Integrative Environmental and Public Health Policy: The Case of Leishmania in Kenya's Game Reserves.

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Integrative Environmental and Public Health Policy:
The Case of *Leishmania* in Kenya’s Game Reserves.

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Abstract:

Wildlife enclosures are argued by environmentalists and politicians alike as being beneficial entities for surrounding indigenous groups. These areas provide environmental, economic, educational, and cultural opportunities as well as promote eco-tourism and conservation values. However, negative consequences of these spaces must not be abandoned. While biodiversity positively affects the tourist sector, increasing biodiversity increases parasitic reservoirs and, thus, parasitic loads. Accordingly, health status and quality of life are in jeopardy for nearby populations. This thesis explores the methodology and importance of combining environmental and public health policy in the case of Leishmania in Kenya’s game reserves.

The genus Leishmania contains 20 pathogenic, unicellular heterotrophic protozoans. Also classified as flagellate parasites, Leishmania is endemic to 88 countries worldwide and puts over 350 million people at risk. The subspecies L. aethiopica, endemic to Kenya and Ethiopia, is the central focus of this thesis because its parasitic reservoirs are game animals, rock hyraxes, and one species of giant rat. A sandfly is the vector that transfers the parasite between animal and human. Human manifestation is clinically referred to as leishmaniasis. In the case of L. aethiopica, a rare, chronic form called diffuse cutaneous leishmaniasis appears as nodular lesions which typically last for three years. While forms of prevention and treatment are available, in African countries these are sporadically utilized and more rarely used properly. Issues of transportation and access to medical care, antibacterial resistance, and cost of medication are primary hindrances in treating leishmaniasis in developing nations.

Accelerating microbial traffic causes infectious disease emergence and reoccurrence. Kenya’s common accelerants are classified under changing environmental conditions, demographic changes, and deteriorating social conditions. The founder of medicine, Hippocrates, first emphasized the contribution of health of the environment and geographical location nearly 2,500 years ago; ultimately, good health is achieved through a balance between man and the environment. Combining environmental and health agendas increases the effectiveness of routine surveillance and helps control animal reservoirs. The goal of public policy—both environmental, economic, and health—was found to inadequately define sustainability and what it meant to individual policy notions. Furthermore, most policies lack a goal of integrating multiple forms of capital in their notion of sustainability. Integrative policies are the only policies which will lend themselves to improve overall quality of life for Africans. In this examination, policy of the tourism industry is most pertinent to parasitic disease in Kenya. Policies in this arena are inspected from both public health and public administration perspectives.
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Within this text, readers will learn a plethora of information about environmental and health issues. My interests in these subjects precede my four glorious years at Miami University. Therefore, it would be unfitting if I neglected to acknowledge lifetime contributors.

First and foremost, I would like to thank my parents. My earliest recollections are the days of family vacations with my parents, brother, and occasionally extended family, particularly camping—where I learned to respect the environment and protect it for generations to come. More recently, my parents have been instrumental in funding my education, encouraging me to remember my roots, and supporting me to follow my dreams. I can never express how much they truly mean. My Western Days have been blessed by the love and support of my boyfriend, Bryan Galli; without him, I don’t think I would have gotten through my collegiate years sane. Next, recognition must be given to my entire family—my bro, grandparents, aunts, uncles, and cousins; they’ve always been there for me. Finally, I would like to thank all the educators, coaches, and trainers that have gone beyond their call of duty. They’ve truly been instrumental in my life.

While the foundation for this thesis has been laid for quite some time, the incorporation of *Leishmania* came about after a summer of exploration in Miami’s Undergraduate Summer Scholars program. I would like to thank my USS advisor, Dr. Joseph Carlin, and Dr. Abhay Satoskar of The Ohio State University for their scientific contributions. Thanks to the Honors and Scholars Program for their financial contributions in helping me attend the American Public Health Association conference in Washington, D.C. in the fall of 2004. In addition, I would like to thank Dr. Terry Perlin, professor of Interdisciplinary Studies and my beloved advisor, for his input on his thesis as well for his humor and guidance over the past four years.

This thesis is dedicated to those Africans that gave so willingly to me during my travels to Kenya and Ghana in 2003 and 2004, respectively. They have truly redefined how I view life and were unprecedented examples of how to live a dignified life.
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Introduction:

The crossroads between health and environment have always been an intersection that interests me. While the question of what factors must be present for a given environment to improve health is worth answering opposing questions also beckon to be reconciled—how does genetic and behavioral health alter an environment. A love for the environment and medicine causes one with these passions to have a heightened level of awareness towards social policy. Although social policy of Western and developed nations have significant implications, in the developing world those implications are more straightforward. Straightforward because citizens of these geographic entities do not have the economic means to fall upon or governing bodies that act as “watch dogs” looking out for the best interest of all.

Within the context of Africa, vector-borne parasitic disease is an excellent example of not only the want but also the need to view policy from the lens of economics, environmental science, and public health. This thesis contains both theoretical and observational information. Due to the interdisciplinary nature of this paper, the chapters that follow could be presented in a wide array of linear ways. The order in which this thesis progresses is as follows because I foresaw the order as the most logical progression of disciplinary details. This discussion is broken into eight chapters. Chapter One examines a parasitic disease, leishmaniasis, in the context of Kenya. Next, Chapter Two is titled environmental influences on infectious disease while Chapter Three is an in-depth examination of Leishmania spp. and leishmaniasis. Sustainability and what lies behind the definition is presented in Chapter Four. The integration of environmental policy and developing nations’ economic endeavors is the subject of Chapter Five and public administration is the focus of Chapter Six. The final details of public health are found within the text of Chapter Seven. A conclusion that addresses the complexity of moving toward being medically self-helping is within Chapter Eight.
Chapter 1: Examining a Parasitic Disease in Kenya- *Leishmania*

Kenya is world-renowned for its wide array of wildlife that lies within game reserves and parks (Sindiga 5). Such wildlife enclosures are argued by most to benefit surrounding indigenous peoples by providing economic, educational, and cultural opportunities as well as being environmentally friendly and promoting eco-tourism and conservation values. There are, however, negative side effects of wildlife containment for nearby communities and their inhabitants. Animals, such as large game animals and rodents, are reservoirs for parasites that, when transmitted to humans, cause serious and sometimes fatal diseases. *Leishmania aethiopica* is a protozoan parasite found in game of two African nations, Ethiopia and Kenya. Even if a disease does not reach such proportions as death, disease decreases quality of life and economic pressures often ensue. Thus, it is imperative that initiates to establish and protect game reserves be cognizant of both environmental and public health policies to improve overall quality of life.

Geography is a discipline utilized to examine land areas, their uses and the results of these uses. It is a logical lens through which to view the environmental and health attributes of game reserves. Geography is defined by Peter Haggett as “the study of Earth’s surface as the space within which the human population lives” (Haggett 1). He continues by stating that geography is divided into three “strands”: the first emphasizes location, the second ecological relations, and the third unique characters of the Earth’s surfaces. However, the divisions and definition, and hence the practice, of geography may prevent reserves from being portrayed accurately. Haggett’s definition of geography does not include game preserves and other reserves that are meant primarily for the benefit of animals. Examples such as this can be brought to the forefront for all disciplines. Thus, if a solely disciplinary study were used to study Kenya’s game reserves and their relation to parasitic disease, a pivotal perspective on the subject would be surely neglected. There is no one discipline that encompasses the multi-faceted and interrelated factors of game reserve policy in Kenya. Therefore, this subject is one that *must* be addressed in
an interdisciplinary manner. One must critically examine the subject through each disciplinary lens, acknowledge the strengths and weaknesses of each discipline, reconcile differences between viewpoints, and develop an appropriate strategy to best address the subject for today in the future.

Within the tourism sector, biodiversity increases the number of species to which a tourist may be exposed. Within the food chain, biodiversity increases one species’ food supply and increases another species’ chances of becoming a meal. However, biodiversity within wildlife reserves may have an alarming attribute that few conservation biologists have pondered. For years, conservationists have tried to minimize the transfer of disease-causing microbes and protozoans between species, but have paid little attention to the fact their efforts may increase parasitic diversity. “‘It has never occurred to me as something that one worries about in a natural ecosystem,’ says Richard Estes, a biologist in Peterborough, New Hampshire, who heads the Antelope Specialist Group of the World Conservation Union” (Holmes 14). Vanessa Ezenwa, an ecologist with the US Geological Survey, found there to be a hidden cost of diversity. Ezenwa “estimated parasite loads in impala on five fenced game reserves in Kenya by counting eggs in faecal samples… (and) reports that game reserves containing higher numbers of bovid species—buffalo and antelopes, in other words—had significantly higher parasite diversity” (Holmes 14). Each species added to a preserve is a new animal reservoir for parasites. Ezenwa suggests that reserves begin monitoring parasites to prevent them from rising to dangerous levels.

Monitoring parasitic loads and biodiversity in a game reserve has great scientific as well as public health benefits. It is the intention of this practice to alert people to high or accelerating levels prior to a catastrophic event. An extreme example of a catastrophic event would be a plague which could result if indicators of a crisis are never recognized, overlooked, or misjudged. N.M. Ampel in a review of both modern and historical plagues found that “examples of new infectious disease share a number of features in common: (a) the onset of the new disease appears to be sudden and unprecedented; (b) once the disease is recognized, isolated cases are retrospectively identified that occurred well before the outbreak; and (c) previously unknown
pathogens or toxins account for many of the new infectious diseases” (Haggett 72-73). As Ampel suggests, four factors may be able to explain these observations: (Haggett 73).

1. The infection was present all along but was previously unrecognized. This is often due, in part, to the lack of infection in a large number of patients. 
2. Pathogens responsible for these new diseases existed in the past but in a less virulent form. Some event, such as genetic mutation, altered the organism into its more virulent form. 
3. A new epidemic arises from the introduction of a virulent organism into a non-immune population. 
4. Environmental and behavioral changes provide a new environment in which the disease-causing organisms may flourish. “Further back in time, the types of changes that accompanied agriculture may well have brought shifts in disease patterns. One hypothesis needing study is that malaria began to attack humans 10,000 years ago when Africans shifted from hunting on the savannah to farming in the forests” (Haggett 74).

Leishmania, as an infectious organism, has the ability to create an epidemic that, if in the visceral form and left untreated, could be deadly. The expansion of this parasite worldwide is a result of land use changes, introduction of animal reservoirs, and alterations in the sandfly population. Due partially to global warming, the sandfly population now covers a larger portion of the globe. Once tropical conditions are established, this insect can infect greater quantities of people. 

Global origins of geographical epidemics raise two important concerns that Haggett questions: “First, how do epidemic diseases emerge and can we trace their geographical origins to any particular part of the world? Second, why do more diseases appear to be emerging now and how far does this crudescence relate to the unprecedented changes in the global environment?” (Haggett 67).

The nature of epidemics is important when conducting geographical surveys. Defining the term epidemics has changed throughout history. Epidemic comes from two Greek words: “demos meaning ‘people’ and epi meaning ‘upon’ or ‘close to’” (Haggett 10). Conducting epidemiological studies has shown to be unique based on what type of communicable disease one is investigating.

A propagated epidemic is one that results from the chain transmission of some infectious agent. This may be from person-to-person as in a measles outbreak, or indirectly via some intermediate vector or a microparasite. In some cases, indirect transmission may occur via humans (as in a sandfly- man- sandfly chain
with *Leishmania*). In others, the survival of the parasite is independent of man. The second type of epidemic is a common-vehicle epidemic which results from the dissemination of a causative agent. In this case, the epidemic may result from a group of people being infected from a common medium (typically, water, milk, or food) which has been contaminated by a disease-causing organism (Haggett 12).

As Haggett states, reasons why geographical tracking is pertinent to epidemics include virological, epidemiological, clinical, statistical, and humanitarian.

The large-scale picture of environmental and public health policy in the context of game reserves is necessary to provide a backdrop. Environmental factors affect how individuals psychologically perceive themselves and the world in which they live. There is a need for behavioral science in the context of disease; this science has the potential to address concerns that can minimize disease while promoting health. Epidemiology, for example, has been criticized for being “based on ‘risk-factorology’: a never-ending, circular, and ultimately fruitless quest for the set of biological and behavioral risk factors that are associated with a disease, without addressing the true socioeconomic roots of the problem” (Elder 137).

