more specifically on conservation with a slightly different definition and an even more diverse set of objectives. An accessible definition of conservation can be seen in an editorial published by *Conservation Biology*. It states, “Among conservation biologists the prevailing view of conservation education appears to rest on a deep-seated belief that the basic function of conservation education should be to disseminate knowledge that scientists generate, essentially to transport information to the public and key groups in the expectation that it will eventually precipitate more appropriate conservation-related behaviors” (Bride, 2006, p. 1337). There is no universal definition of environmental or conservation education, however, the statements by Stapp and Bride are detailed enough to convey the difference between the two types of education.

History of Conservation and Environmental Education

The history of environmental education was born out of a time when caring for the environment had been introduced to the public as somewhat of a fad. As Jack Lewis details in his article entitled *Environmental Education: Past and Present*, “It was not until the 1960s that a more scientific tone entered writing, thinking and debate about the environment. Also heard at this point was a growing chorus of pleas for environmental education, both to train specialists and influence society at large” (Lewis, 1988, p. 30). Lewis and many other scholars attribute the origin of American environmental education to the early 1970’s with the publication of Rachel Carson’s *Silent Spring*, and the passing of the *Environmental Education Act* by congress during the Nixon administration (Lewis, pp 30-32).

Internationally, the environmental education movement began to take shape with the Stockholm conference in 1972, the “International Workshop on Environmental Education, held in Belgrade, Yugoslavia in October of 1975” leading to *The Belgrade Charter* “(describing) the goals, objectives, audiences and guiding principles of EE” (Carter & Simmons, 2010, p. 8). Some scholars believe that the recommendation by the International Conference on Public Education, convened by UNESCO and the International Bureau of Educations (IBE’s) in “1968...entitled ‘The study of Environment in School’” was really where the discipline found its beginnings and growing support. As Columbia University Professor Pizmony-Levy details “Although this document does not use the term ‘environmental education’ specifically, it includes a rationale for teaching environmental issues with subjects such as geography and science” (2011, p. 605). Whichever event you believe to be the impetus for such a strong movement, it is important to realize that this movement has gained and lost momentum in various regions throughout the decades that it has been around (Pizmony-Levy, 2011).

In 1987, intergovernmental report *Our Common Future* “paved the way for the focus of environmental education to incorporate “science, values, civics and ethics” (Iyengar, 2011, p. 429). Following this report, environmental education changed its emphasis from an environmental science focus, to a multi-disciplinary approach to environmental knowledge/literacy. While all of these events certainly propelled environmental education forward, there is very little consensus as to which events truly started or stifled the environmental education movement.

The role of the Curriculum

A big and long-lived debate in environmental education stems from whether environmental education should be independent, or be a topic that is integrated into existing, mandated courses. For instance, integration might include teachers using deforestation to teach mathematics. A study in Greece found, “forty-six percent of participants indicated that a lack of an integrated education plan for EE made implementation difficult” (Iyengar, 2011, p. 431). Each country has its own laws and regulations, however very few have mandated that environmental or conservation education be required as independent courses in school. Therefore, there is little incentive for teachers to devote additional effort to create a conservation education course. This issue is complex and the next section of this paper will detail what scholars of the field suggest are the best scenarios for the creation of a successful environmental conservation education curricula.

Implementation Tools

Many articles detail education programming tools, supplementary objects, or formats that might aid in the delivery of an environmental conservation education program. In one article, film was touted as an excellent option,

Community-based conservation, the dominant approach to conserving wildlife since the 1970s, requires the participation rather than the exclusion of local people. While it cannot be proven that showing films in communities had a long-term impact on behavior, from personal experience I have found that involving communities in film screenings not only increase awareness of the species a project is trying to conserve but also increases support for conservation intervention (Wright, 2010, p. 464).

Other articles by Li discuss storytelling and narratives as useful tools. She reports, “My data, provided mainly by the video recordings, showed that experimental narratives are important tools in ethical, and environmental education” (2006, p. 149). Li goes on to detail that the storytelling in her classroom was inspired by other mediums and tools, “My method of study incorporated scientific concepts such as red tides, acid rain...and ecological balance with English language forms of narrative art, dance, drama, music and poetry” (Li, 2006, p. 150). Gupta recommends the use of “comics, magazines, games, cross-word puzzles, cartoons or stories” to hold the interest of the students while conveying the central theme of the lesson (Gupta, 2011, p. 32).

AWF has discussed a desire to use computer technology as a tool for implementing conservation curricula. Research showed support for this idea, but very few articles address using computers for environmental education in the developing world. The use of new media integrated with methods that are more traditional might prove most valuable. “The importance of using the latest technological developments to leapfrog and achieve a wide reach is recognized. In traditional rites and media (i.e. ceremonies, folklore), use of traditional media is a

very effective way to transfer messages” (Gupta, 2011, p. 32). Gupta does go on to detail that modern media integrated into more traditional education models is very effective.

Service Learning and Fieldwork Experiences

Both service learning and fieldwork are often thought of in connection with environmental education. In many of the papers evaluated for this literature review, outdoor programming in the field and service learning were cited as great venues for student growth and lesson retention. Service learning can be defined by the “underlying principles common to” the field (Kaye, 2011).

Service learning provides a flexible framework for integrating green concepts across interdisciplinary content areas. With service learning students: investigate issues with authentic research methods, prepare for the future with rigorous academics and leadership skills, take action that has meaning and purpose, applying knowledge and skills, reflect throughout the process, demonstrate to tell the story of learning and the service (Kaye, 2011, pp. 10-11).

Not unlike community service, service learning enriches the lives of its participants and invigorates the mind. As noted by Johnson-Pynn (2005), “Academic relevance and research has shown that gaining environmental knowledge through service learning cultivates positive attitudes toward the environment”. While service learning has been an effective teaching tool in western education models for a long time, it is relatively new to the majority of developing nations and thus, needs to be evaluated in these contexts as well. Some scholars have noticed this gap in program evaluation and have begun to look into the success of service learning globally. For example, “students in Wildlife Clubs of Kenya (the first student conservation

movement on the African continent) reported feeling empowered by participation in capacity building that was not directed by colonialists. Indeed many of today's leading conservationists in Kenya were once Wildlife Club members or sponsoring teachers" (Johnson-Pynn, 2005, p. 27).

Outdoor environmental education, better described as environmental education, constitutes lessons built with a nearby ecosystem in mind that includes field site visits for students. Many articles emphasize that learning about something in the classroom and physically going outside to do it are two very different experiences. "The colonization of Australia has been implicated in extensive, ongoing ecological disruption. Hannan's expression, 'I did not know any bush' is a reminder that school-based knowledge of the bush is not the equivalent to personal experience" (Brookes, 2002, p. 407). Many articles speak to the research done on outdoor education and its benefits to the participant both emotionally and intellectually, however, these studies are primarily done in westernized civilizations (Dillon et al., 2006; Bogner et al., 1998; Leeming et al., 1993; Dettmann-Easler et al., 1999).

While the tools used and characteristics of the curriculum certainly can be drivers or impediments to success, there was also an emphasis throughout this research on the importance of 'having an impact', not only on the students but on the community as a whole. "The targeting of multiple audiences ranging from school children to university students to farmers, mayors and government officials has proved a winning strategy for the MFG (Madagascar Fauna Group). Additionally, if one had to single out a particular aspect of MFG's approach that makes it so successful it would have to be that of longevity" (Freeman, 2009, p. 122). Essentially, Freeman claims that the impact an organization has on its students is in continuity of a program combined with informational spread through a variety of audiences.

The Role of Teachers

Teachers themselves are a critical component of any conservation education program, because they are the direct link between curricula and the student audience. The success of a conservation education initiative depends largely on who is teaching it, and how they do so. The largest factors contributing to this are a teacher's training in conservation topics and education itself, a teacher's disposition towards education and conservation themes, and the educator's background.

Teacher Training

Conservation education remains nebulous, and its goals and requirements are not concretely established internationally, the way mathematics or science education might be. Very few countries have national policies that coherently plan for formal environmental or conservation education throughout a child's schooling (Gupta et al., 2011). If it is implemented as a new course, or is integrated into existing subjects, conservation education is an unfamiliar discipline to most teachers. Training future conservation educators helps prepare teachers to deliver new topics in new ways, giving them a foundation in the subject matter itself, and tools for communicating it effectively.

Gupta et al. note that traditional teaching methods, like lectures, are often not effective means of conveying the multidisciplinary nature of conservation topics, but without proper training, teachers are left to use the techniques with which they are most familiar (2011). Parts of Malaysia are utilizing mobile education units that employ slideshows and wildlife films to disseminate conservation education, but they require that the instructors be knowledgeable not only on the subject matter, but also on how to deliver it through these technological outlets

(Jacobson, 1987). In an Andean region of Ecuador, teachers from grades 4-6 were specifically trained in *how* to infuse wildlife conservation ideas into their existing curricula, which researchers believed was directly related to the program's success (Espinosa & Jacobson, 2012). But in the United States, researchers concluded that the majority of secondary environmental education teachers felt that they did not have the proper access to instructional materials or training that would make them sufficiently comfortable to teach environmental issues to their students (Kim & Fortner, 2006, p. 19). Consequently, the average teacher covers fewer environmental topics than they would like there to be in the classroom; because they feel their ability to teach those issues was lower than necessary for effective educating (Kim & Fortner, 2006).

Because a large component of conservation education is often hands-on or outdoor learning, training helps prepare teachers for new styles of education that traditional curricula might not have required. Training for teachers generally emphasizes a focus on the transfer of knowledge from teacher to student. Teachers are seen as the providers of knowledge, not as facilitators of learning and discussion. Additional instruction methodologies are often not discussed at length during teacher training, if they are mentioned at all (World Bank, 2008). Without direct observation and interaction with the environment that students are learning about, they will likely maintain lower rates of interest and retention for the conservation topics (Gupta et al., 2011). But in order to take students out into the environment, it "requires teachers' commitment and preparation," and forces teachers to use "distinct skills and knowledge" that they might not possess without specific training for outdoor or conservation education (Simmons, 1998, p. 23). Additionally, Simmons argues, taking students outside of the classroom poses added safety risks that a teacher must be capable to handle. Conscientious teacher training

helps eliminate any innate anxieties or hesitations that educators might have towards new teaching methods, learning environs, or unfamiliar topics, thereby helping to eliminate a potential barrier to program success.

Teacher Attitudes

Beyond the initial training and educating of teachers, the success of a conservation education program also hinges on the natural disposition and attitudes of an instructor. Studies have shown that the same information can be presented using the same tools to the same audience, but *how* different educators actually teach it, and the energy each brings to the subject can have a large effect on the learners' success. According to Kim and Fortner, "If a teacher has a positive attitude toward teaching environmental issues...then he or she will teach the issue more often or more properly" (2006, p. 16). Similarly, a teacher's attitude toward using outdoor and hands-on teaching techniques will vary by individual, and "there is evidence that teachers do not see natural areas uniformly when they are determining if a particular setting is appropriate for an educational outing" (Simmons, 1998, p. 24). Acknowledging and addressing the various concerns that each teacher may naturally have towards a given outdoor setting helps to mitigate these as potential obstacles to effective conservation and outdoor education.

Teacher Education and Career Paths

In some places in the world, the most skilled and motivated students are generally not attracted to becoming primary or secondary school teachers. Teachers, considered to be "semi-professionals", are paid significantly less than "professionals", such as engineers, doctors, or lawyers. In most of SSA, the status of teachers in society has declined significantly, and for many university and secondary school graduates, teaching has become an "employment of last

resort.” As a result of these factors, teachers and those providing them training often lack a long-term commitment or a strong connection to their teaching careers (Bennell, 2004, p. 3).

Teacher management, performance appraisal, and inspections are typically sporadic or non-existent. Incentives for quality teaching are rare, and salaries and promotions are generally unrelated to performance. Teachers often do not face discipline for behavior such as ineffective teaching or chronic absenteeism. The lack of supervision and support they receive further demotivates teachers and gives little encouragement for them to improve their teaching methods. However, effective management training programs designed for principals and head teachers have led to significant improvements in both teacher motivation and performance, as seen in two recent studies in Kenya and Botswana (Bennell, 2004, p. 18).

The degree of training that teachers receive varies widely from school to school, even amongst those within the same country and/or region. Rural schools and primary schools are seen as less desirable to teach in, and consequently are often staffed by less-qualified teachers with significantly less training and enthusiasm than their counterparts in urban schools. A study conducted in 2004 found that, in Namibia, only 40% of teachers in the northern, more rural part of the country were qualified to teach according to national guidelines, compared to 92% in the country’s capital of Windhoek. Similarly, in urban areas within Uganda, two-thirds of primary school teachers were sufficiently qualified, but only half of the teachers were qualified in Ugandan rural schools. In Sierra Leone’s capital of Freetown, 96% of teachers were qualified, but less than 25% were qualified in rural, more remote areas to the north (Bennell, 2004, p. 24). Many rural schools, particularly primary schools, are also staffed by a single teacher who must balance the educational needs of students of varying ages and academic abilities. This “multi-

grade” teaching, while common, is something that few teachers in SSA are adequately prepared for (Michaelowa, 2002).

The Role of the Community

Beyond the teachers who directly deliver curricula to students, conservation education success depends largely on other the members of the community fostering a supportive atmosphere for conservation. The “community” that is related to an education program exists at multiple scales. There is the immediate community, including parents and family members of students in a conservation program. There is the larger community that might include neighbors, school officials, and other educators. And there is a broader “community” linked to conservation education, including park and protected area managers, NGOs and government institutions. Collaborating with these various community members helps to enable successful implementation and long-term viability of a conservation program (Fiallo & Jacobson, 1995). All over the world, in places like Ecuador, Nepal, South Africa, and Tanzania, conservation education has been proven to positively influence people and communities’ attitudes towards conservation, but ensuring that initial community support is critical for doing so (Fiallo & Jacobson, 1995).

Buy-in and Support

The effects and implications of conservation education extend far beyond the walls of the classroom. In order for conservation to be well received not just as an education topic, but as a stimulus for behavior change, it is essential that there is investment and support from the larger community. Formal conservation education programs are usually focused on youth, but ensuring support from the broader community could extend some level of education or knowledge sharing to them as well. Things such as incorporating communities in the program planning process, or

discussing program objectives are good ways to make conservation education initiatives more inclusive. In places like equatorial Africa, “conservationists should not assume that {conservation} information is already available to people in these areas,” and garnering community-wide support may be easiest by simply explaining the goals and values of a conservation education program to the community (Kuhar et al., 2012, p. 215). For instance, in Kenya, rapid urbanization is leaving larger portions of the country’s population unfamiliar with everyday conservation and wildlife issues that education programs seek to address (Mbugua, 2012). In other areas, human-wildlife conflicts pose a significant barrier to community acceptance of conservation education and its implicit behavior changes (Mbugua, 2012). In parts of Nepal, for example, communities face depredation from wildlife and restricted use of their traditional forests, which often creates initial opposition to conservation education that seems unfair or impractical for the affected community (Mehta & Heinen, 2001). Clearly, every community will have varying perceptions of conservation education based on their local context, and these perceptions will even vary within each individual community, but addressing community concerns in order to garner their support remains vital (King & Peralvo, 2010).

As mentioned previously, when including the larger community, either by disseminating information or engaging in a discourse on conservation, one of the best ways is to use a combination of traditional techniques and mass media strategies, in order to reach all community members effectively (Gupta et al., 2011). Gupta offers, “The tales or legends told by elders can serve as a means of transferring feelings of respect and appreciation for animals, forests and other wildlife,” thereby blending modern conservation ideas with traditional values (2011, p. 32). Radio has been proven to be a successful technique for communicating with people in rural African communities, including for relating conservation education topics (Mbugua, 2012).

Additionally, certain education techniques can engage entire communities, beyond just the students in a classroom, such as citizen science programs, mapping activities, or service learning projects (Jacobson et al., 2012). Studies like those in the Ecuadorian Andes show that community members, not just the youth, show more favorable attitudes towards wildlife and conservation after they have been exposed to ideas through avenues of conservation education (Espinosa & Jacobson, 2012).

In their 2010 work, King and Peralvo determined that due to the way that socioeconomics and the culture of an area are so directly related to a conservation initiative's success, it is imperative that a community's needs be addressed in conjunction with conservation education goals (King & Peralvo, 2010). Similarly, Mbugua (2012) reminds us that "communities need to meet their day-to-day requirements before they can conserve," implying that community support for a conservation education program might be conditional upon securing other community programs first. This is important when considering which community members are likely to be most supportive of a conservation education proposal, and often means that people with higher incomes are more receptive at the outset to conservation programs than other members of their community (Espinosa & Jacobson, 2012).

Collaboration

To ensure that all levels of community are supportive of a conservation program, and that resources are being used efficiently, it is helpful to go beyond conversations and actually develop collaborations between educators and community members. Mehta and Heinen (2001) demonstrated that in socially and ecologically similar areas of Nepal, the communities where conservationists collaborated with the surrounding people, rather than simply imposing environmental restrictions on them, showed greater receptivity (85% of 800 respondents) to

conservation education and behavior changes. And as early as the 1960s, Rhodesia used conservation education programs to attract support from outside donors, supplying the country with financial and educational resources, and providing the donors with an enhanced public image (Pile, 1962). In Ecuador's Machalilla National Park, community members who had stronger relationships with park representatives were consistently more receptive to conservation than those with whom park employees did not collaborate (Fiallo & Jacobson, 1995). There is evidence from around the world to support strengthening and utilizing existing collaborations among "community" members when establishing a conservation education initiative, rather than attempting to do so independently.