Nonetheless, environmental factors, even at the microscopic level, are indispensable when examining disease. Leishmaniasis, the manifestation of the presence of *Leishmania*, is no exception. Interfaces between the environment and the host (vector), the host and reservoir, and the host and human are critical in vector-borne diseases. The study of outdoor spaces is an important topic in the observation of *Leishmania* in Kenya. Bucheton, Kheir, Hassan El-Safi, Hammad, Mergani, Mary, Abel, and Dessein observed “the interplay between environmental and host factors during an outbreak of visceral leishmaniasis in eastern Sudan” in 1999. These researchers noted that important “parasite-human interactions are exposure, parasite ‘virulence’ and host resistance factors” (Bucheton 1449). Factors that were studied included age, economic condition, malnutrition, impaired reactivity of the immune system, environmental factors—the presence of cows and neems in the household—and ethnic origin. The results of these factors were studied at many different stages of the disease. Environmental risk factors for visceral
leishmaniasis had a major effect during the ascending phase of the epidemic, but throughout the entire course of the disease the most important factor was ethnic origin (Bucheton 1453). This study alludes to the importance of studying both the presence of vegetation and animals as well as identifying how they affect the vector of *Leishmania*, the sandfly.

In 2000, Fichet-Calvet, Jomaa, Zaafouri, Ashford, Ben-Ismail & Delattres examined “the spatio-temporal distribution of a rodent reservoir host of cutaneous leishmaniasis.” Within their scientific paper, these authors discussed the importance of understanding population dynamics before implementing a preventative control strategy; a portion of this understanding is gained through index-based sampling. Rioux, Dereure & Perieres also emphasize that “searching for indicators is one of the central projects” (Fichet-Calvet 613). Fichet-Calvet *et al.* continue this notion of finding the connections between the indicators; an example of this is the correlation between rodent abundance, vector abundance, and transmission of *Leishmania* to humans (Fichet-Calvet 613). Many of the issues made known via spatio-temporal distribution are answered by simple ecological methods. Another means to reduce the presence of leishmaniasis is to conduct an epidemiological study. M. R. Yaghoobi-Ershadi & E. Javadian studied endemic areas of zoonotic cutaneous leishmaniasis and the reservoir hosts within them in order “to determine the ecology of natural reservoir hosts of leishmaniasis for possible future field trials of leishmania vaccine” (Yaghoobi-Ershadi & Javadian 587). All these researchers agree, however, that major health problems will arise due to hyperendemic zoonotic cutaneous leishmaniasis until something is done to control the animal reservoir.

Routine public health surveillance, animal reservoir control, and mapping have been noted for their positive role in the development of public health. Lawson and Williams note four advantages: accurate information would be available to the community about its current health status; if route profiles found the community to show signs of deterioration then early detection would instill minimal delay in remediation of the problem; hypotheses and more long-term analysis of geographical distribution of disease would be easily derived from existing knowledge;
and the details from these profiles would allow health authorities to provide the quality and quantity of resources appropriate to the local needs (Lawson & Williams 107). “To be successful, the epidemiological surveillance of communities requires two distinct procedures: the routine surveillance of the whole community; but also the in-depth surveillance of health parameters within the community” (Lawson & Williams 107). For those with a medical interest in public health, mapping is essential for determining differences in disease rates, mapping and interpreting ecological analyses, and map clusters of disease cases around putative sources of pollution (Lawson & Williams 108).

**Chapter Conclusion**

Examination of a parasitic disease must be taken from an interdisciplinary approach. Such an exploration of disease must include disease mapping, biodiversity sampling, and identification of parasitic loads to minimize the possibility of an epidemic and create public health initiatives within game reserves. When these steps are taken, the lack of a communicable infectious disease also has the potential to greatly benefit indigenous populations in the area. The presence of reserve game is, however, only one factor that influences infectious disease. Factors transcend the boundaries of game reserves and are rooted in an array of social, environmental, and demographic circumstances. Chapter 2 will explore “Environmental Influences on Infectious Disease;” environmental is used in the title in the loosest sense.
Chapter 2: Environmental Influences on Infectious Disease

Although an examination of *Leishmania* in Kenya’s game reserves from a purely ecological and microbiological standpoint would probably breed a much more directed conclusion, it would not recognize influences that some argue are far more significant. This chapter presents a holistic view of influences on infectious disease. An extremely significant contribution of this chapter is the recognition of the differences in *causation*, *agent*, and *correlation*. In addition, it is acknowledged that not all influences end up having the same affect on all people. In most instances, an infection must take place before someone even knows they’ve come into contact with an infectious environmental agent.

Mascie-Taylor’s exploration of “The Biological Anthropology of Disease” addresses the basic principles and factors which modify disease pattern. Mascie-Taylor identifies these principles: definition of disease, causation of disease, steps in the development of disease, classification of disease agents, the host-agent interaction, modes of transmission, and host defense systems. Factors that are known to modify disease include socio-cultural evolution, the physical environment, seasonal effects, movement patterns, customs and habits, urbanization, affluence, modernization, beliefs, occupation, sexual practices, agricultural practices, and control measures (Mascie-Taylor 1-26). Not all factors that Mascie-Taylor identifies are factors that directly affect leishmaniasis. Sexual practice, however, is the only one that does not alter one’s predisposition to the parasitic disease.

It is imperative that one keep in mind the different mannerisms in which something “influences” or “predisposes someone to” disease. Based on a wide array of infectious disease material, I believe it is best to categorize these “influences” into three categories: cause, agent, and correlation. A *cause* is an underlying reason for a condition. An *agent* is something that is able to produce an effect; in terms of disease, the agent is the “biologically active principle” (Merriam-Webster). Last but not least, a *correlation* is the “relation existing between
phenomena…in a way not expected on the basis of chance alone” (Merriam-Webster). Without such an understanding of these terms, it will be impossible to conclusively identify a disease’s triggers.

Platt is another researcher that discusses the causes of infectious disease emergence and reoccurrence. On the following page is a summary of ideas originally tabled by Platt. Table 2.1 is a reflection of what causes a disease.

Table 2.1. Causes of infectious disease emergence and reoccurrence (Platt 22-23).

<table>
<thead>
<tr>
<th>Cause to Speed Up Microbial Traffic</th>
<th>Specific Examples</th>
</tr>
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<tbody>
<tr>
<td>Changing Environmental Conditions</td>
<td>Deforestation</td>
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<tr>
<td></td>
<td>Agriculture and irrigation</td>
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<td>Dam and road building</td>
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<td>Poor sanitation and hygiene</td>
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<td>Climate change</td>
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<td>Demographic Changes</td>
<td>Urbanization</td>
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<td>Increased trade</td>
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<td>Travel and Migration</td>
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<tr>
<td>Deteriorating Social Conditions</td>
<td>Breakdown in public health services</td>
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<tr>
<td></td>
<td>War and civil disorder</td>
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<tr>
<td></td>
<td>Increased sexual activity</td>
</tr>
<tr>
<td></td>
<td>Intravenous drug use</td>
</tr>
<tr>
<td></td>
<td>Overuse of antibiotics</td>
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</tbody>
</table>

Molyneux, a professor of Biology, describes the emergence and reoccurrence in scientific terms. In his address of the “factors affecting history and outcome of infection,” Molyneux discusses parasitic strain, size of inoculum, site of inoculum, host genetics, acquired immunity, and nutritional state (Molyneux 192-193). This description is of how an agent influences disease.

Although the most noteworthy form of leishmaniasis for this project is cutaneous, the current issues regarding the other forms, mucocutaneous and visceral, are generally applicable to the study of cutaneous leishmania as well. Bryceson discusses that treatment options depend on what is the best regimen, what is the economic status of the country in which the patient is treated, how to account for drug resistance and the immuno-suppressed patient, and finally the balance between efficacy, cost, and speed of treatment (Bryceson 81). Bryceson’s report
reiterates the importance of long-term causes of disease, such as country economics, in the context of short-term correlations. In my opinion, this multi-level portrayal of medical diseases must be utilized to alleviate the problem.

Prior to an investigation of the factors increasing infectious disease, it must be made clear that a mere infection of an organism in a large population of people does not mean that an epidemic, plague, or even a rise in clinical manifestations will be seen. Mc Keown has noted the three events that may occur when a human host and infection come into contact:

1. the virus may fail to multiply and the encounter passes unnoticed;
2. the virus multiplies rapidly and kills the host without being transmitted to another host;
3. virus and host populations (after a period of adaptation) settle down into a prolonged relationship which we associate with sustainable diseases (Haggett 74).

Thus, separating causalities and determining the magnitude of each causality is difficult due to the lack of disease manifestation as well as overlapping disease agents.

Given the difficulty in asserting the causation, this chapter will be primarily devoted to environmental influences on infectious disease. Again, one must keep in mind these are separated only to better explain the detail of each type of influence; rarely does one influence result in an infectious disease. Rather, it is the conglomeration of a plethora of influences that initiate disease.

*Changing Environmental Conditions*

Poor agricultural practices in sub-tropical and tropical nations have been noted for increasing the prevalence of parasitic disease. “Transformation of the foci of diseases existing in natural landscapes, and modification in the forms of contact of the population with them, is a basic medico-geographical problem emerging as a result of changes in ecosystems” (Malkhazova & Karimova 33).

Due to the infrastructure of Kenya, it is often difficult for an individual to be able to come up with the time, money, and mode of transportation it takes to get to the nearest apothecary.
Some individuals can afford a small quantity of a medication, and have the intention of coming in the future to get the rest of the medication. It is in instances like this that Kenyans and people of developing countries worldwide develop of drug resistance. Resistance to malarial medications is the widest occurring example. Medications of Africa are unlike those of the developed world. No prescription is needed for most drugs, the drugs are not universally labeled or packaged, and pharmacists hold no license to dispense drugs. These attributes of the drug industry were quite apparent in my travels.

Demographic Changes

“The social conditions of human being are the largest determinants of their susceptibility to disease and these are politically shaped and driven” (Whitman 6). Specific political examples of infectious disease influences can be classified as either demographic causes or alterations in social conditions. These causes overlap in the political realm: legislation and political decisions alter the populations’ and outsiders’ ability to urbanize, increase trade, travel, and migrate. Political influences are not an agent of disease, rather they are causes or correlations. These political forces create and/or sustain agents; they are rarely simple and linear.

The identification of political causation—say, the marginalization and impoverishments of peoples, whether the culprit is identified as an international institution or the incompetence or corruption of local officials—or the isolation of disease agents, easily brings us to a… model of the incidence of infectious diseases, and of the relationship between human health and the environment more generally (Whitman 6).

Now more than ever, the human population finds itself in many more environments—natural and political—and, therefore, greatly complicates “both the epidemiological assessments of risk and political responses” (Whitman 7).

Nearly every place in the world has had some degree of human exploitation or intervention; there are truly few ‘natural’ environments anywhere. These non-natural environments have consequences for human health, both direct and indirect. An example would
be the attempt to eradicate or control disease vectors through extensive use of pesticides. Each year these fumigation programs cause “approximately one million cases of poisoning, with some 20,000 fatalities, principally in the developing world” (Whitman 7). Political agendas, at many levels of government, include wide-scale pesticide control. This example is directly applicable to *Leishmania* because of the attempt to control the sandfly. It is unfortunate, but the vast majority of political consequences of these programs will be discovered after it’s already too late.

It is far from clear what might be the legacy of extensive use of pesticides for the immune system of those most affected, but we are beginning to understand, belatedly, that ‘insect and parasite resistance to biocides… contributed to the persistence and evolution of disease, especially in the tropical parts of the world. […] Resistance emerged within a constellation of enormously complex social, medical and ecological problems, many of which were poorly understood during the middle of the twentieth century. Among these problems, the limited knowledge of entomology, parasitology, and human immunology played a decisive role’ (Whitman 7-8).

Although the example of pesticide control points towards many of the inadequacies and unknowns in political agendas, a potentially larger amount of damage would be done if nothing was done politically.

Political actions directly and indirectly influence the state of the human condition within geographical borders. There is no clear policy direction that law makers should take. On the contrary, there are a few points that Whitman sees as conclusions about infectious disease and humanity on a planetary scale:

1. *In microbial terms, globalization is already a reality.*
2. ‘Stability is a special case of change, not the natural order of things.’
3. *History may prove an inadequate guide: the possibilities are more extensive than recorded experience* (Whitman).

The diffusion of disease *agents*, such as protozoan parasites, has a major influence on the magnitude of a disease. Peter Haggett discusses the concept of spatial diffusion as central to geographical perceptions.

The Oxford English Dictionary defines diffuse as ‘to disperse or be dispersed from a center; to spread widely, disseminate’. However, in the geographical literature, the term *diffusion* has two distinct usages… Expansion diffusion is the process whereby a phenomenon of interest spreads from one place to
another. In this expansion process, the item being diffused remains, and often intensifies, in the originating region, but new areas are also occupied by the item in subsequent time periods. Relocation diffusion is also a spatial spread process, but the items being diffused leave the areas where they originated as they move to new areas (Haggett 2).

Torsten Hägerstand is a Swedish geographer that brought geographical interest into diffusion studies. Originally published in 1953 and the precursor for many American studies, *Innovation Diffusion as a Spatial Process* discussed the disturbances of locals accepting technological innovations. Profiling of diffusion and recognition of the four stages (primary, diffusion, condensing, and saturation) in the passage of an innovation through an area were other pivotal concepts that came from this piece of work. Hägerstand’s Monte Carlo diffusion model was “the first major attempt within geography to formulate a workable model of the process of spatial diffusion”; the works of Robert Yuill and Richard Morrill are noted for their improvements of Hägerstand’s model (Haggett 6).

Situating the issue of disease within its geographical place has been claimed as both helpful and harmful.

Eventually tropical medicine was transformed to a ‘medicine in the tropics’ and ultimately to a concern with the diseases of poverty and global communicable disease. It is no small irony that the renewed interest in the old tropical pathogens is linked with the ‘new’ or exotic diseases of the affluence and global travel, and it invest the earlier work of such medical pioneers such as Manson, Ross, and Castellani with new importance (Hellen 156).

Hellen names two extremely important areas of concern in the public health arena of tropical medicine. To prevent environmentally induced public health catastrophes, general practitioners need to have adequate advising in the field of medical training. Secondly, travel agencies must be cognizant they often promote, short term risk-taking activity via tourist migration.

Disease mapping is a central focus in linking environmental causation to the presence of disease. As Andrew B. Lawson and Fiona L. R. Williams state, “the ultimate aim in many studies that use disease mapping is the quantification of the deviation from the background level of disease expected for the community of interest” (Lawson & Williams 3). Hippocrates (born 460
BC) was the first to emphasize the contribution of health of the environment and geographical location; important in implementing Hippocratic medicine was the balance between man and his environment. “The potential contribution of geographical methods to the study of disease processes was first emphasized by the pioneer of public health in Europe, Johann Peter Frank in his book, *System emer vollstandigen medizinischen Polizey*, published in 1779” (Lawson & Williams 4). Leonhard Ludwig Finke’s *Versuch emer ailigemeinen medicinish-praktischen Geographie* was the first publication to comprehensively describe medical geography in 1795. Prior to this in the seventeenth century, John Graunt was the first to undertake a major geographically-based, statistical study of disease. It was not until three hundred years later that the full potential of geographical analysis was first realized when Melvyn Howe cumulated years of statistical annual reports and published *National Atlas of Disease Mortality in the United Kingdom* in 1963 (Lawson & Williams 5).

Nonetheless, there have been a number of infamous case studies, the most famous being John Snow’s use of mapping in epidemiology when he examined the cholera epidemics in London in the middle of the nineteenth century (Lawson & Williams 6). In summary of disease mapping, Lawson and William point out that any disease map must be considered with the appropriate background population which gives rise to the incidence; maps answer the question whereby revealing spatial patterns not easily recognized from lists of statistical data; and maps that show infectious disease can help elucidate the cause of disease and help generate hypotheses of disease causation. “Because maps provide the reader with clear visual impressions of the relationship between disease and geographical location, the impact of the environment on health will be better understood once maps have been constructed for a wide variety of disease, preferably spanning several decades” (Lawson & Williams 12).

Environmental influence on disease is addressed by Kroll-Smith & Floyd in *Bodies in Protest*. They argue that “our bodies are surrounded by environments and themselves constitute parts of the environments that other bodies experience. In spite of this close affinity… (or,
perhaps, because of it), most people do not pay close attention to their bodies’ complex relationships to biospheres and the things in them” (Kroll-Smith & Floyd 71). It is this neglect of recognizing the environment that poses a serious threat to survival and well-being. Kroll-Smith and Floyd realize, however, that sickness is inevitable when they quote Sontag. “Everyone who is born holds dual citizenship, in the kingdom of the well and in the kingdom of the sick. Although we all prefer to use only the good passport, sooner or later each of us is obliged… to identify ourselves as citizens of that other place” (Kroll-Smith & Floyd 71).

**Deteriorating Social Conditions**

The question of why parasitic diseases proliferate through the tropics and sub-tropics, yet are only minutely present in other areas is answered by some as an environmental conditions that are “conducive to the enormous diversity of parasitic organisms, and their transmission” (Esch 189). Esch, however, recognizes other factors that play a significant role in this presence. Poverty is rampant in most of the countries in these regions. Exacerbating the socioeconomic problems is political and social unrest that often leads to conflict and movement of mass numbers of people. Both of these factors lead to increased transmission of human parasites.

A recent (2002) press release from the World Health Organization (WHO) states that “mass population movements are fueling the growing epidemic of ‘black fever,’ better known as kala azar, or visceral leishmaniasis,” in a number of countries in the developing world since 1993. According to the same report, “an outbreak [of kala azar] in Sudan killed 100,000 in an area with a population of less than one million,” a hefty level of mortality (Esch 189).

Cook claims that “to some extent, these diseases exist because poor and disadvantaged people do not have access to the public health infrastructure that is available to people in the industrialized world” (Cook 135-136).

Within the literature of tropical medicine, the topic of a medico-geographical viewpoint often arises. Land development, obviously, alters the landscape but larger environmental changes must also be addressed. “Paradoxical as it may seem, economy-related; measures taken
in the name of development are often hazardous to the health of the population” (Malkhazova & Karimova 33). Worldwide, leishmaniasis affects approximately 20 million people. This disease is both a result of and causes environmental health concerns. Whereas Malkhazova and Karimova note economy-related endeavors to possibly negate parasitic disease, Rukunga calls for direct intervention. “Diagnosis and treatment of all human cases reduces the reservoir of human infection. Insecticide spraying in houses controls sandfly breeding. Personal prophylaxis involves covering cutaneous lesions. Health education is helpful” (Rukunga 163). All these interventions require economic capital—something that Africa doesn’t have.

Elimination/reduction of parasitic disease is an aspiration of many worldwide organizations and people everywhere. According to Esch, the issue of why parasitic disease is a problem in some countries more than others is an issue of modeling efforts, cost of treatment and drugs, and national priorities (Esch 192 & 193). Carballo points to global literacy, displacement, economic deterioration, and development projects as reducing mechanisms that work towards the elimination of parasitic disease. What causes the impedance of reduction to be baffling, according to Carballo, is the increased symbiotic relationships among countries, improved telecommunications, and educational efforts; Carballo advocates that the hindrance is ultimately caused by unequal distribution (Carballo 15-17).

John Snow was the first to underline the importance of social systems in health. His recommendations, however, have led to an imbalance of generating social capital versus such things as modification of an individual’s risk factors (Lomas 1181). In 1995, John McKinlay stressed “while still largely overlooked in epidemiologic thinking, social system influences…may account for as much (if not more) of the variation in health and/or illness statistics as do environmental influences, or even the attributes and lifestyles of the individual” (Lomas 1181). Health is argued by Lomas to be not solely an individualistic entity; rather, it is embedded in citizenry interaction and depends on the trust and association of those within communities. Three elemental aspects of community social systems influence health: physical structure, social
structure, and social cohesion (Lomas 1182). These prominent factors contribute to Patrick and Wickizer’s advocacy of community-level rather than community-based health interventions. “A community-level intervention is an intervention organized to modify the entire community through community organization and activation, as distinct from interventions that are simply community-based, which may attempt to modify individual health behaviors” (Lomas 1184). As discussed by Lawson and Williams, causal modeling is important to understanding disease patterns. Lomas argues that “individual versus social systems” should be presented in causal models and discusses how this can be done efficiently (Lomas 1186).

Gesler and Kearns discuss the interactions between culture, place, and health. Their exploration of the subject discusses the assumptions behind cultural geography and the recent emergence of a new cultural geography; structuralism, humanism, and postmodernism are also addressed in a cultural, public health perspective. Notions of healing landscapes, consumption, and medical metaphors are also presented. The structure and agency of health care is an issue of great importance to this project. Several key elements typify the structural approach; this perspective “assumes that there are underlying forces in society that create divisions along the lines of ethnicity or race, class, gender, age and other population characteristics” (Gesler & Kearns 50). When applied to health, the structural approach examines (1) inequalities in service provision, (2) the medicization of care, (3) the effects of restructuring and privatization, and (4) resistance to dominance. On the other hand, the humanist approach deems that the most important aspect of a situation is an individual’s subjective experiences. “In the realm of health care, the humanist approach leads us to ask questions about (1) the beliefs of different actors in medical encounters; (2) feelings of identity with places where health care is administered; and (3) the role of concrete and abstract symbols” (Gesler & Kearns 59).
Chapter Conclusion

Influence is complex: cause, agent, and correlation. Causation of disease is debated in the epidemiological arena as an environmental problem. Causal mechanisms, or sufficient causes, are often conceptually depicted as a theoretical pie; their intent is to pictorially represent those mechanisms causing a disease. Unfortunately, many causal mechanisms are incomplete. K. J. Rothman notes that genetic and environmental causes should always be represented within the pie (Rothman 10). John Stuart Mill, a well-respected scholar, has identified nine causal criteria—strength, consistency, specificity, temporality, biological gradient, plausibility, coherence, experimental evidence, and analogy—and notes the problems with each criterion. Others avoid this checklist approach because it is deceptive and, instead, advocate conjecture and refutation approaches (Rothman 20). No matter what approach an individual opts to take in assessing disease influences, the assessment must go beyond the obvious agents of parasitic disease and investigate the correlations which often provide insight to the causation.

While the macro portrait of leishmaniasis is imperative, so is the micro portrait. Thus, the microbiological specifics of the parasite Leishmania are explicitly stated in the next chapter. This chapter will provide sufficient background information on the diseases Leishmania species (spp.) cause, how they’re treated, and who’s at risk. General concepts of virulence, resistance, pathogenesis, and immune-suppression will also be presented.
Chapter 3: Infectious Disease - *Leishmania*

*Leishmania* are unicellular heterotrophic protozoans of the kingdom Protista and the phylum Mastigophora, which consists of approximately 1,500 species. *Leishmania* are sometimes referred to as flagellates due to the flagella that propel these microorganisms (Platt 12). The genus *Leishmania* contains 20 pathogenic protozoan species that cause a clinical manifestation known as leishmaniasis.

Old World cutaneous leishmaniasis was first described in English by Alexander Russell in 1856. Cunningham, who was working in India in 1885, correctly described *Leishmania* in a fixed section of a skin lesion. Adler and Theodor were the first to demonstrate that sandflies were the vector of *Leishmania* (Despommier 203). Englishmen, however, were not the first to recognize this disease; pre-Columbian Incas knew of the dangers of the disease and used captives to cultivate their cocoa crops rather than risk their own health (Allison 833).

<table>
<thead>
<tr>
<th>Table 3.1. Brief overview of <em>Leishmania</em>.</th>
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<tr>
<td><strong>Leishmania spp.</strong></td>
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<tr>
<td>Classification</td>
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<tr>
<td>Distribution</td>
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<tr>
<td>Who’s At Risk</td>
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<tr>
<td>Clinically</td>
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<tr>
<td>Disease Route</td>
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<td>Means of Killing</td>
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<td>Diagnosis</td>
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<td>Treatment</td>
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Compiled from Despommier & Allison
**Manifestation**

To reiterate, the presence and infection of *Leishmania* causes leishmaniasis. This disease is primarily a skin disease and is found in three basic clinical forms. The form depends upon the species, subspecies, and strain of organism: cutaneous, mucocutaneous, and visceral leishmaniasis (Allison 832).

Cutaneous leishmaniasis is characterized by chronic skin lesions. Lesions can be multiple and tend to ulcerate. These lesions tend to heal spontaneously, but often leave disfiguring scars (Allison 832). Mucocutaneous leishmaniasis has the potential to be fatal if an initial lesion produces a secondary infection of the mucosal tissues of the nose and mouth. This tissue destruction characteristically leads to gross facial deformities (Allison 832). Visceral leishmaniasis is most noteworthy by its gross abdominal enlargement and swelling of the liver and spleen. Other symptoms include fever, diarrhea, emaciation, anemia, and darkening of the skin. In untreated cases, the two year mortality rate is between 75 and 95 percent (Allison 832).