Barriers to Successful Conservation Education

There are a variety of factors that can inhibit the success of a conservation education initiative, including both physical and institutional issues. It is important to recognize these issues and the impacts they can have on EE in order to mitigate their effects and maximize the probability of success for the program.

Shortcomings in Teacher Training

When discussing the critical importance of teacher training for ensuring effective conservation education, scholars also cite the lack of teacher training as one of the largest impediments to success. Many teachers are only slightly better educated than their students and this, coupled with their general lack of training, often makes them reluctant to implement new subjects and teaching methods in which they do not feel competent (World Bank, 2008).

Training also rarely focuses on continuous professional development and is instead usually a one-time experience for many teachers, completed early in their teaching career and not built

upon (World Bank, 2008). Because “most teachers receive no training in the content or pedagogy of conservation education,” underprepared teachers and institutions continue to fight an uphill battle to implement conservation education effectively (Jacobson & McDuff, 1998 p. 254). By failing to equip teachers with the training and tools necessary to be impactful conservation educators, teachers are poised to achieve less than exemplary outcomes in the classroom.

Programs Fail to Match Local Context

One of the reasons that community support and collaboration are so vital is because they help ensure that conservation education programs work well with the local context. Because outside NGOs or governments are often involved in conservation programs, it is critical that the local cultural, ecological, political, or economic conditions be taken into account before community outsiders impose any conservation scheme. Regarding foreign conservation organizations, “major problems can arise when approaches used to achieve their conservation objectives interfere with the social and political norms of the host country” (Kevan de Haan, 2008, p. 172). This is a significant task, however; and careful study must be given to the community before conservation education plans implemented, finalized, or even created. A repeated finding from King and Peralvo’s research is that “communities are often presented in homogenous terms, which obscures the multiple impacts of conservation planning upon local populations” (King & Peralvo, 2010, p. 266). Thus, it is critical that conservation education programs complement the local reality, and give necessary attention to the complexities of the affected community.

Lack of Resources

One of the underlying barriers to a successful conservation education program is a lack of resources. Although usually financial, resources might include teachers, materials, infrastructure, or other necessities. It is not uncommon for schools in SSA to have some desks or benches, a blackboard, and nothing else. When textbooks are available, many times one textbook is shared amongst multiple students, which can severely hinder learning (Majgaard & Mingat, 2012). Integrating conservation education into the formal education system often means addressing “lack of time in an already crowded curriculum and lack of funding and materials” (Jacobson & McDuff, 1998, p. 254).

Absence From National Curriculum

While environmental education has been recognized as valuable in some nations, many still have not mandated that it be incorporated into their curriculum. This leads to implementation difficulties. Motivating teachers and school systems to implement additional curriculum that is not mandated by the government can be difficult. For instance, in India, “Although the National Policy on Education of 1986 acknowledged the importance of EE, it was not a mandatory subject in the formal schooling system until December 2003, when the Supreme Court of India ordered that ‘green curriculum’ be taught in all 28 states of India,” thereby spurring EE implementation in classrooms (Iyengar, 2011, p. 434). With such limited government direction, it is difficult for schools to know how best to implement this type of program, and whether or how to train educators to teach the new body of information. This lack of legislation and national EE standards sparked a curiosity in this research project. During the interview phase of this project the idea of impediments and adjusting a curriculum to the local education standards is brought up and further evaluated.

Because there are such a vast number of impediments represented throughout these texts, it is important to evaluate which impediments are experienced most often in the field. The Results and Observations section will more thoroughly detail how frequently respondents stated which barriers, listed above or otherwise, they believe hinder the successful creation and implementation of an environmental conservation education program.

State of Education in Africa

The education system varies widely throughout the continent, but currently the majority of Sub-Saharan Africa follows a schooling pattern of six years of primary education, three years of junior secondary education and then three years of senior secondary education, ending at Grade 12. Some countries, particularly the Francophone ones, include a Grade 13 in order to accommodate the Baccalaureate (World Bank, 2008, p. 16). Current education practices and perceptions in Sub-Saharan Africa have a wide-reaching impact on the quality of education students receive and on the chances of implementation and success of any new education projects.

Teaching Methods

In keeping with the training that educators have received, classroom strategies in SSA are generally teacher dominated. Often described as “chalk and talk” lessons, teachers will lecture to students who copy down notes and engage in rote memorization. The lessons often require minimal or no materials, taking into consideration the lack of resources at many schools. Some recent curricula in Africa have attempted to address this issue and increase active learning or “learner-centered education” (LCE), as it is often known in the region. A classroom that

promotes LCE would be expected to place more emphasis on student participation, activity-based education, integrated learning, and critical thinking skills (World Bank, 2008).

While some reforms have been made in SSA schools in an attempt to improve student participation and interaction, widespread changes and acceptance have been difficult to achieve. Several reasons for this exist, including cultural differences as to what “good” teaching entails, inadequate teacher training in more participatory-teaching methods, large classroom sizes, language barriers between students and teacher, a lack of physical resources, and an overloaded curriculum. A significant issue in many SSA classrooms is that, in most African countries, teachers are viewed as authority figures and as the bearers of knowledge. This makes it difficult for both students and teachers to feel comfortable with students voicing their own opinions in the classroom and can act as a hindrance to promoting more participatory teaching methods (World Bank, 2008).

Curriculum Organization

Education in SSA is generally organized into required core subjects and additional optional subjects. The two major subject areas in which education focuses are language and mathematics. Other subjects, such as history and the sciences, are also often taught, but they are typically not the primary focus of the curriculum because they are not as emphasized on standard examinations (Murtin, 2013).

Students in Sub-Saharan Africa who complete their primary education are expected to competently read and write in the language of instruction, have basic numeracy skills, and understand basic problem solving questions (Majgaard & Mingat, 2012). Exit skills that graduates of secondary school are expected to have obtained include more advanced problem solving abilities, a higher degree of writing skills and literary comprehension, and more

advanced mathematics, such as geometry. Completion of secondary education is often seen as a way to obtain better paying and more prestigious white-collar jobs, or as entry to a university. However, due to weakened economies in much of SSA, there are not enough university spots or white-collar positions available for the increasing number of secondary school graduates. As a result, completing one's secondary education is increasingly seen as unhelpful to securing better employment (World Bank, 2008).

Related to the earlier discussion on the mismatch of curricula efforts and local needs, curricula are often not tailored for different regions within a country. Instead, standardized lesson plans are developed and used throughout the entire country without taking the local environment, knowledge, beliefs, or culture into consideration. This can lead to difficulties when implementing the curriculum in certain regions where it does not adapt well to local classrooms. Additionally, the curricula is often written and taught in a language different than the native language of many of the students. This can be problematic as there have been multiple studies that show a strong, positive correlation between language proficiency and comprehension of the material being taught, particularly for mathematics and the sciences. In fact, additional studies have shown that the language used in the classroom has a greater impact on the amount of knowledge that students gain than either the medium of instruction used or the ways in which students are assessed. However, promoting an indigenous language over the language in which standardized tests are conducted can lead to the promotion of ethnic rivalry and conflict when one indigenous language is chosen over others (World Bank, 2008, p. 59).

Many schools in SSA also struggle to use classroom time efficiently. Large class sizes, teacher absenteeism, administrative duties, and a lack of educational materials all contribute to taking time away from teaching and thus reducing learning opportunities. Studies have also

found that time spent actively learning is further reduced when curriculum reforms are being implemented (World Bank, 2008).

Currently, few curricula in SSA emphasize subject integration. While the academic benefits of subject integration are noted, it is logistically difficult to achieve in SSA for several reasons. The first is that revising curricula to include more integration would increase the workload of teachers who are often already burdened with overcrowded classrooms and a lack of resources. Second, integrated learning is a teaching method that very few teachers have experience with, and in places in SSA where its implementation has been attempted; few teachers were able to teach integrated subjects effectively. Instead, many struggle to teach or simply abandon integrated curricula in favor of the traditional curricula with which they feel more comfortable. A third barrier to subject integration is that educational assessment exams in Africa generally do not emphasize subject integration. Because the results of national assessments are given considerable weight, teachers tend to format their lessons to maximize success on the exams. Exams that do not include a large degree of subject integration will not compel teachers to increase their use of subject integration in the classroom (Majgaard & Mingat, 2012).

This literature review serves a dual purpose. Primarily this literature review was conducted to discern what contemporary and historic scholars believe drives and impedes successful conservation and environmental education curricula, as well as the state of education methodologies in SSA. This literature review also attempts to provide background and context for the reader. The data collection focused on many of the ideas discovered and presented within this section. Environmental education experts were interviewed for this project to see if they would address similar drivers and barriers to successful curriculum implementation and

development that were found in the review of existing literatures. Furthermore, in discovering that there is not a tremendous amount of literature addressing this type of curricula in developing nations, questions were tailored to emphasize education and curriculum development within the context of the developing world. The following section will detail the results and observation obtained following expert interviews and analyses. Many of the results reinforce the information presented in the literature review.

IV. Results and Observations

Drivers and Impediments to Successful Conservation Education Curricula

As the researchers conducted interviews, emphasis was placed on questions addressing the drivers and impediments to a successful conservation or environmental education curriculum. These questions centered on how to develop successfully and implement a new curriculum in a developing nation.

Drivers of Successful Curriculum

When asked about what drives a successful curriculum, each of the nineteen environmental and/or conservation education experts were able to identify at least three characteristics that they believed to aid in the success of a curriculum. These drivers ranged from characteristics of the curriculum itself to the local community supporting the effort, from training of the teachers to the funding available for the program and even where the program is delivered. After evaluating the interview transcripts using NVivo 10 software, it was clear that there were five essential drivers that many experts identified as invaluable these were:

- matching the national education standards
- integration of the curriculum into other subjects
- teacher training
- local context
- community support/involvement

It is important to note that these five drivers were seen and supported by the literature read for this research.

The top 25 words mentioned when addressing drivers to successful curriculum development and implementation can be found in Appendix I (Word Cloud). The most frequently cited terms were “teachers” (54 references), “education” (44 references), “think” (40 references), and “curriculum” (38 references), “training” (23 references), “community” (19 references), “computers” (16 references). The frequency of these particular words demonstrates the emphasis placed on technology, training and community throughout this section of our interviews.

Matching National Education Standards

Five of the nineteen people interviewed for this project discussed national education standards when thinking of drivers for successful implementation of curricula around the world. Many nations set education standards to help outline what teachers should be teaching and accomplishing at each grade level in the classroom. When creating a curriculum, whether it will ultimately be implemented on a local or national scale, these experts expressed that it was imperative that the developers of such curriculum attempt to align their curriculum to these standards. Alignment to the standards helps keep the developers aware of what the important

messages are for each age level. Some experts made this argument by simply stating that a driver of successful curriculum would “take into account the national curriculum or the curriculum that the teachers are supposed to be teaching in the schools” (R. Bergl, Personal Communication, November 11, 2013). Others focused on how aligning with national curriculum would strengthen educator support for the curriculum and turn teachers into a support network for this type of education. Brian Day states that “Integrating conservation education into that national curriculum will be the fastest way to get it adopted because the teachers are under pressure to teach to the national curriculum” (B. Day, Personal Communication, October 25, 2013).

Integrating Curriculum Into Other Subjects

Eight of the experts interviewed for this project independently spoke to the importance of integrating environmental or conservation topics into existing courses within a school. They discussed that integrating these themes into more mainstream subject areas would give environmental and conservation education traction within a school environment. “If you have a whole school of teachers that are dedicated to making it work, that can be one of the best ways to do it, because kids get the sense that this is an important topic and there’s lots of way to interact with wildlife concepts” (M. Monroe, Personal Communication, October 18, 2013). Others emphasized that without integration, “they will not get it successfully into the national curricula. If they want it to be sustainable it (the curriculum) must be integrated to the national curricula” (D. Cox, Personal Communication, October 9, 2013).

Integration was presented as an aid to program longevity by creating an effective way to educate students about the environment. “Selling them on efficiency and effectiveness...we have to sell them on, if you sit there and you have a mandate to teach a reasoning skill or evidence and making an argument based on evidence skill, that is classic in English language arts and it is also

classic in science and in social science, so those are standards that show up across those disciplines. Instead of the teacher saying open your books we are doing English language arts now and today we are going to read this paragraph and I am going to ask you to do these questions that make you think about making reasoned arguments from evidence, close you books, the bell has rung, were going to science now. Guess what today we are going to talk about making reasoned arguments from evidence... we can use environmental education and environmental literacy as the common denominator” (B. Simmons, Personal Communication, November 11, 2013).

Teacher Training

The importance and value of a good teacher has been emphasized throughout the course of this project. Without strong teachers, it would be significantly more difficult for a curriculum to reach its intended audience. Nine experts mentioned the inherent value of good teachers and the fact that teachers can only succeed if they are given required tools necessary. Teacher training, which focuses on educating and preparing teachers for the classroom, was referenced as one of these necessary tools. Nine of the experts interviewed for this project listed teacher training as a key component to successful curriculum implementation and an essential driver. “I think one of the least used tools of environmental education is the teachers and giving them training. If you’re able to reach teachers and give them the knowledge you’re trying to impart, if you get them to understand the importance of conservation and give them tools to teach conservation, you have a greater ratio or multiplier, you reach a much greater number of people” (R. Bergl, Personal Communication, November 11, 2013).

One expert spoke to the importance of teacher training and its potential to garner teacher support or buy-in for the project. Jacobson stated, “Really think about teacher training, if they

can get in at that pre-service teacher training. If you're gonna start developing curricula and new materials they need to really get teachers involved in that and get them involved in actually developing the materials that will be used" (S. Jacobson, Personal Communication, October 30, 2013).

Community Involvement/Support

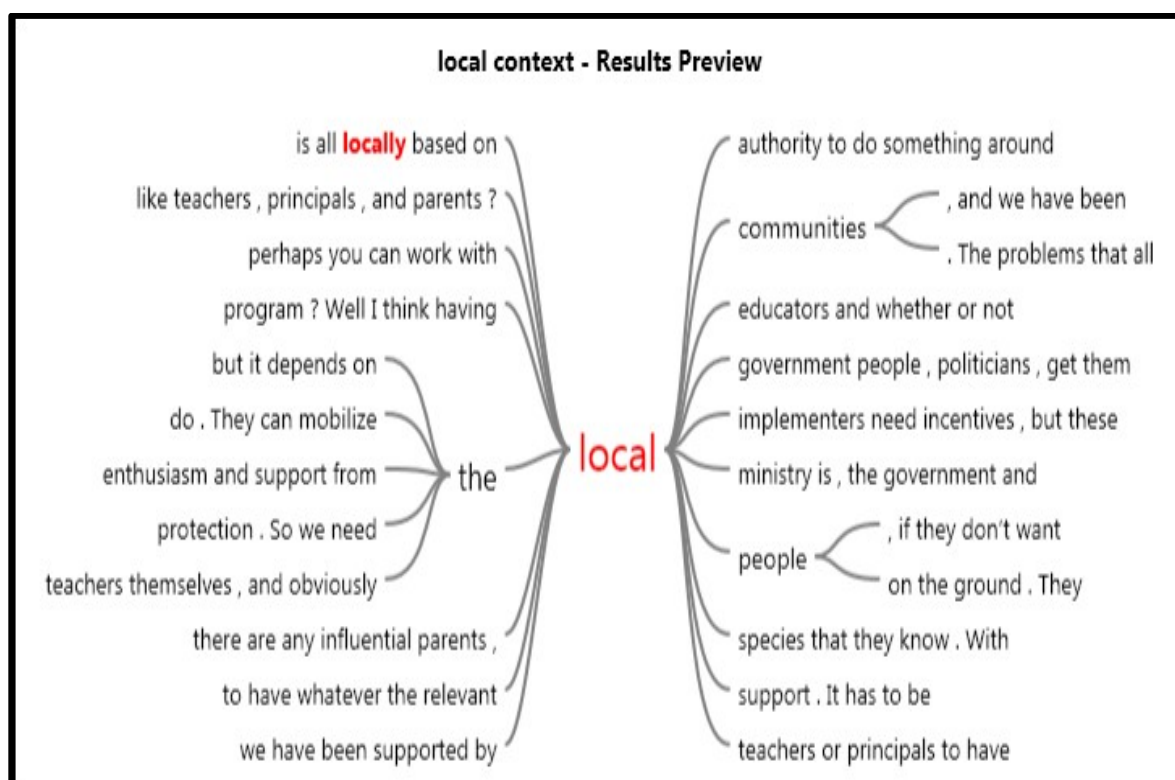
Many of the environmental and conservation experts interviewed have ample experience implementing curricula in developing nations, and eight of them stated that the local community is a major driver for conservation education initiatives. One expert defined community meant and explained why its involvement is important, "the community being a couple different levels. The teachers themselves, and obviously the local people, if they don't want anything to do with it, you're not gonna get anywhere, it's just not gonna have any traction" (C. Kuhar, Personal Communication, October 25, 2013). Communities have the ability to push school systems to support a curriculum that includes environmental topics. "I think having local support. It has to be something that engages the people. Because if it doesn't then they just think you're some silly people, trying to tell them how to do things. So it has to make sense to them and be relevant to your audience" (T. Bettinger, Personal Communication, October 8, 2013).

Of the eight people who referenced community buy-in as a driver to a successful curriculum, one discussed the community as an audience also in need of environmental education. "One thing that is very important in the areas we are working we have to ensure that we work with communities to minimize human and wildlife conflicts. Because the challenges we have especially in schools that are closer to national parks that house some of the big animals like elephants, we have issues when students cannot go to school because the elephants are blocking the way.... We have to work as a team and we have to ensure that we support the

community. And then we can buy-in. I can assure you that our relationships with most of the communities have been very good because even a normal conservation efforts we have been supported by the local communities” (P. Mbugua, Personal Communication, October 30, 2013).