**Causes and Origins**

*Leishmania* infect organisms via zoonosis transmission from wild or domestic animals to humans. Bites from thirty species of the female sandfly, a 2 to 3 millimeter long insect, are the known vector of the disease. Parasites of the *L. mexicana* complex, including *L. mexicana, L. amazonensis,* and *L. venezuelensis* are transmitted by flies of the genus *Lutzomyia*; this complex is found predominately in Central and South America. Cases of *Leishmania* elsewhere in the world are a result of transmission by sandflies from the genus *Phlebotomus*. Major parasites that are infected into humans by *Phlebotomus* include *L. tropica* (Middle Eastern countries, central Asia, India), *L. aethiopica* (Ethiopia and Kenya), and *L. major* (India, Pakistan, China, central Asia, and Africa) (Despommier 203).

Female sandflies infect themselves with *Leishmania* parasites from an infected carrier—a human or mammalian host—when sucking blood to obtain essential protein for egg
development (Figure 3.1 above). Binary fission divides the protozoa into enormous numbers and eventually some parasites move to the pharynx and buccal cavity (Allison 832). Maturity of the parasite takes between 4 and 25 days until it has undergone major alterations; when the female stings its next blood source, the Leishmania is transmitted to another victim (Despommier 204).

Within female sandflies, Leishmania parasites exist as extracellular flagellated promastigote forms and are found exclusively in the alimentary canal. In humans and other mammalian hosts, these parasites exist as nonmotile intracellular amastigote forms in tissue macrophages (Despommier 204). Found in the reticuloendothelial cells, the clinically harmful form of the parasite divides by binary fission to destroy the host cell. Leishmania are taken up by sandfly while feeding on the skin of the host. These parasites develop into the leptomonad forms while in the sandfly’s intestine.
Each manifestation of leishmaniasis is caused by particular subspecies and is categorized uniquely. Cutaneous leishmaniasis is caused by several members of the *L. tropica* species complex in the Old World and *L. mexicana* or *L. braziliensis* species complex in the New World (Despommier 203). Unique forms of this disease rise from its geographical location, species of the *Leishmania* parasite, and proximity to densely populated areas. “Urban” forms are closely linked to canines as the animal reservoir while more “rural” cases tend to reserve in various rodents, marsupials, and foxes (Allison 832). Mucocutaneous leishmaniasis is grossly deforming disease caused by *Leishmania braziliensis*. Visceral leishmaniasis, or kala-azar, is a highly fatal form caused by three members of the *Leishmania donovani* complex. The fatality of visceral infection is due to the fact that organisms parasitize reticuloendothelial cells beyond the subcutaneous and mucosal tissue and often reach vital internal organs.

**Incidence**

“As a result of high levels of disease in rodent and dog populations, leishmaniasis is so common in endemic areas that it leaves its mark on every inhabitant” (Allison 832). Therefore, leishmaniasis has been regarded by many as the second most important protozoan disease; the most important being malaria. Cutaneous and mucocutaneous forms of the disease are also noted for their high incidence in heavily forested areas—particularly the Brazilian Amazon.

**Distribution**

Although an ancient disease, leishmaniasis is a disease of both the Old and New Worlds. Currently, leishmaniases threaten 350 million people in 88 countries throughout the world. Cutaneous leishmaniasis is found in Armenia, Azerbaijan, Turk-menistan, Uzbekistan, Afghanistan, India, Iran, the Middle East, North Africa, the Sahara, the savanna states from Sudan to Senegal, Kenya and Ethiopia (Allison 832); the figure on the following page (Fig 3.2) is cutaneous leishmaniasis. Mucocutaneous leishmaniasis only presides in the New World and is
found in Brazil, eastern Peru, Paraguay, Ecuador, Colombia, and Venezuela (Allison 832). Visceral leishmaniasis has clinically manifested in India, Burma, Bangladesh, China, Thailand, Somalia, Chad, Kenya, Gabon, Sudan, and Niger; a primarily pediatric version is common in southern Europe, North Africa, the Middle East, Romania, and the southern portion of the former Soviet Union (Allison 832).

Pathogenesis Rivas refers to Chang et al.’s two models of molecular determinants for the pathogenicity in *Leishmania* infections. First is “a group of surface and secretory products, identified as invasive and/or evasive determinants, which are involved in the establishment of infection and survival” (Rivas 297). Second are pathoantigens--intracellular molecules involved in pathology (Rivas 297).

Virulence and Resistance

The term virulence encompasses microbiological, pathological, ecological and evolutionary factors, with an additional complexity intrinsic to the organism in question… (and) is more complex for pathogens that cause long-lasting infections, and is particularly daunting for *Leishmania* because this parasite lives inside the macrophage, a key cell in the regulation of the host immune system. To give an idea of the complexity, infection of a macrophage by *Leishmania* changed the expression of 37% of the macrophage genes tested in a macroarray system (Rivas 297).
Resistance to virulent strains of *Leishmania* is often seen and poses a health concern for the patient as well as treatment concerns to medical and public health personnel. Because *Leishmania* is a more specialized pathogen than many other microorganisms, the probability of a given mutation to be detrimental for survival is greater than that for other pathogens dwelling in less stressful environments. There are two main forms of resistance to *Leishmania*: resistance may be a result of “colonal phenotypic variation” or an over expression of genes by creating an episomal element or through chromosomal plasticity. Virulence as well as resistance can also be associated with unique features of a biological system. In particular, the plasma membrane and DNA-repair machinery are essential (Rivas 299).

**The Immuno-Compromised Patient**

“Although *Leishmania* is hypoendemic in most of the 88 endemic countries, up to 40% of the population in these endemic countries produce a *Leishmania*-positive skin test in rural endemic areas” (Rivas 297). This statistic alludes to the fact that contact with *Leishmania* is more common than previously thought. Co-infection of visceral leishmaniasis in HIV-positive patients has been found to be between 1.5 and 9.0% in southern Europe (Rivas 297).

**Diagnosis**

Current diagnostic tests for leishmaniasis are summarized in the below table.

<table>
<thead>
<tr>
<th>Test</th>
<th>Procedure</th>
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<tr>
<td>Cutaneous scraping</td>
<td>Administer local anesthesia. Clean ulcer of crust, and dry with gauze. Scrape margin and central area of ulcer, and prepare five slides.</td>
</tr>
<tr>
<td>Punch biopsy</td>
<td>Punch 2 to 3 mm along active border; make tissue-impression smears from a biopsy sample by rolling the cut portion on a slide after blotting excess blood.</td>
</tr>
<tr>
<td>Needle aspirate</td>
<td>This test is useful with nodular and popular lesions, using 0.1 mL of preservative-free saline injected into the border through intact skin. Fluid is aspirated while the needles is moved back and forth under the skin; the fluid is useful for culture</td>
</tr>
<tr>
<td>Immunologic tests</td>
<td>Antibodies are detected most consistently in mucosal disease. Polymerase chain reaction (PCR) test is highly sensitive but not standardized. Test is species specific.</td>
</tr>
<tr>
<td>Skin test</td>
<td>Test is no longer available in the United States</td>
</tr>
</tbody>
</table>
The primary differences between first and third world parasitic disease are the susceptibility, diagnosis, treatment, and prevention of the parasites. Diagnostic procedures in Africa are the same as the U.S., but African health centers do not have as high rates of sensitivity as American clinics do. Many diagnostic laboratory tools, such as PCR, are not available in Africa on as wide a scale as in the U.S. It is also very difficult to obtain enough microscopic equipment to make five slides for every individual showing the signs of leishmaniasis; the equipment and funding for personnel are simply not available.

Often facing clinics filled above capacity with patients, it is difficult for medical personnel in Africa to determine whom to treat with their limited drug capacity. For the cutaneous form, treatment should prevail if lesions are cosmetically unacceptable, lesions are chronic and/or large, a patient’s immune system is compromised (often by HIV/AIDS), lesions are over joints, mucosal disease, nodular lymphangitis, and worsening lesions. An enlarged spleen, liver, and lymph nodes may also be grounds for treatment if other symptoms of leishmaniasis are present (Markle & Makhoul 1457).

Diagnosis is often more difficult in Africa as well due to rare strands of the disease. A rare chronic form of leishmaniasis called diffuse cutaneous leishmaniasis is endemic to Kenya and Ethiopia; this is caused by the parasite *L. aethiopica*. It is locally and hematogeneously spread from a primary lesion to produce generalized nodular lesions. These “dry” lesions are similar to those observed in lepromatous leprosy in the skin and urban cutaneous leishmaniasis; sometimes the lesions involve the nasal mucosal and laryngopharinx. Swelling of the infected area is common, but only rarely are there frank ulcerations. Lesions are chronic and usually last three years and eventually leave an indistinct scar. Two species of rock hyraxes and a giant rat, *Cricetomys gambianus*, are the known animal reservoirs of this parasite (Georgiev 706).
Treatment

Treatments for cutaneous leishmaniasis include Amphotericin B (Fungizone), Pentamidine isethionate (Pentam 300), topical paromomycin, oral antifungals, heat, and cryotherapy (Markle & Makhoul 1459). Healing is determined by a healed appearance at two months, no relapse at 12 months, and no subsequent mucosal disease. Mucosal disease requires a longer treatment course and is more difficult to cure (than cutaneous) (Markle & Makhoul 1459).

Control

Worldwide, the World Health Organization (WHO) has found it difficult to make recommendations to developing countries hoping to control transmission of *Leishmania*. Difficulties arise from the huge diversity of ecological settings in which *Leishmania* is found. Therefore, the only method of control that WHO recommends is control of the sandfly population although this is very expensive and is rarely done in Africa (Molyneux 48).

Control might soon be no more than a shot away: vaccine development against *Leishmania* is in its testing stages. In March 2004, a combination of killed promastigotes plus bacilli Calmette-Guerin vaccine was being tested in Iran, Sudan, and Ecuador (Markle & Makhoul 1460).

Prevention

Avoidance of sandflies, the vector of *Leishmania* spp. has been proven to be effective in prevention of leishmaniasis. Use of insecticides by U.S. travelers is important in endemic areas; house and space spraying are two effective methods of administering insecticides. Fine-weave pyrethroid-impregnated bednets has shown to greatly reduce the number of leishmaniasis cases. Trying to reduce animal reservoirs, often by spraying into rodent burrows, has had little success (Markle & Makhoul 1460).
The only method of prevention besides avoidance of sandflies is vaccination. “Live Leishmania vaccines have been used in military personnel (stationed in Africa) against L. major whilst ‘leishmanisation’ was practiced historically in the Middle East by initiation of an infection on a part of the body where the lesion will have limited social impact” (Molyneux 45-46). Although vaccination has been utilized as a method of disease prevention, no Leishmania vaccine is recommended for human use (Molyneux 46).

_A Closer Look at Parasitology in Africa_

The subject of parasitic disease caused by protozoan parasites is relevant worldwide, yet it is particularly noteworthy in Africa. Occurrence and distribution of human and animal diseases in Sub-Saharan Africa has caused this part of the world to be second to none in the prominent role disease plays in shaping history. In fact, West Africa is renowned for its title of “White Man’s Grave” due to high mortality rates of Europeans while visiting or exploring the area as a result of tropical diseases (Lucas 12). Today, it’s the Africans having the highest incidence of disease rather than the white man; Africa’s ability to escape the effects of parasites is hindered by the area’s poor socio-economic status. Evidence has shown that infections with protozoa can impair nutrition and growth when socio-economic status is low.

Africa’s illnesses are infamous. They include malaria, trypanosomiasis (sleeping sickness), blackwater and yellow fever, filariases, leishmaniasis, schistosomiasis (bilharziasis), onchocerciasis (river blindness), leprosy, yaws, guinea worm, helminthiasis, and tropical ulcer (Lyons 303). These diseases are prevalent in Africa and not in the United States because each geographical location has its own, unique disease environment. Every human being coexists with microorganisms; it is when one organism fails that the other wins. Co-inhabitation or mutualism is common and sometimes necessary in the microbial world. When conditions are altered, typically one organism thrives while the other dies.
The issue of why parasitic diseases proliferate through the tropics and sub-tropics, but are only minutely present in other areas is a question that many attribute to these areas of the world possessing environmental conditions that are “conducive to the enormous diversity of parasitic organisms, and their transmission” (Esch 189). Esch, however, recognizes other factors that play a significant role in this presence. Poverty is rampant in most of the countries in these regions. Exacerbating the socioeconomic problems is political and social unrest which often lead to conflict and movement of mass numbers of people. Both of these factors lead to increased transmission of human parasites. Cook claims that “to some extent, these diseases exist because poor and disadvantaged people do not have access to the public health infrastructure that is available to people in the industrialized world” (Cook 135-136). Additional influences were discussed in Chapter 2.