Local context

The word “local” was mentioned numerous times when discussing drivers of a successful curriculum. This word seemed so significant that a word tree was used to visually represent the variety of ways something “local” was discussed when speaking about drivers.



Experts approved of curriculum that included locally relevant lessons, and had been developed by local people. One interviewee from South Africa emphasized the sense of intrigue students experience when they make connections from a classroom lesson to their own world. He stated, “So for example we can talk about climate change all over the world, however, for kids,

there needs to be something more that they can relate to. So, if you can talk about air pollution in their own community and how they can tackle that issue in their own community that will be better. It will be better for learning” (O. Pizmony-Levy, Personal Communication, October 13, 2013).

Many of the other experts echoed this sentiment by discussing how the curriculum must be “culturally appropriate, context specific” (R. Bergl, November 11, 2013) and the importance of the curriculum incorporating “local species that they know with local examples, local context (and) local stories” (D. Sutherland, Personal Communication, October 11, 2013).

Technology Use

While no one directly mentioned technology as a driver for successful curriculum, development and implementation, many interviewees spoke to its importance when asked if they believe that environmental education should include modern media and technological opportunities. Eight experts said they believed that modern media and technology could enhance environmental and conservation curricula. For a diagram of how many times each person discussed technology, see Appendix H. The value of technology in the classroom was highlighted best in an interview with Elizabeth Ross on October 16th, 2013, “the kids like computers there is no doubt about it, that it’s fun. I think computers that they’re important because everyone needs to use them now. You need them to type, I mean that’s what they should be doing with computers, teaching these kids how to type, forget anything else.”

Often when doing a project of this nature, there are certain things one expects to hear, and it is interesting when any of those expected terms or arguments are absent from an interview. During the analysis of the interview transcripts regarding drivers to successful curriculum, there

was a lack of emphasis on the importance of learning about conservation or the environment in an outdoor setting. This was surprising, as experts discussed having an outdoor/outside component to the curriculum as an important part of an “exemplary curriculum” during interviews, yet, no one addressed it specifically as a driver of the curriculum.

Impediments to Successful Curriculum

When coding for impediments and barriers to success, the themes ranged from big picture, institutional concepts, to very specific teacher and curriculum attributes. A word frequency query of the top 25 words within the Impediments node showed that most of the interviewed experts believe that impediments to conservation education emerge most often from within schools and at the local level (See Appendix I). The most frequently cited terms were “teachers” (90 references), “school” (81 references), “educators” (75 references), and “curriculum” (39 references). The following themes were identified within the Impediments category: Historical Practices, Sanctions and Bureaucracy, Cultural Mismatch, Lack of Resources, Teacher Attributes, and Curriculum Attributes. The implications of the word frequency query were seen throughout the analyses of these Impediment themes.

Historical Practices

This theme captured any time that interviewees referenced longstanding practices or logistical inertia as potential impediments to a conservation education program, in essence, “the way things have always been.” Seven out of the nineteen experts discussed this issue. First, to begin to implement a conservation curriculum or program, there are various people, organizations, and government bodies that must be consulted and dealt with. An expert explained the difficulty of actually getting a conservation initiative into the formal education

system, because of how established the current way of doing things is. “If it something you are trying to do through the formal education system there may be all kinds of ego and jealousy and the stuff, just amazing kind of old stuck in the mud teaching strategies that are very resistant to change” (D. Sutherland, Personal Communication, October 11, 2013).

Once an initiative makes it past these barriers and is enacted in a school system, there are still issues of historical and traditional practices with the individual teachers that can pose threats to a program’s success. Many African educators have been taught a certain way to deliver material to students, and conservation education often requires that they move outside the boundaries of how they were taught, to more multidisciplinary and innovative techniques. “{Teachers} are basically taught what to teach and told not to diverge from that” (E. Ross, Personal Communication, October 16, 2013). This method, although not true for all Sub-Saharan African schools, is often a direct product of British and other European rote styles of learning. Another interviewee expressed a similar sentiment, asserting that by asking teachers to use new, innovative strategies to convey (often new and foreign) topics of conservation, then “we are talking about changing some pretty big paradigms within the teacher force” (B. Simmons, Personal Communication, November 11, 2013).

Sanctions and Bureaucracy

The Sanctions and Bureaucracy node captured the impediments to successful conservation education that come from outside sources, often institutional or political, and beyond the control of the implementing organization, school, or teachers. Within this larger node, the two child nodes were Institutional Barriers, and Political Barriers. The former identified broad, often unavoidable phenomena that impact education programs, and most other

aspects of everyday life in an African country- “just the way things are.” The latter represents ways in which the political system impedes conservation education programming in Sub-Saharan African nations. Ten experts identified at least one of these two child nodes as potential impediments during their interviews.

Five experts spoke about Institutional Barriers in their interviews, but expressed a wide degree of variety in just what exactly constituted an institutional barrier. One expert was very explicit in identifying the lack of a civil service system as being one of “the biggest impediments” to conservation education in Africa (S. Ham, Personal Communication, November 4, 2013). In contrast, one interviewee cited an array of issues that are inevitable in many countries, especially in Africa, which inherently affect any education or social programming (K. Lehnhardt, Personal Communication, October 23, 2013). Kathy recounted that institutional barriers to success “are things that happen in situ that you don’t think about,” and urged that an organization like AWF be prepared for anything from small logistical issues, to large tragedies like social unrest and war to emerge as roadblocks to success (K. Lehnhardt, Personal Communication, October 23, 2013). There was a shared sentiment among the five experts that these institutional shortcomings cannot be controlled, and *will* occur and impact an education program, but can be worked around with proper planning and acknowledgement.

While the institutional barriers were a rather eclectic mix of potential impediments that ranged in scope and severity, the political barriers were often easier to conceptualize and identify. Six experts discussed how politics impact the success of conservation programming. Bora Simmons (Personal Communication, November 11, 2013) spoke very generally about the reality of the political capacity needed to effectively implement conservation into the formal school system. “There are just the classic political impediments in some parts of the world, this

stuff doesn't go down well politically and that is always an issue," Simmons explained about conservation in the developing world (B. Simmons, Personal Communication, November 11, 2013). And as Chris Kuhar explained, if an education program does not receive adequate political support and backing, "a lot of these programs die a slow death where they just become less and less of a priority until they fade away," while the programs with political support thrive (C. Kuhar, Personal Communication, October 25, 2013).

Sam Ham echoed these sentiments and explained that with the way many governments are set up, personnel changes on such a consistent cycle that any long term plans for integrating conservation into the school system is "a pipe dream," because the results will not manifest before the next election threatens to bring in a new set of leaders and employees (S. Ham, Personal Communication, November 4, 2013). Similarly, beyond the actual politicians of a given state or country, the "politicization of the environmental education project in the international development context" in general presents a barrier to successfully employing conservation education in schools (S. Ham, Personal Communication, November 4, 2013). The intra and interagency politics of funding conservation programs impacts who and where will get the support necessary to implement any semblance of a successful education program. Both aspects of political barriers demonstrate the difficulty of garnering support for programs with such long-term goals, when in competition with projects with more immediate tangible results. The Sanctions and Bureaucracy node captures the reality that many phenomena happen beyond the control of any single conservation or education entity.

Cultural Mismatch

The Cultural Mismatch node was created to capture a phenomenon that was frequently mentioned by the interviewees: Outside organizations create a conservation education program for a given region that simply has no relevance in the context where it is implemented. Sixteen of the nineteen interviewees identified *Cultural Mismatch* as a significant impediment to conservation education programs. Within this node there were two *child* nodes, Failing to Match Local Context, and No Community Buy-in. Fourteen of the nineteen interviewees spoke about education programs failing to coincide with the local realities and contexts. One expert explained that people who try to implement conservation education programs must “get out of a US-centered way of thinking about {primary} schools” (B. Day, Personal Communication, October 25, 2013). Things like the novelty of being outdoors do not always translate the same way for a child in Sub-Saharan Africa the way it might for a child in suburban America. Simply taking a suburban American child outside might be enough to stimulate an interest in the environment and conservation, but that same result does not necessarily translate to a child in SSA (B. Day, Personal Communication, October 25, 2013).

Another five interviewees cited a lack of community buy-in as a significant barrier to successful conservation education. Whereas securing the support of a school’s surrounding community can be an important driver to a successful conservation program, failing to do so can also be one of the biggest impediments by removing that safety net and support structure that a community provides. Unfortunately, as Sam Ham explains, this is not an infrequent occurrence, and “the typical scenario is that it is all top-down...the curriculum gets developed and either it didn’t involve local teachers or it didn’t have buy in” (Personal Communication, November 4, 2013). One expert, who has personal experience working with education programs in Africa, explained how failing to secure local support creates problems that manifest in multiple ways (J.

Pynn, Personal Communication, October 27, 2013). “If there is a lack of community buy-in, there may be resistance from locals in the form of covert or overt tactics to pursue their own self-interests, or what they see as necessary for survival” (J. Pynn Personal Communication, October 27, 2013).

Lack of Resources

The Lack of Resources node included five child nodes; Inadequate School Infrastructure, Lack of Basic Human Needs, Lack of Funding, Lack of Materials, and Large Class Sizes. One of the most frequently referenced, and perhaps most fundamental, was a lack of basic human needs. The top two most frequently used words in this category were “school” (35 times) and “kids” (22 times), showing the significance of how inadequate resources impacts the physical school structure, and the students themselves. This included remarks about children and communities needing consistent sources of food, water, and shelter, well before being able to support education or conservation initiatives, and was brought up by eight of the experts. As Doug Cress (Personal Communication, October 18, 2013) explained, “{education} is a luxury for most people,” and when people’s basic human needs are not met; it inevitably creates a barrier to conservation education.

Unsurprisingly, eight of the experts also mentioned the lack of funding and financial resources as a large impediment to success. Some interviewees cited that securing the initial funding just to get a conservation education program off the ground was difficult enough, because in the rush to achieve immediate ecological results, “conservation education is not something that a lot of funding agencies want to pay for, they don’t want to pay for long-term projects” (R. Bergl, Personal Communication, November 11, 2013). Additionally, those

organizations that do financially support conservation education programs are often willing to provide start-up money, but are hesitant to provide funding beyond that. As one interviewee noted, “so many funders like to fund something for one or two years, but after that they kind of lose interest, or they say it needs to be self-sustainable, but the people are just as poor two years later as they were when you started a lot of times” (T. Bettinger, Personal Communication, October 8, 2013). Between the lack of initial funding and the lack of sustainability in funding, financial resources was a frequently referenced impediment by the research team’s interviewees.

In addition, six experts spoke about issues of Inadequate School Infrastructure, and six spoke to Lack of Materials as significant barriers to successful education implementation. From many African schools lacking walls, floors, desks, or electricity, to materially lacking enough textbooks, pencils, and paper, there was a repeated theme that schools and education programs lack the necessary resources to meet the students’ tangible needs. Whether an organization like AWF that is implementing a conservation education initiative plans to work around these limitations and use lessons that require minimal materials, or plans to fill the existing materials void, experts emphasize groups to be prepared for an “average school {that} is 100 years behind” what any First World school might look like (B. Day, Personal Communication, October 25, 2013). Another four experts discussed a complementary issue, where class sizes are too large to facilitate successful learning of any topic, let alone issues of conservation. Class sizes larger than 50 students, sometimes near 100, make learning environments in many African schools very different, and often much more difficult, than their American counterparts (B. Day, Personal Communication, October 25, 2013).

Teacher Attributes

The final category of potential impediments that was identified by the 19 experts was Teacher Attributes, and it included Teacher Disposition and Lack of Training child nodes. This was one of the most referenced themes within the Impediments category. Eleven of the 19 interviewees talked about at least one of the child node categories, and six discussed both.

Eight interviewees emphasized that the way a teacher feels about a conservation education program or curriculum will significantly impact how it is presented to, and received by students. Some experts believe that the curriculum itself is less important than the actual teacher, and that it is imperative to get quality educators. In order to get “good” teachers, Bora Simmons emphasizes the need for a “big paradigm shift” in order to create teachers who are comfortable with new conservation topics (B. Simmons, Personal Communication, November 11, 2013). Beyond the level of comfort and familiarity that Bora references, another interviewee explained (D. Sutherland, Personal Communication, October 11, 2013), “if you have somebody presenting {conservation topics} who doesn’t care and they are bored with the curriculum and they don’t think it is very interesting, then it is dead in the water.”

Teacher Training, which can both address the aforementioned issues with teacher dispositions, and help ensure program success, can also present a barrier to successful programming when it is ineffective or absent. Nine experts identified the Lack of Teacher Training as an impediment. Brian Day (Personal Communication, October 25, 2013) explained that many Primary School educators in African countries received minimal general education themselves. Similarly, one person (C. Kuhar, Personal Communication, October 25, 2013) also emphasized that many of the teachers in African Primary Schools only “survived” Primary School themselves, and that will always pose a potential threat to a program’s success. Unfortunately, there is no quick solution to this issue, and “strong professional development isn’t

done in one hour at a conference and it isn't done by webinar. It is something that needs to be in-depth and over a period of time" (B. Simmons, Personal Communication, November 11, 2013). But, again, this requires funding and resources, which come with their own set of impediments and difficulties as discussed above.

Curriculum Attributes

The Curriculum Attributes node has seven sub-nodes within it: Fails to Match Audience, Hard to Measure, National Standards, Not Self-Sustaining, Too Diffuse, Too Narrow, and Who Created It. The most frequently cited of these was the Too Narrow node, speaking to curriculum that was too specifically focused to be useful to, or to fit effectively within a school's existing structure. This, according to the experts, creates a two-fold problem. First, overly narrow curricula does not adequately address the true goal of conservation education, and when it fails to be comprehensive, multidisciplinary, and address human behavior it is "missing the very nature of conservation education" (B. Day, Personal Communication, October 25, 2013). Additionally, curricula "that are narrow in scope by grade level or by topic area, by their definition are not really getting to environmental literacy," but in order to solve this, "it needs to be something that is bigger and more comprehensive, and in order to do that it is very expensive" (B. Simmons, Personal Communication, November 11, 2013).

Even once curricula are made comprehensive enough to address the underpinnings of conservation education, perhaps by devoting an entire course to it, conservation education remains vulnerable as an isolated academic subject, because it fills only a narrow niche within the larger school system. Supporting this vulnerability, Sutherland argued "If you are just presenting conservation education as its own theme it is too easy to divorce it from real life, it is

too easy to say ‘well this is just this one topic...’” and conservation can may lose value as an isolated subject in school (D. Sutherland, Personal Communication, October 11, 2013). In contrast, one expert explained the conundrum that when conservation education is *not* its own subject, “it doesn’t get the attention that other subjects get,” and she went on to clarify that “I don’t think it should have a subject by its own, but the reality is that if it is not a subject then they don’t do it” (D. Gan, Personal Communication, October 25, 2013).

Who creates the conservation education curricula was the second most frequently cited issue within Curriculum Attributes, and four of the nineteen interviewees spoke about it. This node captured the idea that outside organizations come into an area to create an education program, but those organizations often have stigmas and reputations that local people are not supportive of in their communities. Sam Ham (Personal Communication, November 4, 2013) recounted the demise of previous African education programs that were never implemented by the local teachers because “it was perceived by the teachers as being foreign. {The program} was perceived as having been handed to them by people who are meddling in their sovereign affairs.” In addition, in the many instances where educators are not inherently opposed to outside organizations’ education work, the materials and resources are often too *Westernized* for teachers in African schools to utilize effectively. “Teachers don’t know how to teach {Western} materials. They are either designed for, or by Western schools, and they use Western methods of teaching...and the curriculum, in essence, does not match the teachers” (R. Bergl, Personal Communication, November 11, 2013).

Similarly, it was reported that conservation curricula often do not “match” the audience or students they are intended to. This issue can include curricula that are inappropriate for the age of students, “oftentimes people develop a program and then they do it at the fifth grade level

and think it's great and then do it at the ninth and don't differentiate to make sure that it's appropriate for the audience" (S. Jacobson, Personal Communication, October 30, 2013). It can also include curricula that are "developed elsewhere, and imported to African contexts." Interviewees with experience in Africa saw that "some of the worst projects...were the ones...that were entirely designed in cutting edge classroom settings and were sort of imported and dropped in from the sky to an African setting and had no relevance. "It was completely beyond the grasp of the audience. It didn't have any association with the audience needs; it wasn't developed in collaboration with locals" (D. Cress, Personal Communication, October 18, 2013). Avoiding this potential impediment requires "recalibrating" and rethinking how a curriculum will relate to its intended audience once implemented (D. Cress, Personal Communication, October 18, 2013).

Beyond failing to match the teachers or the audience, a curriculum can fail to coincide with a country's national education standards, which threatens how effectively conservation topics will be taught, if at all. In some instances, conservation education programs can eclipse the national curriculum topics, and students are "not really being taught the curriculum," because conservation-minded schools are "putting a conservation course in its place" (R. O'Donoghue, Personal Communication, October 14, 2013). In most cases, however, whatever the national curricula are, teachers will adhere strictly to them. Some experts noted, "even in countries where they don't have shoes, if there is a national curriculum and they are tested on it, the teachers teach to that curriculum" (T. Bettinger, Personal Communication, October 8, 2013). At the end of the day, "the curriculum authority is the school and the state, not the conservation agency," and conservation programs must work to supplement and complement the national standards, not

replace or deter from them to ensure that the material is taught (R. O'Donoghue, Personal Communication, October 14, 2013).

The two final themes in this node (Hard to Measure and Not Self Sustaining) captured the inability of education programs to have the long-term conservation impacts that they intend. One expert elaborated, when conservation programs do not have measurable metrics for success, it is hard to determine what impacts the programs have, and therefore make it harder to justify the continued funding and resources needed to sustain the initiative (R. Bergl, Personal Communication, November 11, 2013). In addition, not only if the program cannot be measured, but if the program cannot sustain itself to some degree without the constant assistance of an outside entity, it presents a large barrier to program success. Conservation programs do not immediately or automatically succeed on their own, "you can't go away and come back and expect it to have taken root, it doesn't always go that way" (D. Cress, Personal Communication, October 18, 2013). Acknowledging that some programs need more help than others, and being prepared to provide that support can prevent the rapid failure of many education initiatives.

Characteristics of Exemplary Curricula

One topic interviewees were asked to discuss was examples of exemplary EE curricula and the characteristics they believe made those curricula so successful. Specific curricula examples mentioned are compiled in Appendix E. Four primary characteristics of exemplary curricula were discussed, which are detailed below.

Tailored to the school

Of the thirteen education experts who spoke specifically on characteristics of exemplary EE curricula, half of them noted the importance of tailoring the curricula specifically to the school and its needs. This involves speaking to school officials about what environmental and/or conservation topics they would like added to the curricula and what teaching methods they feel would result in the most successful implementation. Oftentimes, new curricula developed by outside groups will not be implemented permanently or at all because teachers have difficulty using new teaching methods and teaching new topics, and because they do not have space in their schedule to add new lesson material (P. Mbugua, Personal Communication, October 30, 2013). Involving schools helps increase commitment to the curricula because education officials, teachers, and students were part of developing the lessons they will now be using. Environmental education expert Sam Ham stated that, “I have always found that unless those curricula are developed with local teachers they have little chance of actually being implemented” (S. Ham, Personal Communication, November 4, 2013). When schools have the opportunity to give input on the curricula, lessons are often more successful and effective in increasing environmental knowledge and support.

Incorporated local beliefs

Another characteristic of exemplary EE curricula is that it often incorporates local traditions and beliefs. One example is a curriculum developed near the Reiko Forest in Nigeria that includes the local legend of “green totems,” such as a belief in the sacredness of natural objects like trees and rocks. These beliefs were included in a conservation curriculum that combined long-standing traditions with a modern environmental message. It also allowed different generations to become involved in the curricula, because older members of the community who knew the traditional legends best could share their knowledge of the area’s

natural resources with students (D. Cress, Personal Communication, October 29, 2013). Western educators often have different beliefs and perceptions about the environment compared to Africans, so involving members of the community and their traditions when developing curricula helps to improve the probability of it being implemented by teachers and accepted by students.

Coordinated with national curriculum

A third characteristic and a concept mentioned by three of the interviewees is that exemplary EE curricula often coordinate with the national curriculum and educational standards of the country in which they will be used. One of the primary reasons that teachers choose not to incorporate new environmental curricula is that their lessons are often already overloaded with the curricula that relate to national standards. National examinations are of great importance in Africa, and many teachers will simply not teach subjects, such as environmental science, that will not be on the tests. Therefore, curricula that are developed with national standards in mind, such as those that incorporate prioritized exam subjects (like including math components in a conservation lesson plan), or those that follow national teaching methods, are more likely to be used by educators (D. Gan, Personal Communication, October 25, 2013).

Exposed students to nature

A fourth characteristic of exemplary EE curricula is that they allow students to interact with nature. Many times African schoolchildren, even if they live near a protected area, have had little exposure to the charismatic mega fauna and varied ecosystems for which the continent is famous (D. Cress, Personal Communication, October 29, 2013). Allowing them to visit national parks or wildlife sanctuaries where they can be outdoors and see wildlife themselves can significantly alter their perceptions of nature and increase their understanding of its importance.

Many African schoolchildren are taught that the forest is something dangerous and frightening, and actually bringing them into a forest and teaching them about different plants and animals that live there has been shown to significantly alter their perceptions and cause them to view wildlife and nature in a more positive light. Curricula that expose students to nature can include field trips to natural areas, viewing animals, following wildlife footprints, listening to the sounds of the outdoors, or, in the most basic settings, simply showing pictures of wild animals, which many African children do not often see (K. Lehnhardt, Personal Communication, October 23, 2013).

Lessons Learned from Developing EE in Africa

The environmental education experts who were interviewed were also asked to discuss their personal experiences creating and implementing EE curricula in developing parts of the world, particularly Africa. They described lessons they had learned from their experiences and ways in which they maximized the probability of success when attempting to implement environmental curricula in Africa. The interviewees cited capacity building, collaboration, evaluation, and sustainability as emergent themes related to success.

Build Teacher Capacity

Of the nineteen interviewees who shared lessons they had learned, fourteen directly mentioned the importance of ensuring that teachers had the skills and resources necessary to implement new environmental and conservation curricula. Many times, new EE curricula will not be implemented in schools, even if education experts have carefully developed them. The reality in much of SSA is that teachers often do not have the training, support, materials, or time

to begin teaching new lessons that are given to them (D. Gan, Personal Communication, October 25, 2013).

Many educators have not been trained to incorporate the integrative methods and student participation emphasized in the curricula, and even if they do make an effort to use the lesson plans, the curricula are often not taught the way the curricula developers had envisioned. In one example, American educators had devised a conservation lesson plan that included having students interact with puppets of African animals in order to make the curriculum more interactive and increase student knowledge of wildlife. However, when they returned to follow-up on the curriculum, they found the puppets still looking brand-new and placed high on an out-of-reach shelf. Because puppets are not a common feature of African childhoods, neither the teachers nor the students knew how to use them. Once the curricula developers realized that, they made sure to include written instructions and diagrams for their lesson plans, and they included training to ensure teachers knew how to use the materials they were given (T. Bettinger, Personal Communication, October 8, 2013).

The importance of providing educators with the skills and materials they need to properly teach environmental and conservation curricula was the lesson most commonly mentioned by our interviewees that they had learned from their experiences. The quality and ability of the educator teaching the material is a greater determinant of the curriculum's success than the quality of the curriculum itself. As one expert put it, "a good educator and bad material still isn't bad, but a bad educator can destroy good material, bad material, and anything else in-between" (D. Cress, Personal Communication, October 29, 2013). Building teacher capacity is essential to achieving long-term progress in environmental education.

Collaborate

Ten of the interviewees mentioned learning how important collaborating with other individuals and organizations can be when developing and implementing curricula. Many times, other people have already developed relevant environmental curricula and/or they have already begun the process of integrating the curricula into African schools. Making an effort to see what work has already been done and what progress has already been made can help avoid repetition and create a more efficient system (D. Cox, Personal Communication, October 9, 2013).

By working with other organizations with similar views and goals, not only does the work become more efficient, but the message put out by these groups working in tandem often becomes stronger. When multiple organizations interested in improving EE in African schools come together, they are able to build upon the other's successes, learn from each other's mistakes, and make use of their strengths while working together to minimize weaknesses (T. Bettinger, Personal Communication, October 8, 2013). These united groups can also present a stronger message because their ideas are coming from a larger group of people, which can make them seem more valid, and because multiple groups will be able to reach more people than a single group working alone.

Several of the interviewees had success building from existing EE programs rather than trying to create their own. By using the foundation of an already developed group, such as wildlife clubs, girl scouts, or boy scouts, people developing curricula can bypass the beginning steps of creating a group, finding group leaders, getting the first people to sign up etc... These existing groups have also often been assimilated into the area, so they have more support and buy-in from the community and school. Additionally, Bergl suggests that when working with other programs rather than developing new ones, projects are often more sustainable because, if a

source of funding were to stop or a group were to leave the area, other groups or individuals could still continue the program (Personal Communication, November 11, 2013).

Monitor and Evaluate

Eight experts mentioned monitoring and evaluation as a critical lesson they learned during their own experiences. Creating pilot studies, discussing ideas with local educators, having students fill out evaluations, and ensuring regular monitoring and assessment of programs are all ways to minimize problems and ensure that the desired message is getting across (D. Cox, Personal Communication, October 9, 2013).

Sometimes, those implementing a curriculum will feel that it is working well, and it is not until evaluation is conducted that flaws become apparent. Doug Cress related a story where he had developed an education program that included taking schoolchildren in Cameroon to visit chimpanzee sanctuaries. The program seemed to work very well, as the students came away more knowledgeable about conservation, the jungle, and primates. However, when evaluation was conducted, in response to the question “where do chimpanzees belong?” every student responded with “a sanctuary.” The students saw chimpanzees (often infants whose mothers had been killed) come out of the jungle traumatized and undernourished, while the chimpanzees in the sanctuaries looked healthier and better cared for. Therefore, they assumed chimpanzees belonged in sanctuaries rather than their natural jungle habitat. It was not until the evaluation was conducted that this problem was identified and able to be rectified (D. Cress, Personal Communication, October 29, 2013).

In addition to making it easier for researchers to evaluate curricula strengths and weaknesses, monitoring and evaluation can also allow local educators and students to have a hand in refining the curricula. Africans’ perceptions of wildlife and the environment are often

significantly different from those of the Western world (J. Pynn, Personal Communication, October 27, 2013). Providing Africans with an outlet to voice their opinions through evaluation can both allow them to improve a lesson plan they teach or are taught, and can enable researchers to develop lessons that better relate to the African setting where they are being implemented. Additionally, education officials often appreciate seeing the results of monitoring and evaluation. Having tangible data that shows how EE improves students' knowledge of nature, wildlife, and conservation lets the administration know what students are achieving and can be used to help support the expansion of similar programs (K. Lehnhardt, Personal Communication, October 23, 2013).

Develop a Sustainable Program

A final lesson that fourteen of the environmental education experts the team interviewed mentioned was the importance of developing a program or curriculum that was not only effective, but also sustainable. In order to make a lasting environmental impact in an area, the curricula must ideally last at least a generation, and students and their knowledge of conservation issues must be studied over multiple years (D. Cox, Personal Communication, October 9, 2013).

As mentioned in the previous section, many times improving pre-existing curricula will have longer-lasting results than developing a new curriculum from scratch. Integrating the program with the country's national curricula also increases sustainability. When a curriculum follows national standards and includes information tested in national assessments, teachers and education officials will have more of an incentive to continue using it, even after those who first implemented it have left. Lessons developed in-line with the national curricula are seen as more relevant for students to learn and as less work for the teachers, because they can integrate the

new curricula into their lessons plans more easily (B. Simmons, Personal Communication, November 11, 2013).

Another way to increase a project's sustainability is to ensure it will be self-sustaining after external funding ends. The best way to do this is to develop a curriculum that makes use of as few materials as possible and takes into account the existing resources of the school. African classrooms often have minimal materials and supplies, and even a lesson plan requiring something as simple as a globe or a microscope would not be feasible in many of these schools (D. Cox, Personal Communication, October 9, 2013). Ensuring a program remains practical for an African school to implement even after funding ends often requires creativity and adaptability to fit the curricula to the school. This can be achieved by providing teachers with extra copies of all necessary materials in case some get lost or damaged, teaching local educators how to run all aspects of the program before leaving, and keeping the program manageable so that it will not be overwhelming to run after outside groups have left and funding ended.

One of the major difficulties in making a program sustainable is that many times, a research team or an organization will come into an area, spend ample resources creating EE curricula, push to get them implemented in the schools, and then leave a few years later. The majority of the time, the loss of the implementers leads to the curricula being abandoned. A long-term commitment can be difficult to achieve, as many groups have limited time and resources, and funding can be difficult to obtain for longer-term projects (R. O'Donoghue, Personal Communication, October 14, 2013). However, in order to develop curricula that are most sustainable, researchers and organizations need to commit to long-term work in the area. At least several years of work are generally required in order to overcome the frequently significant cultural differences between the curricula implementers and the local educators so

that both groups better understand the values and opinions of the other. Additionally, when people see that organizations or individuals are committed for the long-term and are interested in an area beyond just setting up a program and leaving, they are often more responsive to new ideas and programs that are put forth (R. Bergl, Personal Communication, November 11, 2013).

V. Recommendations and Discussion

Recommendations

From the literature review, interviews with environmental education experts, and analysis of the information obtained, the researchers were able to anticipate better the potential strengths and challenges of EE programs implemented in Sub-Saharan Africa. They used the findings to develop five recommendations for the African Wildlife Foundation as it continues to expand its new conservation schools program. The recommendations cover a variety of educational aspects and involve both large and small suggestions. They focus on long-term changes meant to be continuously built-upon throughout the lifespan of the program. The researchers hope that these recommendations will allow AWF to create a sustainable environmental education program, better mitigate many of the challenges similar programs have faced, and improve environmental conditions and perceptions in the region.

Recommendation 1: Improve Teacher Capacity

The issue that was mentioned most often and by the greatest number of interviewees, as well as being discussed at length in the reviewed literature, was the issue of building teacher capacity. Teachers in SSA often face situations and obstacles foreign to most educators in the Western world. Many times, educators receive little formal training, are underpaid, have limited

materials, teach large classes of varying grades levels, and are pushed to achieve high scores on national assessments. When they lack support, resources, and training, teachers can be a severe impediment to implementing successful environmental curricula.

However, educators, when they are motivated, have received proper training, have access to necessary resources, and have a strong support system, are many times the greatest proponents of new curricula. They often teach thousands of students over their career, and the effect of one exceptional educator spreading the importance of EE can have enormous impacts on student knowledge and perceptions of the environment. Numerous interviewees stated that investing in teachers was the absolute most important thing an organization looking to promote EE in Africa could do to maximize the possibility of long-term success.

The team recommends that AWF make developing teacher capacity a priority in their schools. This can be accomplished in part by ensuring that teachers receive adequate training that both covers teaching methods beyond lecturing and rote memorization and that this training continues throughout their careers. This training should also involve taking the educators to national parks or animal sanctuaries. Teachers who have experienced biodiversity and wildlife will be better informed when they teach those topics to the students, and they are often more passionate about teaching because they have seen firsthand the subjects they are discussing.

Building teacher capacity goes hand-in-hand with providing teachers with needed teaching materials. The two schools where AWF has already begun to work have been provided with exceptional infrastructure and access to materials that many SSA schools do not have. While it is important to ensure schools have basic resources, large disparities between AWF schools and other surrounding schools in terms of access to resources like computers may cause tension or resentment, and it is important to be aware of this possibility. However, classrooms

that do have essential materials such as enough desks, blackboards, and textbooks often benefit from higher teaching efficiency and improved student learning.

Recommendation 2: Develop Partnerships

Developing a long-term environmental education program in SSA requires significant time and resources. Collaborating with individuals or organizations working on similar educational programs can help propel these projects to becoming more efficient and widespread. From the literature reviewed and the experts that were interviewed, it was apparent that many examples of environmentally-focused curricula have already been created, and many conservation groups are working to increase students' exposure to nature and the outdoors. Another way to collaborate is to increase local involvement by working with people who have a vested interest in the students such as parents, community leaders, and elders with knowledge of local traditions and beliefs. Maximizing community buy-in increases the support system for environmental curricula and it spreads the message of conservation beyond the classroom.

With many materials and partnerships available, the researchers recommend that AWF take advantage of these pre-existing resources. Making use of curricula that has already been developed will allow AWF to focus on other priorities because they do not have to start from scratch. If the curricula have been implemented before, AWF can benefit from using lessons that have already been through preliminary rounds of evaluation. Curricula not specifically developed for Africa, but that still have an environmental/conservation focus can serve as a template with modifications made to fit the regional context. Working with groups that have already established relationships in the area can help increase local support for the project when it is just beginning and provide a stronger, more unified message. Throughout its history, AWF has cultivated extensive relationships, and these will likely prove an invaluable resource as they

expand their conservation schools program. Appendix E provides an extensive list of environmental education materials that AWF could look to for guidance.

Recommendation 3: Emphasize Regionally-Specific Curricula

Many times, schoolchildren in SSA have had little exposure to wildlife and natural areas, even if they live close to a sanctuary or a national park. Children are often taught that jungles are dangerous, and wild animals are seen more as pests than charismatic creatures. As a result, students can often feel disconnected from the environment and are unaware of how much it affects them. One of the best ways to mitigate this is to expose children to the outdoors and teach them lessons that directly relate to the ecosystem in which they live.

Regionally-specific curricula often include lessons about nearby areas of high biodiversity, wildlife that live in the region, and environmental issues that the area specifically is facing. Multiple educational experts that were interviewed spoke of the excitement they saw in students when they were taught about places they knew or animals they had seen. Directly relating curricula to the area in which it will be implemented, while a more time-consuming and resource-demanding process than a standard environmental curricula for all of SSA, can greatly increase the interest and sense of ownership students feel when they are taught these tailored lessons.

Another key component of regionally-specific curricula is ensuring that students experience nature for themselves. Even the best classroom lesson cannot match the experience of seeing actual animals, hearing the sounds of the outdoors, and being surrounded by nature. From both the literature and interviews, it is clear that students who take field trips to sanctuaries or national parks often connect strongly with the biodiversity they see, and they come away with a much deeper knowledge of conservation and the environment.

AWF, with their Heartlands program, emphasizes conservation in areas of high biodiversity. Each of the Heartland regions has a unique biological significance and individualized conservation plan. It is recommended that AWF continue to use these methods in their schools by tailoring curricula to the region and providing students with direct exposure to nature.

Recommendation 4: Emphasize Monitoring and Evaluation

After increasing teacher capacity and developing exceptional curricula, it is important to continue monitoring strengths and weaknesses of the program through regular evaluation. Evaluation allows program leaders to track changes that have occurred over time in terms of students' knowledge, their perceptions of the environment and conservation, and their progress on national assessments. It also gives teachers an avenue to voice their opinions on the lesson material, teaching methods involved, and student reception.