The climatic zones within the US and Africa are starkly different. Climatic measures such as temperature, humidity, aridity, and frost zones are major determinants of whether a disease-initiating organism and its vector can inhabit a region (Lyons 303). Proliferation of insects is a natural factor formed by local geographical and ecological factors that can completely hinder a disease, such as leishmaniasis, in the U.S. yet allow it to thrive in Africa (Lucas 13). The midwestern U.S.’ distinct seasons rid the landscape of many disease vectors for months at a time whereas Kenya’s seasons do not because they are based on rainfall rather than temperature.

Yet another sector of factors that contribute to different disease environments are sociocultural practices of communities and community groups. African culture consists of regular rituals that bring people into close contact with one another and physical environments which result in contact with “disease-causing pathogens” (Lyons 304). The majority of Americans do not come proximally close to agricultural practices whereas Kenyans do daily; this again, puts Kenyans and other Africans into environments where crops, possibly carrying pathogens, are brought near the homestead (Lyons 304).
Although some of the factors attributing to Africa’s high incidence of parasitic disease cannot be altered, the protein-energy malnutrition can. Many organizations have been established to help feed these children, yet the problem is still widespread. Africa’s staggering childhood mortality rates are due largely to the “synergism between protein-energy malnutrition and infectious and parasitic diseases” (Lyons 304). Until the latter part of the last century, Africa has been viewed as a helpless, “disease-ridden” continent. Sadly, this mentality persists in some individuals. Yet when one travels to Africa, it can be readily observed that Africans want their loved ones to live long, happy lives and would do anything to have the opportunity to provide healthy, high-calorie meals to their family. With education and financial backing, access to adequate food can become reality.

African economic resources and American economic resources present a dichotomy when evaluating amounts invested in medial infrastructure, education, and drug development. Many issues have created obstacles in establishing an effective budget in Africa: high fertility rates, civil wars and unrest, ineffective, and corrupt and unstable governments. Despite these concerns, the bottom line is that Africa’s infrastructure cannot provide essential services to maintain a healthy lifestyle (Lucas 13).

Essential services are exceptionally significant when determining access to medical care. It was apparent from my travels to Ghana and Kenya that the cost of health care, distance to a clinic, and available means of transportation in Africa are vastly different than in the United States. Although health care in Africa is much cheaper (in U.S. dollars) than in the U.S., low incomes in Africa makes it difficult to seek medical attention. Distance to a clinic, in general, is much further in Africa and it takes a much longer period of time to cover the distance and reach the medical destination when one does not have any means of getting there besides walking—often with children or produce on one’s back. Some African nations like Kenya provide free government clinics, but they are so overcrowded and under-medicated that Africans rarely use them.
A Conclusion- Thoughts on Infectious Disease in Kenya

Substantial gains have been made in the last century to eliminate traditional health problems and to subdue emergent problems. Now what must be done to negate parasitic diseases in Africa is to first establish African “health culture,” which refers to all the phenomena associated with the maintenance of well-being and problems of sickness with which people cope in traditional ways within their own social networks. It is a general term that includes both cognitive and social aspects of [health traditions]. The cognitive dimension involves values and beliefs, the blueprints for health action, and requires us to understand theories of health maintenance, disease etiology, prevention, diagnosis, treatment and cure. The social system dimension refers to the organization of health care or the health care delivery system. It requires understanding of the structure and functioning of an organized set of health-related social roles and behaviors (Gesler & Kearns 30)

After African “health culture” has been established, Africans must work inside this framework to consolidate the goals of medical efforts. This combination will allow the African region to be able to tackle the issue of providing an appropriate health care system to mechanistically prevent, diagnose, and treat protozoan parasitic diseases. Lucas determined this merged goal can be accomplished with a broad range of movements:

- Reform of Africa’s health care system and infrastructure to promote efficiency, cost, and effectiveness
- Strengthening and aid to help policymakers and health workers to manage a diverse array of medical needs
- Continuing of health research efforts to “guide decisions on local issues and to participate with the global scientific community in efforts to develop new and improved technologies” (Lucas 2001)
- Technical support of international governments and corporations to provide guidance that is designed to promote self-reliance

To change the status of parasitic disease in Africa widespread implantation is needed; however, there are things small groups can do. For example, Miami University’s Architecture Department should build an area to prep fruit and vegetables next to the marketplace in a Ghanaian village. All efforts, no matter how small, would greatly help out a population that is facing high possibilities of contracting protozoan parasites. Efforts that are currently being undertaken seek to increase Africa’s sustainability—precisely the topic of the next chapter.
Chapter 4: Sustainability and what lies behind the definition

Throughout the research process of combining environmental and public health policies, it became evident that one, if not the most, fundamental problem in reconciling disciplinary differences is the notion of sustainability and how to achieve it. This chapter will present a widely encompassing view of sustainability. Conventionally, the concept of sustainability is viewed exclusively in environmental terms. Sustainability, as a term, is found throughout numerous disciplines but does not always emanate the same meaning. “The notion of sustainability is best employed as an integrative concept which brings together the interests of all sectors of society and facilitates broad action incorporating health, economic, and environmental concerns” (Mason 76) while the power to maintain and support future generations without compromising the quality of life is its primary ideology (Dorf 2). Similar to “interdisciplinary,” sustainability has become a trendy vocabulary term that is found across higher education; yet it carries different meanings for different people. This chapter will examine the concept of sustainability and apply it to public health and public policy.

Sustainable Development

*Sustainable development* is noted as having health, economic policy, land use, ethics and education as its primary ingredients (Dorf 2). Development processes such as these both affect and are affected by their environments. Non-sustainable development process, on the other hand, neglects one of these primary ingredients.

A word that is generally associated with development is economy; sustainability is no exception. “The concept of (sustainable economy) is rooted in the hypothesis that economic viability, environmental quality, and social justice are interrelated in complex ways” (Dorf 2). Definitions of *sustainable economy* include the following:

- An economy that equitably provides opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations
A mixture of proactive visioning and sound economic reasoning
Meeting the needs of the present without compromising the ability of future generations to meet their needs
Maximizing the benefits of economic development, subject to maintaining the services and quality of natural resources over time
A fair balance among economic, environmental, and social goals while efficiently using renewable and nonrenewable resources
A sustainable economy is attained when rates of use of renewable resources do not exceed regeneration rates; rates of use of nonrenewable resources do not exceed rates of development of renewable substitutes; rates of pollution emission do not exceed assimilative capacities of the environment (Dorf).

The Environment and Public Policy

To some, the ‘environment’ is directly linked to their vocation and, hence, their livelihood. “To others the environment suggests a place, or an activity, which is associated with the time they spend on recreation— it is essentially non-vocational” (Redclift 4). Thus, the environment and perceived need for sustainability varies drastically. The current direction for environmental policy in developed countries is toward balancing what societies achieve by linking economic growth and environmental protection.

Sustainability is most usefully employed as an integrative concept, serving to integrate important policy domains, such as health and land use planning, within the wider compass of public policy. One way of conceptualizing these distinctions, and to integrate sustainability as a concept, is to identify different spheres of environmental activity (Redclift 5).

Redclift defines five spheres of environmental activity. These spheres are only separate for analytical purposes because we can distinguish causes and consequences; they undermine sustainability by increasing the vulnerability of both human populations and ecological systems.

1. The sphere of production
   - The individual’s immediate work environment (industrial risks, plant pollution)
   - Workface conflicts: health, work-related risks
   - Indirect consequences of production activities: waste, toxins, pollution

2. The sphere of consumption
   - The individual’s consumption practices and choices: health risks, food risks
   - Indirect consequences of consumption: food miles, ghost acres, ecological footprints
   - Socially generated consumption: energy, waste
3. The sphere of social capital/infrastructure
   - The built environment, urban space, public utilities, transport infrastructures
   - Spatial structures and access to services with distributional consequences (collective consumption)
4. The sphere of ‘nature’
   - Amenity and the countryside
   - Positional goods and landscape
   - Access to wilderness
   - Animal rights and welfare
5. The sphere of physical sustainability
   - Air pollution, climate change
   - Ozone depletion
   - Stability of coastlines, watershed forests, human management of ‘natural disasters’

Source: (Redclift 5-6).

The five spheres of environmental activity merge when focusing the lens of public policy. Activity of any sort is influenced a great deal of external factors, not just the natural environment. Redclift continues in the sustainability assessment of environmental activity by stating:

Existing ways of accessing the environment, and transforming it, reflect systems of power, and the exercise of power through choices, many of them market choices, which themselves are dictated by the distribution of income, and the existence of different social classes. Environmental policy and management is not divorced from a social context; it is the product of a social context. Environmental concerns are not only the outcome of the individual’s immediate experience of production and consumption, they are also socially constructed, and reflect the institutions which govern our behavior and values. The way in which environmental problems, and policies, are constructed in societies influences both the scope for achieving sustainability, and the way in which sustainability can be achieved (Redcliff 8).

*Sustainability in an African Context*

A U.S. citizen typically sees sustainable practices in the form of products with organic or pesticide-free labels, bicycle tires made from recycled rubber, or other products that have a physical and marketable sustainable appearance. Occasionally, we hear of someone visiting a historic landmark that reflects on sustainable farming, such as Cades Cove in Tennessee, or see sustainability practiced through “green” architecture or a wildflower prairie restoration area.
Culturally speaking, citizens of developed countries are guilty of not seeing the need to practice sustainability on a small scale. Reasons for this sustainable imperfection, more than likely, stem from our purchasing power and our access to raw, natural resources through available capital both home and abroad.

Limited resources and lack of financial capital on a personal scale cause Africans to practice sustainability on a daily basis. Examples of this sustainability are evident all around when traveling through African countries. My most memorable experience of sustainability in Kenya was the Maasai’s practice of gaining all nourishment and most of things needed for their livelihoods, such as leather doors and bone needles, from cattle. Nourishment comes in the form of meat, milk, and blood; varying combinations of these same three substances are used for medicinal treatment as well as they are steamed for pain relief during childbirth. In Ghana, children’s toys were the most memorable signs of sustainability; a typical toy consisted of an empty spool, a nail, and a long, fallen stick. Children would blissfully run barefooted down the dirt paths with a spool nailed to the bottom of the stick. African practices of sustainability have been noted by Westerners for various reasons; in my opinion because they are humbling practices. Paul Theroux described the process of African sustainability as:

The village had an air of being industrious and yet nothing seemed to change. Was there something African in the way that all this energy and motion left no trace? Women carried firewood; big girls carried small children or else buckets of water; boys played or hoed the rows of corn; men squatted in groups, muttering and smoking pipes. Food was grown and cooked and eaten. Firewood was burnt. The buckets of water were emptied. The people were sustained, and the achievement of the work was that life continued. All this effort was to hang on to life and remain the same (Robson 124-145).

**Environmental Sustainability**

“Environmental sustainability is ensued where the physical environment’s contribution to human welfare and the economy can be sustained, that is, renewal of natural resource systems is maintained” (Robson 126). While *environment* is a locale, surroundings or region, an
ecosystem is defined as a community of organisms and its environment. Authors often use ecosystem sustainability as a synonym for environmental sustainability. “A sustainable ecosystem is one from which we harvest a resource that is still able to maintain its essential functions and properties” (Dorf 10). Dorf recognizes five principles of ecosystem sustainability (Dorf 11):

1. The necessary conditions for processes in an ecosystem must be maintained.
2. Operation must be within the carrying capacity of the ecosystem.
3. Harvesting rates should not exceed the regeneration rate.
4. Waste emissions should not exceed the assimilative capacity.
5. The rate of exploitation of nonrenewable resources should be equal to or less than the rate of development of renewable substitutes.

An example of the complexity of sustainability from an intended practice is the example of off-road driving during safaris in Kenya. Safaris are intended to promote a local economy as well as protect populations of endangered and threatened animals, but these safaris often do more harm than is generally acknowledged. The flowchart below, Figure 4.1, explicitly displays the complexity of sustainable notions in Kenya’s Maasai Mara.

![Flowchart of the effects of off road driving](Mountain Forum).

In addition to sustaining an ecosystem, it is vital to preserve the stability of an ecosystem. A stability indicator often used by biological scientists is biodiversity. Three types of biological
variation are included in biodiversity: (1) genetic diversity, (2) habitat diversity, and (3) species diversity (Dorf 12).

Sustaining natural resources in a developing country is exceedingly complicated due to the financial/ economic hardships of indigenous people. Circumstances in Kenya often force populations to “short-termism” in order to survive, “even at the long term cost of liquidating natural resources (e.g. chopping trees to make charcoal in face of need for cash (by charcoal makers) and urban demand for cheap fuel supplies as kerosene becomes either too expensive or unavailable)” (Robson 128).

Many resource consequences affecting East and West African countries that are beginning today are expected to only escalate for future generations. Causation of many of Kenya’s resource problems are the over-grazing of cattle, use of chemical fertilizers (often fertilizers that are banned in the U.S.), lack of crop rotation, deforestation, and patchier, less predictable rainfall. Resource use is interconnected to larger issues, such as health. According to the World Health Organization and its proclamations on global health, “sustainable resource use” is a prerequisite for health. In addition, peace, education, shelter, empowerment of women, social justice, respect for human rights, equity, social security, and a stable ecosystem are other prerequisites (Elder 11).

**Social Sustainability**

It is important to note the relativity of sustainability; relativity is easily understood in the context of social sustainability. “Social sustainability implies maintenance of social cohesion and reproduction of important social institutions and civil society” (Robson 131). Key institutions such as trade unions, NGOs, education and health services are facing a state of non-sustainability through considerable difficulty in daily survival. While non-sustainability faces these organizations, other groups are relatively increasing their sustainability. Some of Kenya’s most
instrumental groups—“households, churches and other religious or ethnic associations—are becoming stronger as means of securing livelihoods and improving life chances” (Robson 131).

From an outsider’s perspective, it may appear that social cohesion and civil society has changed little for hundreds of years for certain Kenyan tribes. *The Maasai Warrior* was a text I had to read during my collegiate experience; the author, a member of Kenya’s Maasai tribe, came to Miami University to speak and dressed traditionally. I never expected the Maasai to appear and discuss things in the same traditional ways as the author. To my surprise, the majority of the elderly Maasai population was traditional while much of the younger population was more Western in dress. One must talk with the indigenous people, the Maasai, to grasp if the social aspects of Kenyan society are sustainable. While the Maasai are a relatively sustainable group, the majority of Kenyans and their important institutions, especially those near urban centers, are unsustainable.

**Ethical Sustainability**

“Ethical sustainability implies that human life (and other forms of life) is valued in the present and protected for the future” (Robson 131). *Ethical sustainability* discussions extend into human rights discussions. Two examples of major obstacles facing Kenyans are minimizing gender inequality and political retaliation. These are two areas of “life” that must be improved to ensure that human life is protected for the future.

In addition to human rights, environmental and animal rights activists want to invest effort, time, and resources into the ethical treatment of all life forms, especially biotic, and want to see sustainability outside the human realm. From a public health perspective, *ethical sustainability* is a notion transformed into indicators such as the number of uninsured (ideally low) and equal access to health care. In rural areas of Kenya, health care is frequently not provided by licensed professionals or by Western methods of medicine. Therefore, *ethical*
sustainability in Kenya’s health care system must include non-traditional forms and practitioners of medicine.

**Political Sustainability**

Political sustainability was not included in Robson’s “dimensions of sustainability.” According to the notions set forth in the other dimensions of sustainability, political sustainability can be defined as “maintenance of political systems to run efficiently, have appropriate resources to do so, and ensure a quality of life that is adequate for the citizens of within the political area.” Although this definition is my own, it is nonetheless a vital component in any society’s policy. Its importance increases in relevance in developing countries due to the inability of the public as well as the private sector to exercise sustainable practices without political support.

Tourism and game reserve upkeep are two important sustainability aspects that transect the public and private sectors. While some reserves can be owned by transnational corporations/NGOs, local for-profit, local not-for-profit or varying levels of Kenyan government, all reserves must rely on political stability for visitors since the vast majority of visitors are international arrivals. During my studies in Kenya in May 2004, the presence of terrorists, namely Al Qaeda, in Nairobi made international news; the final two weeks of my trip were rerouted to “avoid tourist attractions” and management at the majority of places we inhabited said they had “100% cancellation” for the remainder of the summer. Economic endeavors in developing nations that are marketed internationally must pay additional attention to ensuring political sustainability for them to be successful economic endeavors.

**Economic Sustainability**

Sustainable development, consistent exchange rates, high GDP, and absence of shocks and crises are all signs of economic sustainability. Features of economic analysis that one must be cognizant of when examining economic sustainability in the milieu of health economics—
“the study of the allocation of resources to and within the health economy” are identified by Folland, Goodman, and Stano. These economists state that there are many distinctive features of economics which can be identified, but they emphasized four for the study of health economics: scarcity of societal resources, assumption of rational decision making, concept of marginal analysis, and use of models as metaphors (Folland et al. 8).

Africa is, without a doubt, the most notorious continent for the first emphasized characteristic—the scarcity of resources.

Scarcity of (economic) resources is based on the premise that individuals must give up some of one resource in order to get some of another. At the national level, this means increasing shares of GDP going to health care ultimately imply decreasing shares going for other uses. The ‘opportunity cost’ of (what we give up to get) health care may be substantial (Folland et al. 8).

While most Africans notice money as the cost of a good or service, economists identify time as the ultimate scarce resource. This economic principle is employed when individuals sell their time for wages and refuse their time at other moments because “it’s just not worth it.” This principle also expresses itself in the availability of governmental and non-governmental free health clinics in Africa that are not utilized by Africans because the time costs of travel and waiting time are simply too high. The mistaken perception that money is more precious than time is not unique to Africa; rather, there are variables that minimize the effects of this impression in developed countries. For instance, in the United States, the availability of public transportation and health care transportation as well as the general practice of health care appointments rather than walk-in clinics allows US citizens to reduce the amount of time invested in acquiring adequate health care compared to African nations.

Economists view the decision maker as a rational being; one that makes “choices that best further one’s own ends given one’s resource constraints” (Folland et al. 8). In the absence of rational behavior from an individual, economists explain irrational behavior as a result of improperly understood incentives. Marginal analysis, the third featured attribute, is the decision maker’s process of understanding “the cost as well as the benefit of the next, or marginal, unit”
(Folland et al. 8); this process is often considered to be a mental trade-off between incremental costs and benefits at the margin. The final feature of health economics is the use of models. Economists used models to depict subject matter graphically, mathematically or verbatim. Many models are considered to be metaphors and a great deal can be extrapolated from them, but one (economists included) must not lose sight of reality in these simplified metaphors.

In Africa, the overall economy of a country is often grim. However, many people are not formal agents in the marketplace. Economic opportunities and adequate livelihoods are still possible in the informal sector (Robson 138). When the informal sector dissipates, this is when the majority of Africans suffer the most. Proximity to urban centers as well as profession determines an African’s ability to survive economic difficulties. Africans working in the formal business sector are more susceptible to fluctuations in a country’s economy than rural farmers. Farmers, also known as peasants, are

  hard working, resilient, resourceful, and quick to respond to economic opportunity. While not immune to the macro-scale crises in the…economy (e.g. inflation and fuel shortages affect almost everyone) farming and trading are sustaining rural…populations (Robson 139).

When economic troubles prevail and induce layoffs, it is not unusual for African countries to see reverse urban migration, also known as “rural migration.”

  No matter where an individual works and resides, Kenya’s economy overall is not, at the moment, sustainable. Unfortunately, it is a market built upon too many international markets and relies heavily on international monetary aid. Kenyan markets lack one or more of the primary elements to sustainable development, a concept with is intertwined with economy. It lacks health, economic policy, land use, ethics or education. However, this does not mean that Kenya is without any sustainable economic practices within its borders.

  Economically speaking, public health expenditure versus private health expenditure paints a picture of the possibility of individual economic sustainability in the face of health crisis. Unlike in the United States, a Kenyan is never given the opportunity to receive social security
from the government; it simply does not exist as in most African countries. In the WHO’s 2004 Annual Report, it stated that 0% of the Kenyan and South African governments’ expenditure on health was from Social Security whereas in the United States it was 32.9% in 2001. Economic sustainability is further unachievable in Kenya because of low population percentage who hold prepaid health plans. 67.6% of private expenditure on health care in Kenya is out-of-pocket whereas it is 22.1% in South Africa and 26.5% in the US. Contrasting out-of-pocket expenditures is the percent of private expenditure spent on private prepaid plans: 9.5% in Kenya, 72.2% in South Africa, and 64.1% in USA (WHO Stats 2004). Additional statistics (see Appendix B), such as GDP, mortality rates, and life expectancy, are important when looking at economic stability through the lens of health care; these rates determine the future economic contributions of the emerging generation.

Ultimately, what would be advantageous for today’s Africans and emerging generations is for them to have the ability to continuously recreate living capital until they are economically

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**Figure 4.2.** Flowchart of creating quality of life (Dorf).
“Living capital is the sum of the whole of mankind’s accumulated knowledge, their capacity for choice, and the store of embodied energy, as well as nature’s active potential to create and sustain itself in yet more complex and able forms” (Dorf 5). Quality of life, a result of the creating living capital and beneficial economical outputs, can be defined as the level of enjoyment, comfort and health in someone's life.

Although the notion of sustainability can mean a great number of things to different people, it is best understood as an integrative concept. In Africa, sustainability that will have the largest impact on the lives of Africans will have to have a number of sustainable aspects: natural resource use, land and water availability as well as usage, equal access to adequate health care systems, economic opportunity for all, political stability, lack of terrorism threats, and an appreciable quality of life. It is through effective policies that these aspects have the ability to grow in the positive direction; without growth, there will be no sustainability. Achieving sustainability is not going to happen overnight, it is going to happen when people from around the world all take baby steps in helping Africans learn to better themselves and create a sustainable environment for future generations.

**Chapter Conclusion**

As described in this chapter, many attributes of sustainability—political, economic and ethical—must be employed to ensue that game reserves are beneficial for both public health and environmental policy. Not only must these attributes be cognizant, but also integrative. Even with the most aware and elastic policies in place, the sector of tourism is subject to international politics. Therefore, in developing countries, like Kenya, where tourism makes up a large sector of the economy interest groups must emanate to congressional bodies that their politics affect the way of life for many citizens. Chapter 5, the following chapter, will present more methodologies in how to intertwine environmental policy and economic endeavors via tourism.
Chapter 5: Tourism—Intertwining of Environmental Policy and Developing Nations’ Economic Endeavors

This chapter explores tourism as a form of broad development strategy as well as tourism analysis, definition, and as an industry. Tourism occurs everywhere at levels with distinct characteristics for each level—world, continental, national, regional, and local. Therefore, for a policy to be effective it must address specifics that are important to its level of implementation. In the final section of this chapter, tourism as a means for bettering health and social systems will be explored.

Developmental models for sub-Saharan Africa are classified into three primary categories: “expanding and increasing the range of its primary exports from agriculture and mining; focusing on industrialization as a strategy for achieving quick and sustained economic growth;” and promoting tourism for international tourists’ interests (Sindiga 19). The first two categories were tried without much encouragement from the international community for the majority of Africans. Reasons behind the discouragement include continental “endemic economic stagnation leading to chronic poverty,” international debts, fiscal deficits, rising inflation, declining economic growth, and inadequate transportation routes as well as a general lack of infrastructure. A frequent developmental strategy that has taken place in Africa is the need for goods produced to have an out-sourced portion of production; out-sourcing no longer makes development progressive. Rather, it imposes such economic costs that the good no longer has a large enough profit margin to justify infrastructure investment. Agriculture failing as a development option incorporates marginal profit rationale as well as declining agricultural yields, declining per capita food production, and poor export record. Poverty in Africa has reached a level where the majority of Africans cannot meet their basic needs and, in some countries, national debt servicing obligations exceed entire export earnings (Sindiga 20).