Evaluations provide candid reports of how well EE programs are accomplishing their goals of expanding students' knowledge of the environment, emphasizing the importance of conservation, and building a new generation of environmental stewards. It is recommended that AWF implement a structured monitoring system to regularly assess their conservation schools program. This can be done by hiring a professional evaluator to provide regular updates, as well as developing a strategic plan to provide teachers with ongoing training and support in order to ensure that the curricula continue to be taught effectively. Findings from the monitoring and evaluation should be analyzed by AWF, teachers, and education officials in order to regularly refine and improve the conservation schools program.

Recommendation 5: Take a Long-Term View

Making any significant change in an education system takes a great deal of time, money, contacts, and effort, and AWF's conservation schools program to promote environmental education in African primary schools is no exception.

One of the most common pieces of advice espoused by the environmental experts that were interviewed was to use curricula that had been designed to complement the national curricula. Even if modifying lessons so that they better fit national standards takes more time and causes some parts of the curriculum to be left out, curricula that follow the national standards have a much better chance of being used long term because education experts will see them as more effective at increasing student scores on the critical national examinations. This is particularly true for subjects like environmental science, which is rarely covered by national exams in SSA. It is recommended that AWF, in order to have an accepted and long-term program, develop conservation and environmental education curricula that is in-line with the national standards of the countries in which they are working.

From the review of the literature, and the conversations with environmental experts, it is clear that any truly successful environmental education program requires far more than raising test scores. Accomplishing AWF's goals of improving education and increasing local participation in conservation will require years of involvement in the local communities. While the first steps may be teaching students that biodiversity has great benefits and that unsustainable practices such as eating bush meat and cutting down forests should be minimized, the ultimate goal is to change the way in which people view the natural world. This involves understanding the reasoning behind the choices people make, adapting plans to maximize community buy-in, and working to invest in human capital so that the community itself can continue the program. AWF has been promoting conservation for over 50 years, and the research team feels confident

that they will be able to develop their program with a long-term view in mind and work towards making meaningful changes in people's attitudes and behaviors in regards to the environment.

Conclusion

The African Wildlife Foundation has been dedicated to promoting conservation and environmental values in Africa for over 50 years. The researchers feel that, despite the challenges of implementing a conservation schools program, AWF's experience developing partnerships and working on long-term conservation projects will allow them to create an environmental education program that increases educational opportunities and expands support for conservation throughout Africa. The two schools where AWF is currently working have already benefitted students and communities by providing enhanced school buildings, essential materials, and an improved conservation curriculum. The time and effort they have spent developing this program shows the commitment of the African Wildlife Foundation toward improving both education and environmental stewardship in Africa, and it is the researchers' hope that the information and recommendations provided will help to further their efforts and goals.

VI. Acknowledgements

We would like to thank the African Wildlife Foundation, particularly Jeff Chrisfield and Daniel Wesonga, for giving us the opportunity to work with them during this project. It is our hope that our findings and recommendations will help to further the expansion of environmental education in Africa as their conservation schools program continues to grow. We would also like to thank our advisor, Dr. Pamela George, as well as Dr. Charlotte Clark and our interviewees, for their time, support, and advice throughout this Master's Project.

VII. Literature Cited

- African Wildlife Foundation (2012). *Our History: A Rich Tradition of Conservation*. Retrieved from <http://www.awf.org/about/history>
- African Wildlife Foundation (2012). *Conservation Schools*. Retrieved from <http://www.awf.org/community/conservation-schools>
- Bennell, P. (2004). Teacher Motivation and Incentives in Sub-Saharan Africa and Asia. *Knowledge and Skills for Development, Brighton*.
- Bogner, F. X. (1998). The Influence of Short-Term Outdoor Ecology Education on Long Term Variables of Environmental Perspective. *The Journal of Environmental Education, 29* (4), 17-29.
- Bonner, R. (1993). *At the Hand of Man: Peril and Hope for Africa's Wildlife*. New York: Knopf.
- Bride, I. (2006). The Conundrum of Conservation Education and the Conservation Mission. *Conservation Biology, 20*, 1337 -1339.
- Carter, R. L., & Simmons, B. (2010). The History and Philosophy of Environmental Education. In *The Inclusion of Environmental Education in Science Teacher Education* (pp. 3-16). Springer Netherlands.
- de Haan, J. A. K. (2008). What is needed to Improve Tropical Conservation? Appropriate Education, Training, and Encouragement. *The Environmentalist, 28*(3), 171-173.
- Dettmann-Easler, D., & Pease, J. L. (1999). Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes toward wildlife. *The Journal of Environmental Education, 31*(1), 33-39.

- Dillon, J., Rickinson, M., Teamey, K., Morris, M., Choi, M. Y., Sanders, D., & Benefield, P. (2006). The Value of Outdoor Learning: Evidence from Research in the UK and Elsewhere. *School science review*, 87 (320), 107.
- Espinosa, S., & Jacobson, S. K. (2012). Human-Wildlife Conflict and Environmental Education: Evaluating a Community Program to Protect the Andean Bear in Ecuador. *The Journal of Environmental Education*, 43(1), 55-65.
- Fiallo, E. A., & Jacobson, S. K. (1995). Local Communities and Protected Areas: Attitudes of Rural Residents Towards Conservation and Machalilla National Park, Ecuador. *Environmental Conservation*, 22(03), 241-249.
- Freeman, K. (2009). Sustainable Education at a Developing-World Field Site: Developing Programmes Linked to Conservation Work In-Country. *International Zoo Yearbook*, 43(1), 113-123.
- Gupta, S., Yadav, S. K., & Saini, S. (2011). Innovative Approaches for Promoting Environmental Education in India. *The Institute of Integrative Omics and Applied Biotechnology*, 2(3), 30-35.
- Iyengar, R., & Bajaj, M. (2011). After the Smoke Clears: Toward Education for Sustainable Development in Bhopal, India. *Comparative Education Review*, 55(3), 424-456.
- Jacobson, S. K. (1987). Conservation Education Programmes: Evaluate and Improve Them. *Environmental Conservation*, 14(03), 201-206.
- Jacobson, S. K., & McDuff, M. D. (1998). Conservation Education. *Conservation Science and Action*, 237-255.
- Jacobson, S. K., McDuff, M. D., & Monroe, M. C. (2006). *Conservation Education and Outreach Techniques*. Oxford: New York.

- Johnson-Pynn, J. S., & Johnson, L. R. (2005). Successes and Challenges in East African Conservation Education. *The Journal of Environmental Education*, 36(2), 25-39.
- Kaye, C. B. (2011). Greening the Curriculum. *Principal Leadership*, 12(4), 20-25.
- Kim, C., & Fortner, R. W. (2006). Issue-Specific Barriers to Addressing Environmental Issues in the Classroom: An Exploratory Study. *The Journal of Environmental Education*, 37(3), 15- 22.
- King, B., & Peralvo, M. (2010). Coupling Community Heterogeneity and Perceptions of Conservation in rural South Africa. *Human Ecology*, 38(2), 265-281.
- Kuhar, C. W., Bettinger, T. L., Lehnhardt, K., Cartwright, B., & Cress, D. (2012). Education Program Evaluation at Multiple Primate Sanctuaries in Equatorial Africa. *International Journal of Primatology*, 33(1), 208-217.
- Leeming, F. C., Dwyer, W. O., Porter, B. E., & Cobern, M. K. (1993). Outcome Research in Environmental Education: A Critical Review. *The Journal of Environmental Education*, 24(4), 8-21.
- Lewis, J. (1988). Environmental education: Past and present. *EPA Journal*, 14(6), 30.
- Li, L. (2006). Environmental education curriculum in a bilingual education school in China. *The Social Studies*, 97(4), 145-151.
- Majgaard, K. & Mingat, A. (2012). *Education in Sub-Saharan Africa: A Comparative Analysis*. World Bank Publications.
- Michaelowa, K. (2002.) Teacher Job Satisfaction, Student Achievement, and the Cost of Primary Education in Francophone Sub-Saharan Africa. *HWWA Discussion Paper*, No. 188.
- Mbugua, P. (2012). Wildlife Conservation Education. The Kenya Wildlife Service in the 21st Century: Protecting Globally Significant Areas and Resources, 29(1), 59-66.

- Mehta, J. N., & Heinen, J. T. (2001). Does Community-Based Conservation shape favorable Attitudes among Locals? An empirical study from Nepal. *Environmental Management*, 28(2), 165-177.
- Murtin, F. (2013). Improving Education Quality in South Africa. *OECD Economics Department Working Papers*, No. 1056, OECD Publishing.
- Palmer, J. A., Suggate, J., Bajd, B., KP, P. H., Ho, R. K., Ofwono-Orecho, J. K. W., & Staden, C. V. (1998). An Overview of Significant Influences and Formative Experiences on the Development of Adults' Environmental Awareness in Nine Countries. *Environmental Education Research*, 4(4), 445-464.
- Payne, P. G. (2006). Environmental Education and Curriculum Theory. *The Journal of Environmental Education*, 37(2), 25-35.
- Pile, J. A. (1962). Wild Life Conservation Education in Southern Rhodesia. *Oryx*, 6(05), 279-282.
- Pizmony-Levy, O. (2011). Bridging the Global and Local in Understanding Curricula Scripts: The Case of Environmental Education. *Comparative Education Review*, 55(4), 600-633.
- Shumba, E. & Carlson A. (2011). *Status of and Response to Climate Change in Southern Africa: Case Studies in Malawi, Zambia and Zimbabwe*. Harare: World Wide Fund for Nature.
- Simmons, D. (1998). Using Natural Settings for Environmental Education: Perceived Benefits and Barriers. *The Journal of Environmental Education*, 29(3), 23-31.
- Stapp, W. B., Bennett, D., Bryan, W., Fulton, J., MacGregor, J., Nowak, P., & Havlick, S. (1969). The Concept of Environmental Education. *Journal of Environmental Education*, 1(1), 30-31.

UNESCO-UNEP. (1976). The Belgrade Charter. *Connect: UNESCO-UNEP Environmental Education Newsletter*, 1(1), 1–2.

United Nations. (2012). *World Population Prospects: The 2012 Revision. United Nations, Department of Economic and Social Affairs*. Retrieved from <http://esa.un.org/unpd/wpp/index.htm>

UNICEF. (2011). Tanzania: Statistics. UNICEF. Retrieved from http://www.unicef.org/infobycountry/tanzania_statistics.html

UNICEF. (2011). Zambia: Statistics. UNICEF. Retrieved from http://www.unicef.org/infobycountry/zambia_statistics.html

Wright, J. H. (2010). Use of Film for Community Conservation Education in Primate Habitat Countries. *American Journal of Primatology*, 72(5), 462-466.

The World Bank (2008). *Curricula, Examinations, and Assessment in Secondary Education in Sub-Saharan Africa. Africa Human Development Series 128*.

VIII. Appendices

Appendix A

Tier 1 Interview Protocol

Introduction:

AWF is an NGO that has been working to conserve wildlife throughout Africa since the 1960s. AWF has since realized that in order to conserve nature, the needs and values of the African people must be met. Recently they have started their conservation schools initiative, which works with existing schools, and helps build new ones, to both improve and update infrastructure and teaching tools, as well as implement conservation education curricula. AWF has asked us to help look for examples of exemplary conservation education techniques, curricula, and programs, but also examples of what impediments to success might be.

The first portion of our project was completing a literature review over the summer. We looked at the specific ecology and cultures of the African countries that AWF focuses its work in, as well as literature on environmental and conservation education around the world. The second phase of our project is interviewing experts from the field, with a focus on conservation education in developing nations. During our preliminary research we came across your work in the broader context of environmental education. Although your expertise might not be directly related to conservation education curricula in Africa, we still think you can provide us with valuable information.

Do you have any questions so far?

Informed Consent:

Before we start, I want to go over the **informed consent** with you.

We are asking you to volunteer to take part in an interview about environmental and conservation education initiatives in Africa as part of a research study for the African Wildlife Foundation. This interview is being conducted in order to gather information on the state of conservation education, and to provide a description of successful conservation education

programs in order to develop recommendations for future education initiatives for African countries. This interview will consist of questions pertaining to your experience with environmental education, as well as your opinions and knowledge on conservation education specifically. The interview will take approximately thirty minutes of your time.

Your participation in this interview is completely voluntary. This means you do not have to participate if you do not want to. If you agree to participate, you may decline to answer any question we ask, and you have the right to stop participation at any point during the interview. Your responses will be used towards a research document that will be available to the Duke University community and the public. The data that will be used may include direct quotations and may have potentially identifying characteristics such as age, gender, level of education, and title. I would like to attribute quotations to you, unless you would like to request that something is off the record. If you would like to complete the entire interview off the record you may do so, and we will ensure that you are not identifiable in our report.

We are graduate students in the Nicholas School of the Environment at Duke University and are partnering with the African Wildlife Foundation and its education program for this evaluation. If you have questions or concerns regarding this research, you can contact the PI's Christine Sarikas at christine.sarikas@duke.edu, Katy May at katlyn.may@duke.edu or Tori Kleinbort at tori.kleinbort@duke.edu. Finally, with your permission, we would like to tape record the interview in order to focus our conversation instead of taking written notes. The recording will be preserved until the end of the research study. Once the study is complete, the recording will be destroyed.

"Do you have any questions?"

"Do you agree to voluntarily participate in this interview process?"

Sample Questions for International Environmental/Conservation Education Experts Outside of the Developing world/Curricula Development:

1. How would you identify your work and expertise with regard to environmental education?
2. Do you know of any examples of exemplary conservation education initiatives or curricula?
 - a. Who were they done by? Where were they implemented?
3. If you were tasked with this same project, what people would you seek out for interviews and why?
4. What would you consider to be the most important question(s) to ask these experts?
5. Is there anything else you might like to share?

Appendix B

Tier 2 Interview Protocol

Introduction:

AWF is an NGO that has been working to conserve wildlife throughout Africa since the 1960s. AWF has since realized that in order to conserve nature, the needs and values of the African people must be met. Recently they have started their conservation schools initiative, which works with existing schools, and helps build new ones, to both improve and update infrastructure and teaching tools, as well as implement conservation education curricula. AWF has asked us to help look for examples of exemplary conservation education techniques, curricula, and programs, but also examples of what impediments to success might be.

The first portion of our project was completing a literature review over the summer. We looked at the specific ecology and cultures of the African countries that AWF focuses its work in, as well as literature on environmental and conservation education around the world. The second phase of our project is interviewing experts from the field, with a focus on conservation education in developing nations. During our preliminary research we came across your work in the broader context of environmental education.

Do you have any questions so far?

Informed Consent:

Before we start, I want to go over the **informed consent** with you.

We are asking you to volunteer to take part in an interview about environmental and conservation education initiatives in Africa as part of a research study for the African Wildlife Foundation. This interview is being conducted in order to gather information on the state of conservation education, and to provide a description of successful conservation education programs in order to develop recommendations for future education initiatives for African countries. This interview will consist of questions pertaining to your experience with environmental education, as well as your opinions and knowledge on conservation education specifically. The interview will take approximately thirty minutes of your time.

Your participation in this interview is completely voluntary. This means you do not have to participate if you do not want to. If you agree to participate, you may decline to answer any question we ask, and you have the right to stop participation at any point during the interview. Your responses will be used towards a research document that will be available to the Duke University community and the public. The data that will be used may include direct quotations and may have potentially identifying characteristics such as age, gender, level of education, and title. I would like to attribute quotations to you, unless you would like to request that something

is off the record. If you would like to complete the entire interview off the record you may do so, and we will ensure that you are not identifiable in our report.

We are graduate students in the Nicholas School of the Environment at Duke University and are partnering with the African Wildlife Foundation and its education program for this evaluation. If you have questions or concerns regarding this research, you can contact the PI's Christine Sarikas at christine.sarikas@duke.edu, Katy May at katlyn.may@duke.edu or Tori Kleinbort at tori.kleinbort@duke.edu. Finally, with your permission, we would like to tape record the interview in order to focus our conversation instead of taking written notes. The recording will be preserved until the end of the research study. Once the study is complete, the recording will be destroyed.

“Do you have any questions?”

"Do you agree to voluntarily participate in this interview process?"

Sample Questions for African Environmental/Conservation Education Experts:

1. We are calling you because we know you are a leader in your field (_____) We would like to know what your general ideas are on conservation education, specifically in Africa, and what in your experience and background led you to develop those views?
2. Can you describe any examples of truly standout primary or K-8 environmental or conservation education curricula in African countries?
 - a. Can you tell us about that?