Mitchell and Popovic first recognized the importance of tourism in development in the early 1970s, but international attention to tourism as a development tool was not gained until
1976 at a UNESCO-World Bank seminar in Washington DC. As Africa’s economic fortunes dwindle, the importance of tourism to the overall economy increases as well as the importance of tourism as a discipline. Tourism has been referred to as both a “cross-disciplinary field” and a “multidisciplinary field.” The earliest tourism studies were grounded in economics; these inquiries into tourism focused on monetary flows and benefits from tourism activity. Succeeding insights into tourism were from socio-cultural and sustainability perspectives. Consequently, “these developments have led to a scientific body of knowledge of tourism to which the social sciences make a substantial contribution” (Sindiga 14). Disciplines that are incorporated into tourism research include anthropology, business, economics, geography, history, leisure, recreation, management, political science, psychology, regional planning, and sociology. “Different scholars in different fields tend to utilize their disciplinary structures when working on a tourism problem. This causes communication difficulties” (Sindiga 15). Thus, an interdisciplinary approach must be undertaken when examining tourism and the larger picture of intertwining environmental policy and economic endeavors.

The context of development has altered tourism’s foci in the past forty years. Table 5.1 explicitly states the attributes of the four primary paradigms of development. Although the previous paragraph stated tourism as a development option became a popular concept in the 1970s, the embryonic stage of this notion began in the 1960s under the modernization movement.

<table>
<thead>
<tr>
<th>Development paradigm</th>
<th>Main components</th>
<th>Major Concepts</th>
<th>Implications for tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Moderization</td>
<td>diffusion of innovations; western culture is world culture; center initiates, disseminates and perpetuates modern ways</td>
<td>diffusion, change, top-down, center-periphery, nation-building, integration, “modernization” elite and masses, top-down, growth pole, growth center</td>
<td>Tourism is a modernizing force; supports tourism as agent of change; incipient tourism development</td>
</tr>
<tr>
<td>(1960s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Underdevelopment/</td>
<td>neo-colonialism; structural dependency; metropole-periphery; international capital</td>
<td>historical experience; neo-dependency Marxists, core-periphery, top-down</td>
<td>Tourism is an “export” in international trade and is subject to same rules; domination of multi-national companies, mass tourism</td>
</tr>
<tr>
<td>dependency (1970s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Donor-led international development (1980s)</td>
<td>rural development, development from below, development from within, basic needs</td>
<td>bottom-up, participatory, preferential trade</td>
<td>Mass tourism as a source of foreign exchange, participation of host communities</td>
</tr>
</tbody>
</table>
Analyzing Tourism

Analysis of tourism is generally approached from two distinct conceptual viewpoints: political economy and functional. The political economy approach, also known as the core-periphery model, views tourism as any other form of economic activity; ultimately, it is “governed by the political and economic structures which regulate world trade” (Sindiga 15). From this point of view, tourism is a global phenomenon that transcends national frontiers. Whereas, the other viewpoint sees tourism working within a defined area based on functionality; this contrary viewpoint, the functional approach, does not see the importance of international political environments when analyzing tourism. Political economy sees the patterns of current international tourism following economic structures that were established under colonial rule.

The argument follows the underdevelopment/dependency school and world system scholarship which hold that the world economy (read capitalist economy) shapes all societies notwithstanding their geographic location… The nature of tourism as a luxury export, Lea argues, creates structural dependency on external demand leading to alien development to which the local people cannot relate to. The sustenance of these tourist developments must depend on external support (Sindiga 15).

Due to the qualitative nature of the political economy approach, efforts when beginning and evaluating tourism tend to focus on organization, structure and cost-benefit analysis rather than negotiating the fine details of agreements between transnational corporations. Only with fine attention to detail will inequity cease to escape from the hands of developing African countries.

In 1982, Mathieson and Wall developed the functional approach to tourism analysis; this approach attempts to classify tourism in terms of its functional parts while ignoring the historical
experience of development. The functional approach acknowledges three basic elements of tourism: “(1) dynamic element: movement to and from a destination; (2) static element which comprises of the stay at the destination; and (3) the consequential element consisting of a study of the major economic, social and physical impacts of tourism” (Sindiga 16). Quantification is more important than qualification, problems in tourism are sorted out through management and appropriate policy instruments, the emphasis is on economic contribution, and indicators—such as foreign exchange, revenues, employment and GNP—are tourism’s performance indicators. It is “silent on causal relationships and ignores political structures and the wider societal and development issues” rather “it focuses on the nation-state thereby ignoring both the international and local factors and the interactions taking place at these different levels” (Sindiga 16).

**The Conceptuality of Tourism**

The concept and origin of tourism is deeply rooted in Western culture. “In Western Europe and North America, there is the widespread perception that tourism is essential to life; that ‘getting away’ is a symbol of socio-economic status, and that it is healthy” (Sindiga 8). Although a lay word, the definition of tourism is not agreed upon; it has a different meaning for different people. Table 5.2 is a representation of Sindiga’s definitions of tourism.

<table>
<thead>
<tr>
<th>Group of People</th>
<th>Definition of tourism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governments</td>
<td>Economic activities, revenues, employment, per capita expenditure, regional development</td>
</tr>
<tr>
<td>Industry</td>
<td>Promotion, arrivals, departures, length of stay, receipts</td>
</tr>
<tr>
<td>Religious groups</td>
<td>Pilgrimage, spiritual search, universal brotherhood</td>
</tr>
<tr>
<td>Host destinations</td>
<td>Idea of intrusion- European, British, American, Canadian, and Japanese tourists</td>
</tr>
<tr>
<td>Tourists</td>
<td>Escape from daily routine, indulgence in leisure pursuits, rest and relaxation, education, wilderness, experiencing other cultures</td>
</tr>
<tr>
<td>Conservationists</td>
<td>Reason for preserving natural and cultural environments</td>
</tr>
<tr>
<td>Academic community</td>
<td>A giant global industry in which appropriate studies include costs and benefits, its structure, form, stability, functioning, and impact at local, regional, national, and international levels</td>
</tr>
</tbody>
</table>
All groups can agree that, for the tourist, tourism is an alternative to work. The relation between tourism and recreation is also important to the concept of tourism. However, recreation can be done on the weekends, after work, and close to home whereas tourism is done for an extended period of time away from home. “Recreation and tourism appear to ‘differ more in degree than in kind’; both activities are pursued for pleasure and both require planning, travel to the experience, participation in the activity itself, travel back home, and recall of the experience” (Sindiga 11).

Tourism Externalities

Worldwide, externalities that arise from international tourism are both positive and negative. The Merriam-Merriam-Webster dictionary defines as externality as “a secondary or unintended consequence.” Externalities of tourism are particularly serious in Africa due to its lack of stability in numerous political, economic, and environmental aspects. Positive externalities include bringing attention to a physical place as a tourist attraction. “Attractions are created on the basis of natural endowments (scenic landscapes, wildlife, coastal beaches etc.), historical significance, culture, arts, crafts, dance, and a myriad cultural attributes” (Sindiga 8-9). Additionally, attractions must be well-maintained and husbanded to an extent that ensures a site will continue to appeal to tourists.

Hellen uses an analogy to parasitology for a unique positive and negative insight into tourism of developing countries. This analogy carries additional validity because the focus of this project is the relationship of parasitology to environmental, public health, and development policy.

The dictionary definition of parasitism as an intimate association between organisms of different kinds, involving a dependence on something else for existence or support, is a useful conceptual link between apparently unconnected aspects of the benefits and risks of this global industry. It serves to underline the dangers of conducting research into tourism in the developing world without recalling how, little over a century ago, indigenous tropical diseases had baffled a medical world whose knowledge was restricted to illnesses of temperate areas,
but it also opens up the prospect that global tourism may itself become a vehicle for investment in environmental health programs and securing improved health for all (Hellen 154).

The comparison of global industry and health in developing nations to parasites alludes to one individual benefiting from another’s demise. Unfortunately, it is quite evident that the tourism industry benefits despite the local population’s or tourist’s health.

On the negative side, tourism does impose costs on others who may not be entirely compensated by what tourists pay. “The presence of such externalities means inter alia that, even in a competitive market, buyers of tourism service do not always pay a price that reflect the true cost of the provision of those services” (Sindiga 9). Tourism suppliers do not have to meet all the costs incurred by the activity; as a result, ‘the market’ generates a socially inefficient level of tourism activity. Deterioration of both the physical and the socio-cultural environments are a result of negative externalities. The “interface” of tourism and the local people is especially significant in Kenya with the property rights of local communities being undermined. Due to significance of agriculture in both feeding a family as well as selling cash crops, when property rights are lost it may lead to the deterioration of a family financially as well as psychologically.

Wildlife-based tourism throughout Africa has also produced pasture and water right conflicts due to the literal encompassment of a once accessible public good. Fenced property that was once used for water catchments and grazing becomes cut off from the public’s use. Women and children must travel greater distances to gather water and settle for water of lesser quality; thus, this impact of tourism is the one that is felt daily and decreases the quality of life in Kenya. Additionally, pastoral lands become isolated with the fencing in of game reserves. Herders and their livestock must travel great distances to avoid these once-frequented areas. In times of reduced rainfall and drought, the removal of grazing lands may cause such a burden that livestock fall ill and die. Thus, when implementing or imposing wildlife-based tourism one must be cognizant of adjacent lands as well as agricultural practices on land that is to be converted.
Depending upon the size of the game reserve or park, the impact of environmentally-based tourism may disrupt the wildlife’s natural food chain patterns and begin to domesticate the animals. Baboons and other members of the ape family changed their behavior when they saw our Land Rovers approaching around Lake Nakuru; they physically and emotionally changed their state of being to gain attention. One baboon at Baboon Cliff even went on top of the vehicle and began reaching its long arms into the empty vehicle when it saw a box of crackers. It was an example of tourists not trying to feed the animals, but of the animals taking advantage of the tourist population. Repeated actions, even when they’re not at the discretion of tourists, cause the animals to become domesticated. In addition to domestication, loss of game trails is an extreme possibility in parks that require vehicles to stay on a path or roadway. While many species, like antelopes, are more dispersed, others follow each other close in line and wear away the earth to produce game trails. When trying to establish vehicle routes in a reserve, park employees often choose these game trails due to less physical labor in establishing new pathways and the knowing that the course is safe or else game would have opted for a different path.

Another negative externality is the effect on African culture. Once a tourist market is introduced, the local people as well as outside tourism investors transform culture into marketable goods and services and skew it to profitability. While in the market place it is obvious when looking for a good if it was produced by the seller or by someone else. Many of the African masks and wall hanging are mass produced, bought in bulk, and the seller profits off marginal bargaining. These mass produced items are available at the majority of store fronts (often a table, a shanty, or a tarp) and are obviously not made from local resources or with local labor investments. Therefore, tourism alters the use of resources, labor, and culture.

Tourism is one of the primary means African governments and NGOs have utilized to increase economic development. Development in the form of tourism affects social structures, physical landscapes, and local level dynamics rather than just per capita incomes.
It subsumes ‘reduction of poverty and greater equity to progress in education, health and nutrition, and to the protection of the environment.’ Only the environmental protection through effective resource management strategies can assure sustainable development (Sindiga 1).

From an African context, tourism must contribute to poverty alleviation and the overall economic progress of the continent. Ideally, endeavors from the tourism industry would positively affect the status of education and health resources.

Tourism as an Industry

J. Anthony Hellen found that the modern tourism began from Europe with the American Express Company under the direction of Thomas Cook. Cook organized his first expeditions in the 1840s through ticketing agencies that filled steamboats and trains; thus, he created tourism in the modern sense. The reduction of the requirements for travel to luggage meant increased mobility of the traveler and thus began the tourism industry. Paul Fussell, a literary historian, noted: “‘before tourism there was travel and before travel there was exploration. Each is roughly assignable to its own age in modern history: exploration belongs to the Renaissance, travel to the bourgeois age, (and) tourism to our proletarian movement’” (Hellen 159).

In terms of the numbers of people participating, the amount of resources generated, and employment opportunities, tourism and travel are “among the world’s largest industry” (Sindiga 2). If the trend of the past ten years continues, the World Trade Organization estimates that global international arrivals will reach 937 million in 2010. This incredible flux of people touring has created large economic changes; in less than ten years, international tourism receipts more than doubled from $204 billion in 1988 to $443 billion in 1997. Investments in tourism infrastructure, facilities, and equipment have proven to be success economic endeavors from a financial standpoint. One researcher, Richter, even speculated that one in sixteen people in the world work in tourism (Sindiga 3). Africa, however, does not rank highly on the list of geographic areas that tourists visit. While Africa received 3.5% of arrivals, Europe had 60%,
Americas 20%, and East Asia/Pacific 13%. The only two regions with lower international arrivals were the Middle East with 2% and South Asia with 0.7% (Sindiga 3).