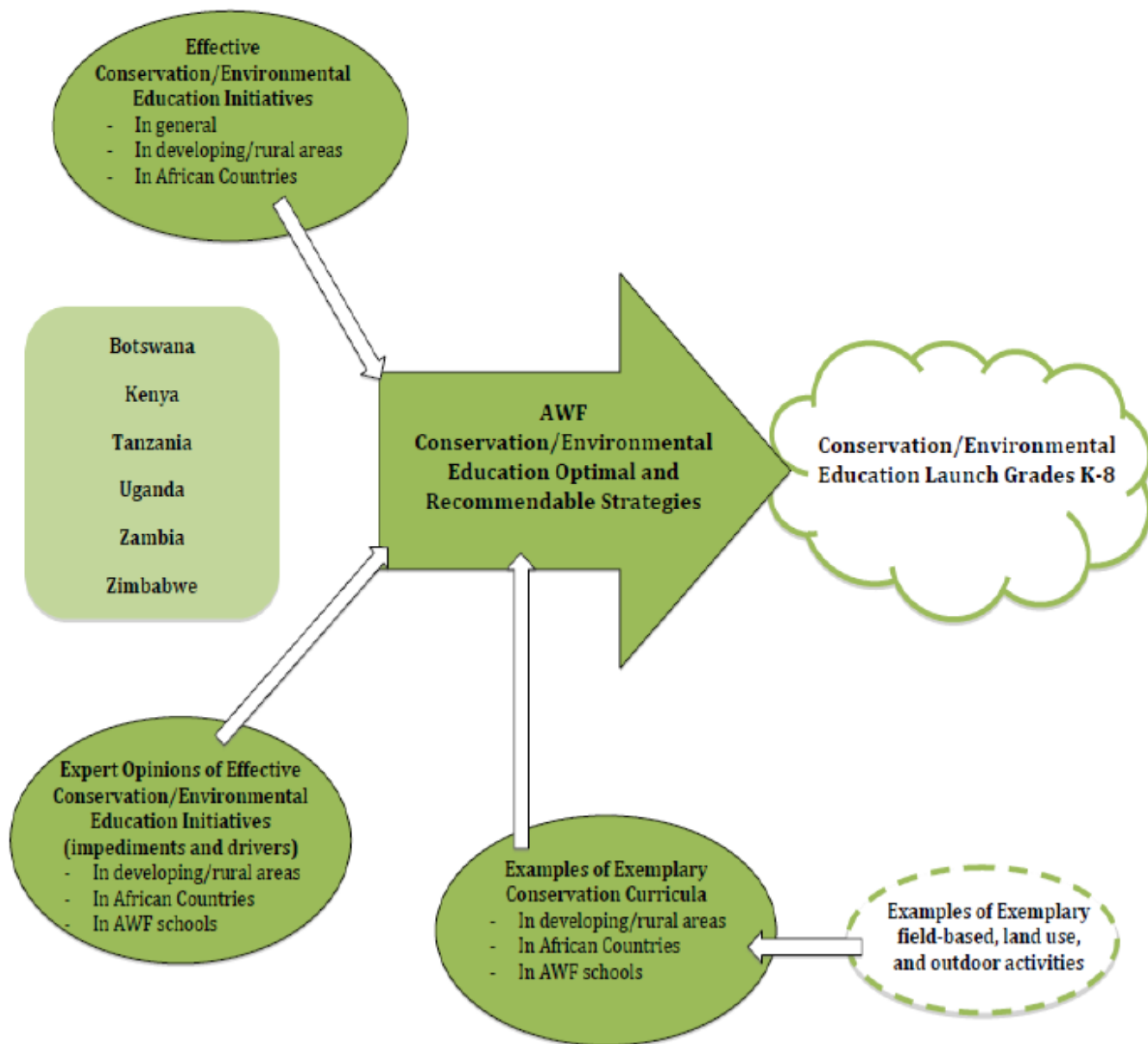
From your experience:

3. What characteristics do you identify with a successful conservation education curriculum?
4. In your experience which of these drivers is the most critical for success?
5. What do you believe are the greatest impediments for creating successful environmental education curricula in Africa?
6. How do you make sure curriculum matches the setting/context in which it is being implemented (location, infrastructure, financial considerations etc...)?
7. In what ways can you optimize support from local implementers like teachers, principals, and parents?
8. What advice or lessons would you give an organization seeking to expand environmental education in Africa?
9. You didn't say anything about:
 - a. Integrated or dedicated curriculum
 - b. The role of teachers or teacher education, do you have any opinion about that

- c. Environmental education versus conservation education
 - d. Liaison to ministry of education and education standards
 - e. Outdoor versus IT computer based coursework
10. Do you know of any other examples or individuals or organizations currently working on similar environmental or conservation education curricula that we should contact?

Appendix C

Conceptual Framework



Appendix D

Hierarchical Node Structure

Drivers of Successful Environmental Education

- Collaborations
 - School Collaboration
- Community Involvement
 - Targeted Group
 - Teacher/Principal Buy-In
- Curriculum Attributes
 - Outdoors Component
- Detailed Framework
- Drivers found through Impediments Question
 - Curriculum Characteristics
 - Funding
 - Local Context
 - Teacher Training
- Funding Patterns
- Sanctions and Affiliations
- Student Focused
- Targeted Group
- Teacher Benefits and Rewards
- Teacher Qualities and Dispositions
- Teacher Training
- Technology

Exemplary Curricula

- Characteristics
- Examples

Impediments to Successful Environmental Education

- Cultural Mismatch
 - Fails to Match Local Context
 - No Community Buy-In
- Curricula Characteristics
 - Doesn't Match the Audience
 - Hard to Measure
 - National Standards
 - Not Self-Sustaining
 - Too Broad

- Too Narrow
 - Who Created It
- Historical Practices
- Impediments found through Drivers Question
- Lack of Community Buy-In
- Lack of Resources
 - Inadequate School Infrastructure
 - Lack of Basic Needs
 - Lack of Funding
 - Lack of Materials
 - Large Class Sizes
- Sanctions and Bureaucracy
 - Institutional Barriers
 - Political Barriers
- Teacher Qualities
 - Dispositions
 - Lack of Training

Lessons for AWF

- Build Teacher Capacity
- Collaboration
- Evaluation
- Experience Outdoors
- Keep Project Manageable
- Regionally Specific
- Sustainable

Appendix E

Examples of Exemplary Environmental Education Materials

Organization/Individual	Description	Link (if available)
UNESCO	Material on climate change, including some developed specifically for Africa	http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/climate-change-education/cce-clearinghouse/pedagogical-resources/primary-materials/
Council for Environmental Education in India	Paryavaran Nitra teachers handbook, primarily for elementary school. Lessons adapted for specific ecosystems	
Irma Allen	Helped develop environmental education programs for roughly 10 African countries	
North American Association for Environmental Education	Guidelines for excellence, particularly for elementary grades. Focus on teaching process over content.	http://eelinked.naaee.net/n/guidelines/posts/Environmental-Education-Materials-Guidelines-for-Excellence
Jane Goodall's Roots and Shoots Program	Extra-curricular activities teacher manuals designed to promote student interest in conservation	http://rootsandshoots.org/project-toolkit
Jane Goodall's Roots and Shoots Program: Super Kodo films	Short films starring a young superhero (Super Kodo) who teaches children about biodiversity and how to protect the earth	http://www.firstpost.com/topic/person/jane-goodall-clip-de-la-serie-congolesa-super-kodompeg-video-fEhPRAEicz4-4812-8.html (Background video)
Jane Goodall Institute Earth Education Programme	Curricula materials on a wide variety of subjects, tailored specifically to Africa	http://www.comminit.com/africa/content/jane-goodall-institute-earth-education-programme (Click "Resource Materials" and select "Natural Resource Management Themes")
North Carolina Zoo: UNITE Program	Environmental curricula, developed specifically for Uganda	

Disney Nature	Educator Guides focused primarily on wildlife conservation. Designed to complement Disney Nature movies, but can be used independently	http://nature.disney.com/ (Scroll down to “Educational Materials”)
Pan-African Sanctuary Alliance		
Lincoln Park Zoo of Chicago	Curriculum guides designed for Lincoln Park Zoo, but can be modified to apply to other zoos/wildlife sanctuaries	http://www.lpzoo.org/education/educators-resources
Brookfield Zoo Chicago	Teacher resources and classroom activities on subjects such as insects and ecosystems	http://www.czs.org/CZS/Educational-Programs/Teacher-Resources/Curricula
International Zoo Educators Association	Materials for conservation educators from a variety of sources	http://www.izea.net/education/interpretation.htm
Dave Sutherland (Galapagos middle school guide)		
Field Trip Earth	Educator materials primarily based on wildlife conservation	http://www.fieldtripearth.org/educator.xml
World Wildlife Fund: Project WILD	Conservation education materials available for purchase or for those who attend Project WILD workshops	http://www.projectwild.org/resources.htm
Chesapeake Bay Foundation	Resources on subjects such as starting an after-school environmental club, water conservation, and coastal ecosystems	http://www.cbf.org/join-us/education-program/resources
NOAA’s BWET (Bay Watershed Education and Training Programs)	Environmental curricula related to oceans and coasts	http://www.education.noaa.gov/ and http://oceanexplorer.noaa.gov/education/materials.html
Rosanne Fortner (educator on the national Sea Grant Advisory Board)	Card, board, and other games teaching species life cycles, food chains, etc. WWF has incorporated some of these games	Fortner.2@osu.edu

Appendix F

Case Study: Building a School and Developing Curriculum in Southwest Uganda

The African Wildlife Foundation: Implementing Conservation Education in Southwest Uganda

Introduction

Education has been touted as an effective way to increase awareness and knowledge of an issue, and to subsequently change the way people behave. In Africa, conservation education is gaining popularity as a way to foster sustainable relationships between human and wildlife populations. Consequently, the African Wildlife Foundation (AWF) has begun incorporating conservation education initiatives into its wildlife preservation programs, most recently by establishing “conservation schools” in Tanzania and Zambia. As AWF continues its mission to conserve wildlife throughout many of Africa’s important landscapes, it hopes to increase the education level in local communities by building and enhancing more primary schools. We will use this paper to look at the southwest region of Uganda, and explore it as a potential site for an AWF conservation school. We will discuss the history of AWF, assess the biophysical attributes, human demographics, and institutional structures of the region, explore the educational policies in place, and synthesize what conservation education experts from around the world have identified as important drivers and impediments to a successful education initiative. With this information, we can make recommendations to AWF on how to best proceed if it chose to establish a conservation school in Southwest Uganda.

The African Wildlife Foundation: historic conservation

In 1961, a group of American conservationists established the African Wildlife Foundation (AWF) to ensure wildlife conservation during a time of political and social transition throughout Africa (The African Wildlife Foundation, 2012). From its inception, AWF has been intent on protecting important species of wildlife, and began incorporating local people into this process almost immediately. By 1962, AWF was providing training for African people interested in helping to manage nature reserves, and had established the College of African Wildlife Management in Mweka, Tanzania (The African Wildlife Foundation, 2012). For the next few decades AWF used international marketing campaigns to facilitate an awareness of conservation issues with people outside of Africa, namely in the United States. The “Give a Lion a Home,” “Mountain Gorilla Project,” and the “Save the Elephants Campaign” were a few of the organization’s most notable initiatives that fostered an understanding of the issues threatening African wildlife, and encouraged monetary donations from concerned global citizens (The African Wildlife Foundation, 2012).

By 1998 AWF began moving beyond species-specific conservation, to a broader habitat and regional approach. The “African Heartland Program” focuses on conserving large landscapes that have “important natural value,” and contain the habitats of popular species, such as the Rhinoceros or Mountain Gorilla (The African Wildlife Foundation, 2012). These “Heartlands” often encompass land in more than one country, which creates unique circumstances for the neighboring communities, and AWF has been increasing its efforts to incorporate and empower these affected people ever since (See Figure 1). Today, AWF is working with communities throughout Sub-Saharan Africa to determine the roots of their human/wildlife conflicts and their community-specific needs. AWF hopes that addressing these issues, and otherwise empowering communities will promote more local conservation behaviors

(The African Wildlife Foundation, 2012). The organization is currently trying to engage African communities by employing three large strategies: training park rangers in Zambia and The Democratic Republic of the Congo (DRC), providing scholarships and job training for people interested in pursuing conservation as a formal career, and most recently, creating its conservation schools project.

Fostering Conservation Through Education: AWF's conservation schools

As mentioned, AWF has been incorporating education since its founding in the 1960s. AWF has created college funds for men to study wildlife management and biology, established the College of African Wildlife Management, and built a handful of education centers, like the one in Nairobi National Park, established in 1963 (The African Wildlife Foundation, 2012). Their most recent project, creating “conservation schools,” is arguably AWF’s most significant foray into Africa’s formal education systems. AWF will focus on primary education throughout the Heartland regions by building new schools, as well as “adopting” and improving existing ones (The African Wildlife Foundation, 2012). Although AWF will not directly employ any teachers or principals, nor will it own any of the schools directly, the organization hopes to make a large impact by creating curricula, and facilitating teacher-training programs to help implement it (The African Wildlife Foundation, 2012).

AWF’s primary schools will be located throughout its 16 current Heartland regions, and will be chosen based on “how critical the conservation need” is nearby (The African Wildlife Foundation, 2012). Africa has the youngest population on the planet, so by focusing on primary school education, and by prioritizing among critical landscapes, AWF is poised to make very large conservation impacts with its education programs (The African Wildlife Foundation,

2012). The theoretical basis for the conservation schools project is that AWF will provide education resources, with prominent conservation themes, and in exchange the surrounding community will participate and engage in wildlife conservation behaviors (The African Wildlife Foundation, 2012). In essence, providing quality education to primary school children fosters a knowledge of conservation and a passion for learning, which will ideally lead to continued secondary and tertiary education, and eventually alternative, less resource-dependent livelihoods (The African Wildlife Foundation, 2012).

So far AWF has rebuilt the Lupani Primary School in Zambia, and has renovated and given the Manyara Ranch Primary School in Tanzania an Internet/technology (IT) lab (The African Wildlife Foundation, 2012). The Lupani and Manyara Ranch schools are in the Kazungula and Maasai Steppe regions, respectively, with very different corresponding biophysical, social, and institutional structures. Because the schools project is a new endeavor for AWF, the organization wants help determining what has driven the success of other conservation education initiatives, what has impeded it, and what is the way forward. Eventually, AWF wants a systematic way, or framework for implementing conservation education in more Heartlands effectively and efficiently. The rest of this paper will focus specifically on the Southwest region of Uganda, part of the Virunga Heartland Region, and will answer the question, “how should AWF implement a conservation school here?” based on its specific ecological and social conditions. AWF can use this individual case study as an example of how to systematically evaluate potential new school sites, and to determine the best strategies to implement that school.

Biophysical Ecology: Looking into Uganda’s Heartland

AWF works in 16 Heartland regions, within 15 Sub-Saharan African countries (See Figure 1). We will focus specifically on the Virunga region, which is in southwest Uganda, bordered by the DRC to the west, and Rwanda to the south (See Figure 2) (Uganda Bureau of Statistics, 2006). According to Uganda's 2002 Census (the most recent one publicly available), Uganda has 56 political "districts," divided among four larger regions; Central, Eastern, Northern, and Western (Uganda Bureau of Statistics, 2006, p. 16). The Virunga Heartland is in Uganda's Western region, and is home to two national protected areas (See Figure 3). Bwindi Impenetrable National Park is in a non-volcanic mountain range, and contains over 100 species of mammals, including primates, otters, side-striped jackals, and golden cats (The African Wildlife Foundation, 2011). Mgahinga Gorilla National Park is a mountainous, forested and bamboo region that extends into Rwanda and the DRC, and provides critical habitat to the threatened Mountain Gorillas (The African Wildlife Foundation, 2011). The Virunga Heartland is one of the last places that the Mountain Gorilla is found in the wild; potentially constituting the "critical conservation need" that AWF looks for when siting a new conservation school.

Nearby human communities inevitably interact with surrounding wildlife. Agriculture is very prevalent in Uganda, and in the Virunga region croplands usually extend right up to the boundaries of national parks (Uganda Bureau of Statistics, 2006). The implications of this are twofold. First, villagers often journey into the adjacent forests to cut down trees and clear more land for agriculture. This puts them in close proximity to animals like the threatened Mountain Gorillas, which are already highly susceptible to human diseases, and the risk of poaching. Additionally, nearby herd species like elephant and buffalo frequently trample important crops because of the close proximity between their habitats and human communities in this region (The African Wildlife Foundation, 2011). So, as AWF ponders the notion of establishing a

conservation school in this area, it will have to take these ecological factors into consideration. In theory, the school would have to be outside of buffalo and elephant migration paths, promote an awareness of the fragility of gorilla populations, and ideally lead to alternative livelihoods that do not rely on forest clearing and expanding agriculture.

Human Ecology

While the Virunga Heartland is home to some undeniably valuable wildlife and ecosystems, there are also important human populations in the area that need to be considered when thinking about conservation education both in Virunga, and in Uganda more generally. More than 87% of Uganda's population lives in rural areas, the vast majority of which (70%) have agricultural and resource-based livelihoods, exporting mostly fish, coffee, and tobacco (Uganda Bureau of Statistics, 2006, p. 13). This means that a very large proportion of Ugandans rely directly on the land and natural resources for subsistence and livelihoods, potentially putting them in conflict with local wildlife conservation efforts. But the aforementioned statistics describe Uganda's adult population, and AWF's conservation schools will target Ugandan children.

As of 2002, more than half (56%) of Ugandans were under 18, and 22% of the entire country was primary school-aged, between six and twelve years old (Uganda Bureau of Statistics, 2006, p. 24). The Net Enrollment Rate for Ugandan primary schools in 2002 was 86, which means that of the children who were between six and twelve years old, 86% of them were attending primary school in 2002 (Uganda Bureau of Statistics, 2006, p. 21). The Census calculated this 86% to be roughly 6.2 million children enrolled in primary school in 2002 (Uganda Bureau of Statistics, 2006, p. 18). Regionally, the Western region (where Virunga is

located) matched the larger country statistics, with an 86% Net Enrollment Rate, falling below the Central and Eastern regions that had 89% enrollment, but well above the Northern region that only achieved 77% enrollment (Uganda Bureau of Statistics, 2006, p. 25). This implies that a large majority of families in the Western region want to send their children to primary school, and the more accessible that primary school education becomes, the higher the region's enrollment rates will be.

One of the biggest factors that can affect a child's access to primary school education is the distance that a child must travel between home and school. In 2002, 50% of all households, and 46% of all rural households were within one kilometer of the nearest primary school (Uganda Bureau of Statistics, 2006, p. 24). The Western region had the second highest percentage of households between one and five kilometers from the nearest primary school (45.25%), but also the second highest percentage (8.1%) of homes that were more than five kilometers from the nearest school, which generally prevents primary school-aged children from attending school at all (Uganda Bureau of Statistics, 2006, p. 25). High enrollment rates, but variable distances between homes and schools might imply that by AWF establishing a conservation school in southwestern Uganda, more children will be within that 1-5km radius and have easier access to primary school than ever before. This will further increase the enrollment rates, and ultimately increase the regional and national education levels. Still, 77% of children who only attend primary school (and no additional schooling) will end up working in agriculture, and it is not until Ugandans achieve post-secondary education that the dominant livelihood switches from agriculture (12.7%), to professionals and semi-professionals (58%) (Uganda Bureau of Statistics, 2006). With this in mind, a new, AWF conservation school in Virunga

might be the stimuli needed to encourage continued education and spark an interest in conservation and alternative livelihoods.

Institutional Ecology and Historical Education Policy

The country of Uganda is a Republic that operates much like a hybrid of the British and United States governing systems. There are three branches, the legislative, judiciary, and executive (See Figure 4). The executive branch contains the offices of the President (Gen. Yoweri Kaguta Museveni) (See Figure 5), the prime minister, the vice-president, and the cabinet. The president of Uganda operates as both the head of state and the head of government and is elected every 5-years. The legislative branch is operated by parliament while the judiciary branch contains various court systems up through the Supreme Court. The government controls all policies and amendments to the constitution within Uganda and is in control of enforcing education policy. A republic is defined by its constitution and Uganda drafted and enacted their constitution in 1995. Soon after in 1996, the president of Uganda, Museveni, declared that at least four children from each family should attend primary school. This began a trend towards national education policy reform ministries obtaining authority over national policy (Ward, 2006). Specifically, the Ministry of Education and Sports, a government agency, was established to draft and implement education policy. Currently, it facilitates implementing new curriculum, setting new education goals, and helping with teacher training. While the Ministry of Education and Sports heads all education policy, they share curriculum development responsibilities with a separate organization known as The National Curriculum Development Center (NCDC). The curriculum developed by NCDC is then implemented throughout the school system. The NCDC also attempts to give the Ministry of Education and Sports the resources and information necessary to aid curriculum dissemination and delivery in the classroom (Ward, 2006).

The 1995 Ugandan Constitution and the 1997 Local Governments Act (amended in 2006) allowed the Ugandan government to create many of its' policies for "school-based management" that are still in existence today (Najjumba Vol III, 2013). In 1997, the Local Governments' Act was established and shifted the authority over public services, such as primary education, from the national government to local institutions. The government agencies like the Ministry of Education and Sports (MES) still develop and enact education policies, but the Local Governments' Act splits the authority for implementation of those policies between the national and local levels, allowing local government sectors to begin taking more ownership of local schools.

Overtime, the MES realized that the School Management Committees, a pre-constitution organized system should be better utilized. Historically, these committees were charged to monitor school progress and the MES believed the SMCs could help their workforce implement policies on the ground (Najjumba Vol III, 2013, pp. xv-xvi). These committees are considered governing institutions that control and manage primary schools "on behalf of the government" (Najjumba Vol III, 2013, p. 7). They were originally instituted in 1969; however, Acts such as the Basic Requirements and Minimum Standards for Schools in 2010, and the 2008 Education Act gave these committees more control. SMC's have six elected members that serve for two-years with a potential 2nd term extension.

The SMC representatives are appointed to their role by a Foundation Body formed for each primary school and are composed of former students, teachers, parents, and government officials (Najjumba Vol III, 2013). The World Bank report published by Najjumba et al in 2013 describes the "overall objective for which the SMCs were established is 'to manage schools,' which implied making decisions within the established legal framework and other confines of

primary education service delivery” (Najjumba, 2013 Vol III, p. 9). The SMC objectives and role has been outlined since 1969 to focus on “financial management of the schools...infrastructure and property development, management and maintenance; ensuring the discipline of learners and staff; and school level conflict resolution” (Najjumba Vol III, 2013, p. 9). Many of the SMC committee members understand why they are on the committee, yet due to limited resources and governmental outreach they are uncertain what the committee can actually accomplish (Najjumba Vol III, 2013).

While some countries have their own economic base from which to develop and drive new policy, Uganda relies on outside institutions to monetarily aid their development. United States Aid for International Development (USAID) and International Development Association (IDA) Education V, a branch of the World Bank, are the two organizations that have had a tremendous impact on education implementation and policy in Uganda. These organizations have played a big role in the progress that the Ugandan education system has made. The World Bank and USAID have aided Uganda with new textbook distribution, increasing primary school enrollment, and the 1994 Teacher Development and Management System (Arudo, 2006) (Ward, 2006). It is important to understand who is funding development in Uganda because education is generally viewed as a form of “development.”

By the late 1990’s, Uganda began to realize that the increase in students from the President’s declaration meant that their current infrastructure would need a drastic overhaul including more teachers, textbooks, classrooms and funding. Retroactively, the Education Strategic Investment Plan (ESIP), attempted to prepare the primary school system for a tremendous influx of children in 1998. The initiative set out to provide, “access, quality, equity, partnership (amongst private and public sector participants) and capacity building (a focus on

strengthening district level and central government)” (Ward, 2006, p. 6). The Education Sector Strategic Plan (ESSP) followed ESIP in 2004 (Education Sector Policy Overview Paper, 2006). ESSP explicitly delineated the objectives for primary through tertiary education levels throughout the country.

The Universal Primary Education (UPE) initiative, introduced in 1997, focused on building human capital through education. The government developed this initiative to help boost the economy. Eliminating tuition and fees drastically increased the number of children attending primary school, “from 3.1 million in 1996 to 7.6 million in 2003” (Overseas Development Institute, 2005, p. 1). An increase in primary school attendance and the implementation of the ESIP, led to an increase in primary school facilities, (from 8,531 in 1996 to 13,353 in 2003) (Overseas Development Institute, 2005, p. 2) but it has taken a long time for the infrastructure and teacher population to catch up to the increase in the student population. As of 2003, the average student to teacher ratio in public primary school classrooms was 54:1 (Overseas Development Institute, 2005). To further complicate the issue, as of 2003, 37% of primary schoolteachers “had no formal teacher training” (Overseas Development Institute, 2005, p. 2). During this time, Uganda allocated upwards of 30% of the national budget to education initiatives (Chapman, 2009). It is important to realize that Uganda was focused on educating its populous, yet there was no evaluation of its curriculum at this time and thus no measure of success.

The primary school system is not the only education sector that was overburdened. Following an increase in primary school enrollment, the secondary school system saw an increase in demand for access to public secondary education, something not universally available in most Sub-Saharan African nations (Chapman, 2009). “In 2006, Uganda became the first Sub-

Saharan country to adopt a policy of free universal secondary education (USE)” (Chapman, 2009, p. 77). Unfortunately, the USE highlighted the same Ugandan policy and implementation deficiencies that had plagued the UPE years earlier. When Chapman et al. (2009) went to interview “256 secondary level head teachers” they found that while 87.6% of them believed that USE was a good policy, “only 6.6% believed that USE was “‘very’ successful.” Even more unsettling, the overwhelming majority believed it to be “ only ‘somewhat’ or ‘not at all’ successful” (Chapman, 2009, p. 79).

While the education policies and initiatives within Uganda are an important component to the institutional ecology, how the education system functions, as mandated by the government is also distinctive and important to understand. “The current primary curriculum is divided into nine subjects in P1-3 (Local Language, English, Mathematics, Science, Social Studies, Agriculture, RE, Integrated Production Skills and Performing Arts and Physical Education). It then introduces Kiswahili in P4 and thus has ten subjects in P4-6. Because Local Language is dropped as a subject after P6 there are nine subjects in P7” (Ward, 2006, p.33). Many experts argue that ten subjects is simply too many to try and address successfully within primary and secondary education programming.

Uganda’s education policy is rooted in a governmental framework that is presented as a “4-tiered educational model,” with “seven years of primary education, four years of ordinary level secondary education, two years of advanced level secondary education and (three years of) the tertiary level of education” (Uganda Bureau of Statistics, 2006, p. 4). Access to education, specifically the upper tiers of the education system is very difficult to achieve. Primary education is a huge part of each child’s life and often times the only level of schooling that they complete. Therefore, AWF reaching students when they are in primary school is essential.

Uganda is currently in the process of applying for a World Bank grant that would aid in creating effective teachers, effective schools, and technical assistance (defined as evaluation, review and general capacity-building support) (Uganda Global Partnership for Education Project, 2013). While this proposal was just drafted in August of 2013, if funded, it would provide \$100 million USD to the Ugandan government specifically the Ministry of Education and Sports to help continue to achieve the UPE and USE initiative goals. This funding would be a tremendous asset to the Ministry and would certainly help alleviate some of pressure felt in over crowded classrooms with limited resources.

Environmental Education Policy in Uganda?

When looking at education policy, it is important to realize that countries set standards depending on their overall education goals and regional norms. In Uganda, the ESSP updated for 2010-2015, detailed the objectives for the education system as follows,

Primary-level pupils who can master basic literacy (reading and writing), numeracy and basic life skills, post primary students who are prepared to enter the workforce and obtain further education; and tertiary graduates who are prepared to be innovative, creative and entrepreneurial in the private and public sectors (Najjumba Vol II, 2013).

While these goals resonate with education objectives around the world, some constraints in this region are ignored. “Despite the fact that the ideal expected performance for any teacher ...based on test items (questions) drawn from the curriculum that they teach- is 100 percent... Ugandan primary teachers’ record of 84 percent in literacy and numeracy is considered high” (Najjumba Vol II, 2013, p. 98). The secondary teachers had comparable test scores when tested in literacy and numeracy, however, not within the scientific realm. Secondary school teachers

are employed as “subject specialists,” yet when the “S2 biology teachers” were tested, their test scores came in at an average of 65 percent (Najjumba Vol II, 2013). This drastic drop in knowledge comprehension with regard to biology is significant to AWF’s efforts within the region. If biology teachers are demonstrating a difficulty comprehending rudimentary concepts, there is very little foundation on which to base a conservation curriculum. It might be advantageous for AWF to create a curriculum that can be integrated into more than just the science classrooms within the region.

In numerous countries, environmental education standards are listed as part of the “science” standards. Other countries have specific environmental education, conservation education, or education for sustainable development standards that have been implemented. With so many different titles for the same type of education programming, it is easy for teachers to get lost or confused. While policy driven standards can focus on any number of subject headings, many specialists argue that teachers have a hard time balancing subject specific standards with subject directed curriculum goals. Simply stated, there are far too many standards and subjects that require individual attention.

For AWF, Uganda’s biggest education dilemma is a lack of explicit conservation education standards. A problem develops when teachers begin to feel overwhelmed and unaccomplished. This is mainly due to country standards and policies continuously demanding more of their education system. Currently Uganda responds to their unsuccessful education system by adding more subjects and policy regulations into the education sector. Rather than adding more subjects and policy heavy regulations to the curriculum, it would be better to alter existing policies to incorporate ideas of sustainability more effectively (Bjömelloo, 2007). When there are many demands put on a teacher and hundreds of standards to achieve throughout the

course of a year, the last thing needed is an extra regulation, however, some experts argue that these newer regulations could eliminate some of that workload. If policies encouraged the integration of environmental concepts into pre-existing curriculum rather than creating another set of new standards, teachers could meet more of their standards more easily. “If we want our school system to be successful with Education and Sustainable Development (ESD) the implementation of ESD should make it *easier* and more satisfying to be a teacher – *not* more difficult or more frustrating” (Bjömelloo, 2007, p. 19). Due to the lack standard specificity, teachers of any subject often address a topic in very different ways. The lack of teacher knowledge, preparation, and training only further exacerbates the inconsistencies found between classrooms. For environmental and conservation education to be successful in Uganda, there needs to be a set of standards created to address the goals and learning objectives for each grade level and each subject. AWF might benefit from creating their own set of standards, goals, and objectives for their educators to meet. While Uganda specifically does not have standards that are as rigid as many other places around the world, it is important to realize that these standards are continually evolving policy arena and the process of creating these policies is iterative.

Recommendations

Based on the information provided throughout this paper, there are various recommendations for both AWF and the Ugandan government. Our recommendations to the Ugandan government are large-scale policy options that would foster country-wide education and conservation successes far into the future, but ones that AWF cannot impact in any immediate sense. Our recommendations for AWF, however, can have more instantaneous and local impacts in places like Virunga and southwest Uganda.

Ugandan Government:

It would be advantageous for the Ugandan government to continue drafting proposals to the World Bank and USAID. If approved, these will help the Ugandan populace obtain the resources necessary to move up on Maslow's Hierarchy of Needs, making effective, widespread conservation education a more realistic goal. Eventually, once Uganda is able to provide exemplary primary education to all of its population, it will be easier to expand the curriculum and integrate conservation into the classroom. Plus, an increase in funding for education specifically might allow Uganda to economically incentivize teaching as a career and encourage more citizens to continue their educations and become teachers in the future. This will help address the large student to teacher ratio that still exists from President Museveni's proclamation and the Universal Primary Education and Universal Secondary Education initiatives.

Uganda is in need of concrete education standards. Over the next few decades, with or without outside funding, Uganda should attempt to create education standards that are less abstract and more measurable. Having standards that detail the objectives of a lesson and the reason that each lesson is valuable will certainly aid the teachers in this region. Furthermore, Uganda needs to start addressing the quality of its teachers, and would benefit from a teacher-training program. When only 63% of the teaching population has received an education more advanced than their primary school pupils, it is likely that teachers are not nearly as effective as they could be in delivering educational material.

AWF:

For AWF to succeed in developing a conservation school in the Virunga Heartland, it will have to create its own education standards and training opportunities for their teachers.

Educators need to understand what it is that they are trying to convey, the purpose for their lesson, and what tools they can use to teach it well. AWF has a tremendous amount of resources at its disposal, and they can be used to train local teachers to effectively communicate conservation topics, and to integrate with the existing curriculum in Uganda. Furthermore, if these trainings involve a detailed explanation of how these curriculum alterations will simplify the lives of each teacher (covering more ground in each classroom), and enhance the education of each student, they will likely receive more community support.

It is essential that AWF distribute education materials to a Virunga school that make conservation education easier to approach. Distributing lesson plans, computers, textbooks, and video would be an excellent start, but also incorporating local materials that do not require outside funding and support, and complement Virunga's local context. In the long term, AWF should work with the government of Uganda to help formulate more national education standards with an emphasis on developing a set of conservation education standards. In addition to this type of collaboration, it would be helpful for AWF to assist the government in obtaining funds to aid in meeting the basic needs of the average Ugandan.

Conclusion

The African Wildlife Foundation has started using the formal education system to create conservation awareness in various African Heartland regions. By establishing "conservation schools," AWF is reaching children of primary school age to promote future generations of conservation-minded citizens. As they look to expand their efforts, and decide where to site a new conservation school, AWF must first review the biophysical, human, and institutional realities of a Heartland, just as we have done. Additionally, coordinating with experts who have

extensive experience with conservation education in African nations can help AWF to discern what will be most and least successful based on a region's biological, social, and institutional context. We used the Virunga Heartland region as an example of how to review a potential site for a conservation school in this way in the hopes that AWF will employ a similar strategy as it proceeds with instituting formal education in its conservation schools.

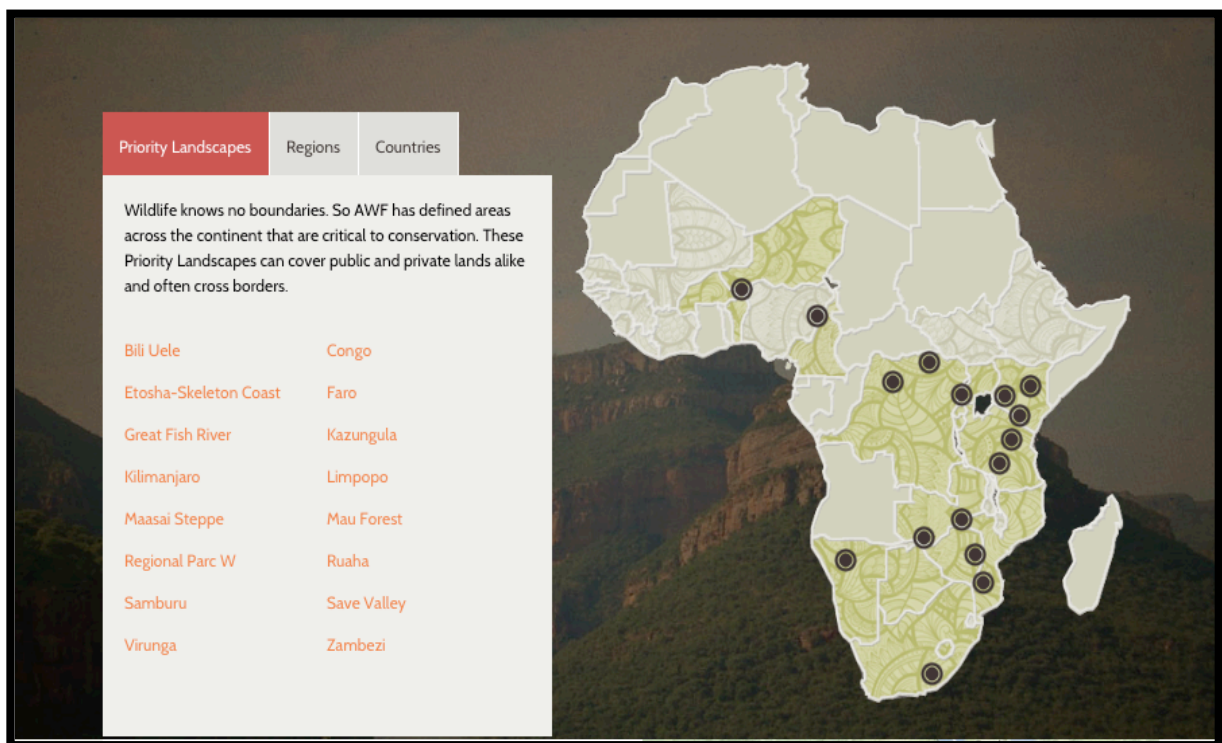


Figure 1: AWF's 16 Heartland regions (The African Wildlife Foundation, 2012).

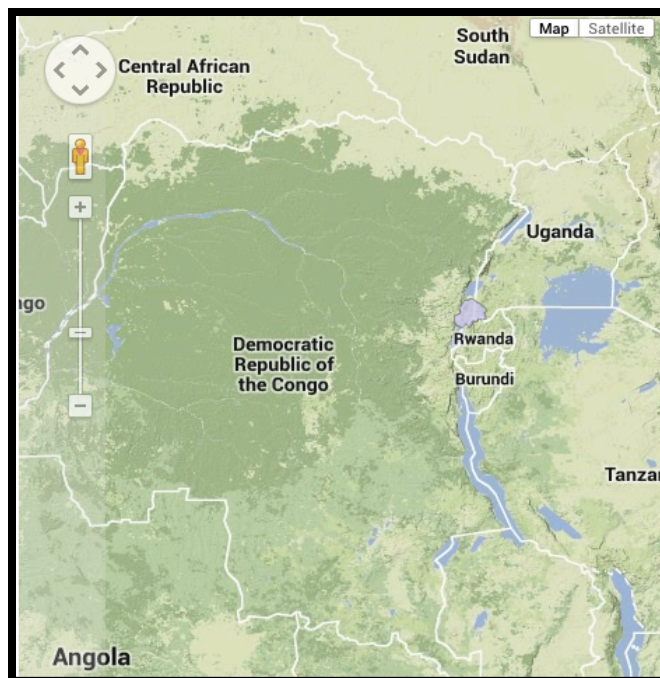


Figure 2: AWF's Virunga Heartland region spans Uganda, the DRC and Rwanda (African Wildlife Foundation, 2012).

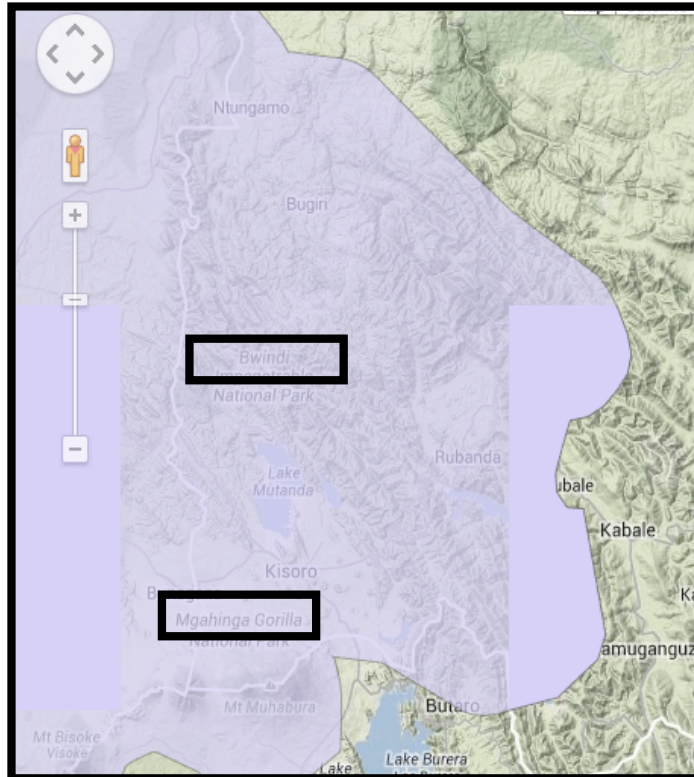


Figure 3: The Virunga region in Uganda contains two national parks, the Bwindi Impenetrable National Forest to the north, and Mgahinga Gorilla National Park to the South (African Wildlife Foundation, 2012).

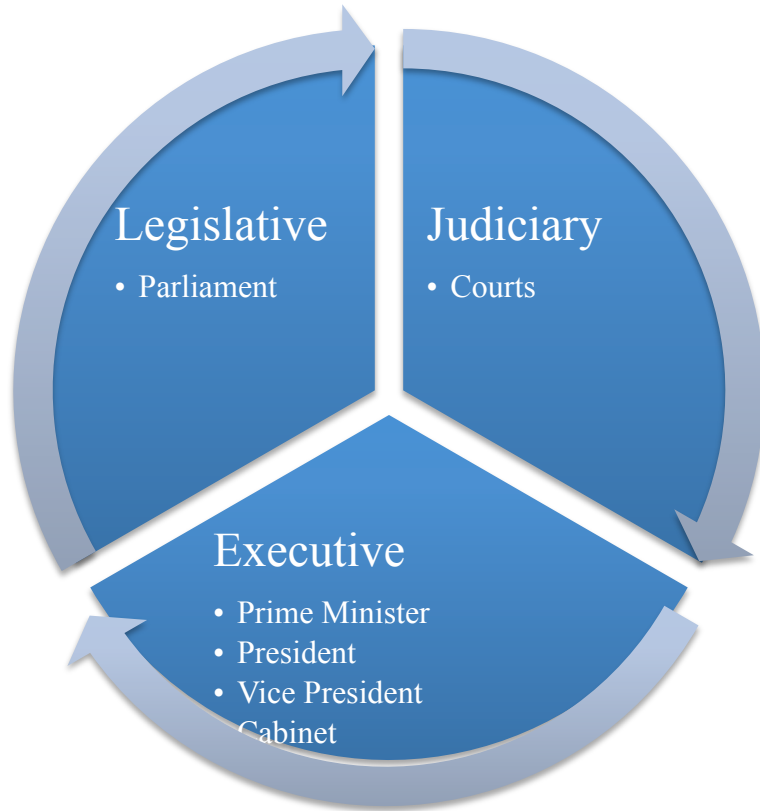


Figure 4: The Ugandan government system



Figure 5: Ugandan President Yoweri Kaguta Museveni

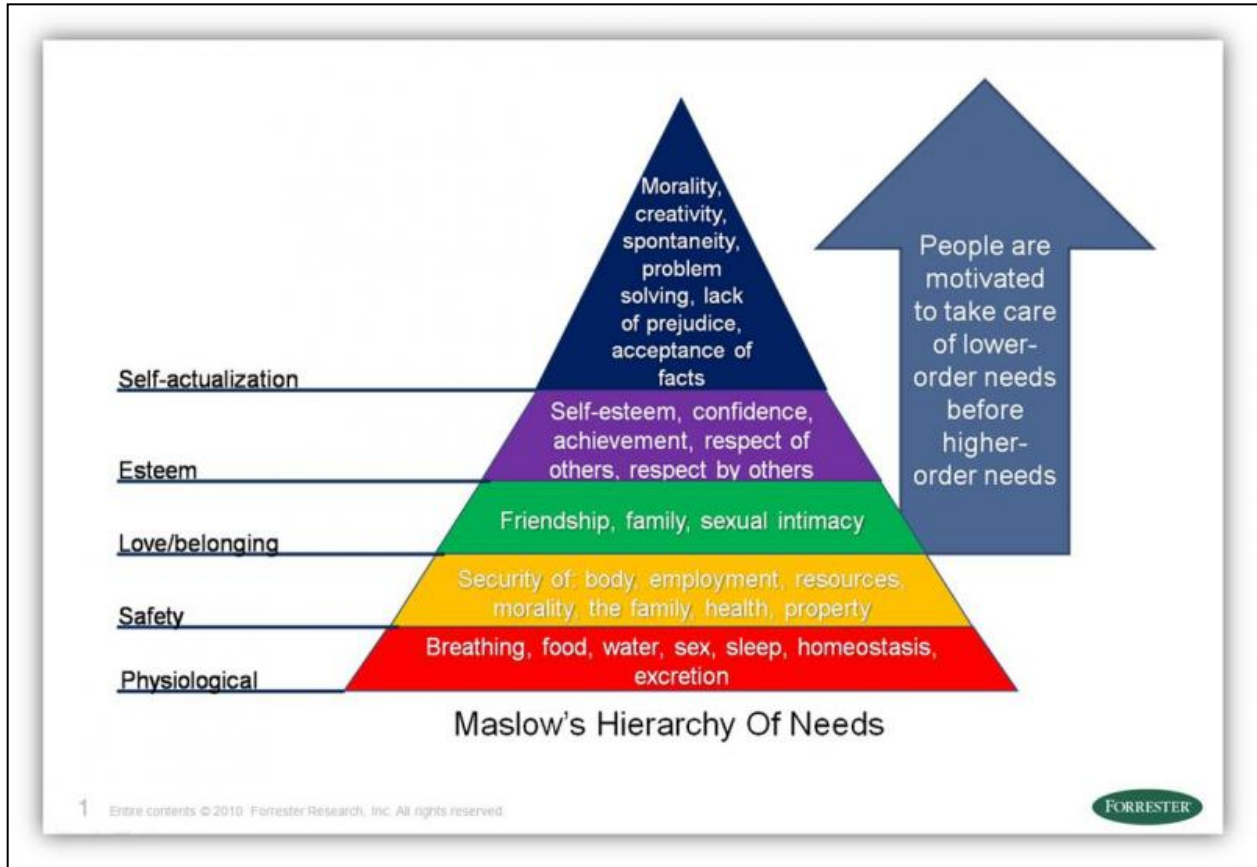


Figure 6: Maslow's Hierarchy of Needs

Works Cited and Reviewed

African Wildlife Foundation (2012). *Conservation Schools*. Retrieved from

<http://www.awf.org/community/conservation-schools>

African Wildlife Foundation (2012). *Our History: A Rich Tradition of Conservation*. Retrieved

from <http://www.awf.org/about/history>

African Wildlife Foundation (2011). *Virunga Heartland Is Biologically Rich--but Embattled*.

Retrieved from <http://www.awf.org/news/virunga-heartland-biologically-rich-embattled>

Arudo, ., Syngellakis, K., IT Power UK. (2006). *Education Sector Policy Overview Paper*.

Barifaijo, E. (1999). Earth Science Education in Uganda. *Journal of African Earth Sciences*,

28(4), 843-849. Blaak, M., Openjuru, G. L., & Zeelen, J. (2013). Non-formal vocational education in Uganda: Practical empowerment through a workable alternative. *International Journal of Educational Development*, 33(1), 88-97.

Björneloo, I. (2000). Drivers and Barriers for Implementing Learning for Sustainable Development in Pre-School through Upper Secondary and Teacher education.

Chapman, D. W., Burton, L., & Werner, J. (2010). Universal secondary education in Uganda: The head teachers' dilemma. *International Journal of Educational Development*, 30(1), 77-82.

Deininger, K. (2003). Does cost of schooling affect enrollment by the poor? Universal primary education in Uganda. *Economics of Education Review*, 22(3), 291-305.

Jacob, W. J., Holsinger, D., & Mugimu, C. (2008). Private secondary education in Uganda: Implications for planning. *The Teachers College Record*, 110(4), 867-893.

Johnson-Pynn, J. S., & Johnson, L. R. (2005). Successes and challenges in East African conservation education. *The Journal of Environmental Education*, 36(2), 25-39.

Kuhar, C. W., Bettinger, T. L., Lehnhardt, K., Tracy, O., & Cox, D. (2010). Evaluating for long-term impact of an environmental education program at the Kalinzu Forest Reserve, Uganda. *American journal of primatology*, 72(5), 407-413.

Ministry of Education and Sports, Education Planning Department. (2013). *Environmental and Social Management Framework, Uganda Global Partnership for Education Project*. Draft Report.

Mitra, J. D. (2001). *Uganda: Policy, participation, people*. World Bank-free PDF.

Najjumba, I., Bunjo, C., Kyaddondo, D., & Misinde, C. (2013). *Improving Learning In Uganda* Volume I.

Najjumba, I. M., Habyarimana, J., & Bunjo, C. L. (2013). *Improving Learning In Uganda: School-Based Management--Policy and Functionality* (Vol. 3). World Bank Publications.

Najjumba, I. M., & Marshall, J. H. (2013). *Improving Learning In Uganda, Volume 2: Problematic Curriculum Areas and Teacher Effectiveness: Insights from National Assessments* (Vol. 2). World Bank Publications.

Ssewamala, F. M., Wang, J. S. H., Karimli, L., & Nabunya, P. (2011). Strengthening Universal Primary Education in Uganda: The potential role of an asset-based development policy. *International Journal of Educational Development*, 31(5), 472-477.

Sullivan-Owomoyela, J. (2006) *Inter -Agency Network for Education in Emergencies Minimum Standards for Education in Emergencies, Chronic Crisis, and Early Reconstruction: A Uganda Case Study*.

Overseas Development Institute. (2006). *Universal Primary Education: Uganda Policy Brief*

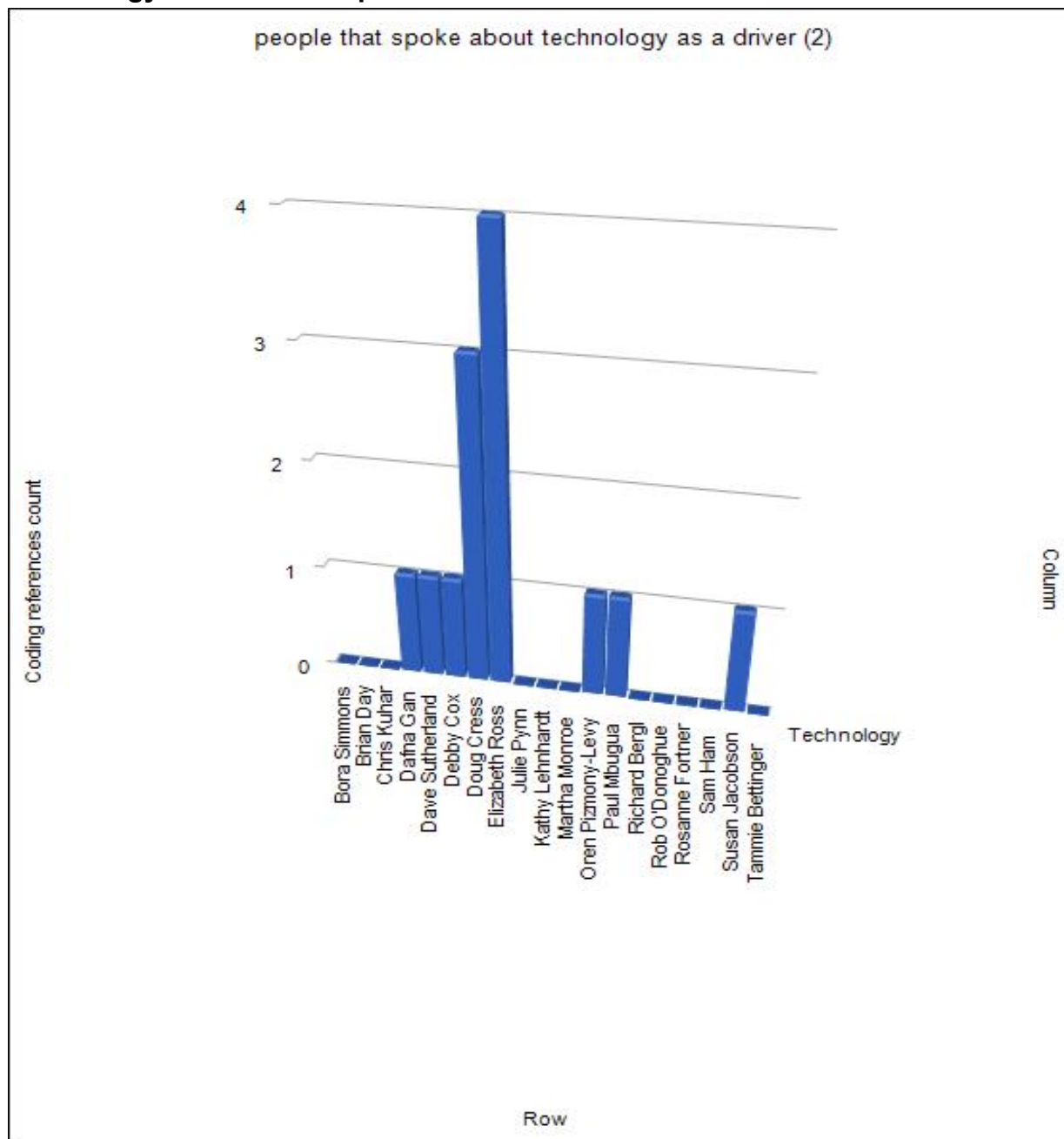
10. Inter-Regional Inequality Facility; sharing ideas and policies across Africa, Asia and Latin America

Ugandan Bureau of Statistics (2006). *The 2002 Populations and Housing Census, Education and Literacy*. Kampala, Uganda.

Ward, M., Penny, A., & Read, T. (2006). *Education Reform in Uganda-1997 to 2004: Reflections on Policy, Partnership, Strategy and Implementation*. Department for international development (DFID).

Appendix G

Technology Reference Graph



Appendix H

Word Cloud Drivers



Appendix I

Word Cloud Impediments