**The Scales at Hand**

World, continental, national, regional, and local scales of tourism are vital for accurate perspectives of not only tourism, but also the effects of tourism. The most difficult hurdle to overcome has been the ability to decide which scale would be allow for the greatest sustainability and efficiency of tourism; each scale is one that offers an important aspect in how environmental policy and developing nation’s economic endeavors mold tourism.

For the current subject of study, one of the most relevant issues that must be examined is the worldwide effects of tourism on public health. David Satcher, Director of the Center for Disease Control, has written that, in the 21st century, public health must be global in its perspective and approach.

As disease knows no borders, the health of all human beings on the planet must be the concern of every person in public health. We are already a global village. We believe that, in the 21st century, to raise a child will take not only a village, but a global village (Kerns 216).

Tourism can enlighten diplomats of foreign countries and wealthy of the problems facing mankind worldwide, but those that are well traveled also begin to understand the extent of the inflictions altering the lives of developing nations’ citizens. Personally, it made my heart wrench to see children playing in sewage and chemically tainted (often green) water of not only one village, but all villages. I didn’t know where to begin to help those suffering. Who should I choose first? Where do I draw the line of giving? Therefore, worldwide aspects of tourism on public health are insightful, but often leave one baffled.

Intra-continental comparisons of both tourism and health care systems as well as their effects on one another are important to find how countries compare to those with similar geographical location, biophysical elements, temperature/precipitation ranges, climate for
disease, and, in the case of Africa, similar colonial history. Such associations allude to relevant aspects of health care systems in terms of the government’s abilities to help its citizens and the economic viability of tourism to truly alter the state of health. Table 5.3 is a comparison of leading African tourism nations in terms of receipts and how much each tourist contributes to the economy of the country.

Table 5.3: Leading African tourism destinations by international arrivals, 1996.

<table>
<thead>
<tr>
<th>Country</th>
<th>Arrivals (thousands)</th>
<th>Receipts (US$ million)</th>
<th>Per capita receipts (US$ million per thousand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>4640</td>
<td>1738</td>
<td>0.37</td>
</tr>
<tr>
<td>Tunisia</td>
<td>3885</td>
<td>1436</td>
<td>0.36</td>
</tr>
<tr>
<td>Morocco</td>
<td>2693</td>
<td>1292</td>
<td>0.47</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1743</td>
<td>219</td>
<td>0.12</td>
</tr>
<tr>
<td>Kenya</td>
<td>907</td>
<td>493</td>
<td>0.54</td>
</tr>
<tr>
<td>Botswana</td>
<td>660</td>
<td>178</td>
<td>0.26</td>
</tr>
<tr>
<td>Mauritius</td>
<td>435</td>
<td>473</td>
<td>1.08</td>
</tr>
<tr>
<td>Namibia</td>
<td>405</td>
<td>265</td>
<td>0.65</td>
</tr>
<tr>
<td>Reunion</td>
<td>339</td>
<td>--</td>
<td>N/A</td>
</tr>
<tr>
<td>Tanzania</td>
<td>326</td>
<td>322</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Source: WTO, 2 April 1997 (Modified from Sindiga 7).

From the statistic of per capita receipts, it is obvious that each tourist arriving to Kenya spends more per capita than in the four aforementioned countries with greater numbers of international arrivals. However, countries having fewer international arrivals (except for Botswana) profit more from each tourist than Kenya does. It is important, therefore, for Kenya to look to South Africa, Tunisia, Morocco, and Zimbabwe for ideas of infrastructure to see how better to attract tourists to Kenya for their next travel destination; whereas, Mauritius, Namibia, and Tanzania should not be overlooked when trying to develop new ways to market goods and services in Kenya because their economy receives more capital from each tourist.

Structures set forth by governments are vital to the national state of tourism, health, and the interface of these two. The manner in which funds are appropriated for both of these sectors of the public budget often reflect on how they are spent and if the money truly is able to do what it was intended to do. African countries are notorious for not getting funds to those populations
that need it most due to embezzlement; and poor economic standing of many government workers causes the temptation to outweigh the punishments. National policy structures are failing in Kenya’s health system. Since 1963 the postcolonial government has been the major provider of health care in the country; therefore, when public health policy fails at a national level it fails at the majority of levels. In all sectors of public policy, situations are “aggravated by the fact that only about 70% of (all Kenya’s) funds voted are actually allocated to the recurrent budget thereby leaving in absolute terms, insufficient resources for operational expenses and in particular, the provision of quality and accessible health care services” (Oyaya 115). Kenya’s gross domestic product (GDP), a measure of economic growth, is 1.5% per annum. It is one of the countries “in Africa with the fastest declining economy” (Oyaya 114). The health sector at the national level has shown to be ineffective.

Another important scale at which policy initiatives are taking place is the regional level. Kenya’s regions are better known as districts, the U.S. equivalent to a state. The public health strategy outlined in 1983 titled District Focus for Rural Development (DFRD) established “the district as the basic level responsible for operational tasks with relatively limited strategic functions” (Oyaya 116). District Health Management Teams operate accounts through World Bank credit to deliver health care services. Thus, the national government has moved more towards regional control of health care.

The goal of decentralization is therefore to ensure the rationalization of the management and delivery of health care and the gradual transfer of the process of decision making and management of health resources from the central administration at the national level to the local levels (Oyaya 116).

Oyaya’s reference to “local” is in fact regional in the context it was stated.

While the previous reference to local meant regional, many feel that local policy refers to their city, village or town. Local policy has impacts in developed nations, but it has added importance in developing nations. The most effective policy initiatives that I saw while in Africa were local ones, especially when environmental policies. Indigenous populations must feel they
have “something at stake.” In environmental terms, their stake is their resource. When goods need to be protected for the sake of all people, it is much easier to convince someone to practice protection when they know who they are protecting for in addition to themselves. Local policy is appropriate for some aspects of health and medical policy, but not for other. It would be helpful in vaccination campaigns because health care workers would know where to go to seek out the children. However, an initiative to prevent parasitic diseases often must be done at a higher level than local. Factors such as movement of people, movement of disease, and concentration of medical supplies and technologies urges health care policy to be more centralized than the village, or local, level.

As this dialogue regarding the scales at hand suggests, there is no obvious answer to the question: where’s the best level for integrative policy in Kenya? Intertwining environmental policy and economic endeavors such as game reserves in a developing country such as Kenya is difficult not only at the level of policy formation and writing, but also at the level for which the policy should be implemented. Maybe it’s not a theoretical question, but rather one in which we should consult the history books. What policy factors have produced the most sustainable tourism structure? How was the most successful public health initiative undertaken? Ultimately, what policy actions ensure that Kenyans receive a higher quality in life, in financial as well as medical terms?

Tourism, Health, and Social Systems

Global tourism and health initiatives have been present throughout the past few centuries. In the eighteenth century, one of the primary motives for British “to travel to the mainland was to combine tourism and traveling for health” (Hellen 159). Such travel initiations caused health tourism to be fashionable. Although events similar to this must be recognized for historical purposes, the purpose of this chapter is to identify the health of travelers and populations surrounding tourism sites.
In reviewing a hitherto fragmented or compartmented but necessarily multidisciplinary approach to safeguarding the health of individuals and ensuring the sustainability of tourism in potentially hazardous areas, it has become clear that applied medical geography might make a considerable, indeed an essential, contribution to both public health and development of the tourist sector in developing countries (Hellen 171).

Hellen’s observation is an important basic observation in the marriage between public health and epidemiology. It is, however, not the “end all” of observing tourism and health. Sociologist John McKinlay stated that “while still largely overlooked in epidemiologic thinking, social system influences... may account for as much (if not more) of the variation in health and/or illness statistics as do environmental influences, or even the attributes and lifestyles of individuals” (Lomas 1181). The presence of a tourism market, especially eco-tourism such as game reserve safaris, alters the environmental influence on local citizens and, thus, affects their social system. Effects on a social system have the potential to generate “social capital” in the form of universal policies. Such policies would have the ability to decrease the need for “individual ‘treatment’ approaches” (Lomas 1181).

For tourism to promote healthy practices the citizens around the game reserves must be invested in the process of intertwining policies to endorse economic, environmental, and health policy simultaneously. “The extent to which we encourage interaction among the citizenry and the degree to which we trust and associate with each other in caring communities is probably the most important determinant of health” (Lomas 1181). Governments and those persons involved in the implementation of tourism in developing countries must be clear that the citizens are significant. There must be an effort to include citizens in the three elements of a social system in a community relevant to health: physical structure, social structure and social cohesion. Physical structure refers to the design of a place or objects and has “both direct influences on health through exposure to risks and indirect effects through the creation or neglect of health-inducing environments” (Lomas 1182). A community’s social structure can be seen in such things as a village center for meeting, a marketplace, mechanisms of financial distribution, opportunity for
education and interaction. “This, too has both direct effects on health, ensuring the availability of basic prerequisites for health, and indirect effects, facilitating collective problem solving or collective identity” (Lomas 1182). Lastly, *social cohesion* is product of the adequacy of the physical and social structure. “Along with such things as the cultural or social homogeneity of a community, its physical and social structure can either encourage or discourage mutual support and caring, self-esteem and a sense of belonging and enriched social relationships” (Lomas 1182).

The physical and social structures of game reserves are important for inducing positive health social systems. Structural elements such as these are vital in the health of community members; tourism in Kenya, if set up to promote social capital and thus social systems, may predominately influence the community in healthy ways. Allowing local artisans to sell their works, having women cook and directly wash clothes for tourists are all endorsements that the management of tourist attractions may take to promote economic activity and structural elements. Investing tourist revenues back into the community is a continuous form of appreciation to the community and would promote social cohesion.

Attaining high levels of social capital often depends on the manner in which comparative evidence of epidemiological and public health is approached. Patrick and Wickizer made the important distinction between *community-level* and *community-based*:

A *community-level* intervention is an intervention organized to modify the entire community through community organization and activation, as distinct from intervention that are simply *community-based*, which may attempt to modify individual health behaviors such as… physical activity (Lomas 1184).

Therefore, making community members aware of the threats of parasitic disease from game reserves is a critical component to public health; this awareness should be community-level and research out to the entire community. Those implementing public health policies may be apprehensive to utilize the ideologies of community-level intervention because it is unconventional to public health workers. Trade-offs must take place on a series of work-related
dimensions such as: “acceptance vs marginalization, familiarity vs change, resource access vs resource famine, individual relations vs community interaction, individualized short-term impacts vs diffuse long-term evolution” (Lomas 1184). Every trade-off is a sacrifice on the part public health worker, but their actions have the potential to reach innumerable amounts of people. It is in this ideology which many Africans entrust their lives to and hope for public health professionals to decide to go against the norm.

Chapter Conclusion

While tourism in Kenya was not noted for the largest revenue, the relative importance of tourism to Kenya’s economy cannot be overstated. Many people who benefit from tourists, such as peddlers, local artisans, and children who line the streets selling gum and bottled water, are not major players in the economy; as such, tourism is sometimes downplayed as an important economic sector. As the beginning of the chapter explicitly stated, tourism provides both positive and negative externalities; both of which need to be effectively addressed in policy. The level at which policy is meant to be implemented must also be considered as distinguishing level characteristics alter policy outcomes. In the end, it would be most beneficial to indigenous groups to have policies at multiple levels and have a system in place to constantly reevaluate tourism policies to ensure they align with desired social, environmental, economic, and health outcomes. The proceeding chapter on public administration is a continuation of the public policy notion.
Chapter 6: Public Administration

This chapter is an introduction to the foundation of public administration, including many of the pivotal authors and their theories. The purpose of this chapter is multi-faceted. First, it is to recognize the complexity of administering public goods. Second, an evaluation of a collaborative public organization, African Development Foundation, is in the context of becoming independent. The final purpose is to acknowledge specific aspects of administration that would be helpful for organizations with a public focus.

Complexity of Administering Public Goods

Administration can be defined as cooperative group activity between and among individuals directed at goal seeking actions. Public administration is inherently different from private administration for a number of reasons. Public interest, accountability, and social profit are the three main characteristics of why public administration is public. Administrators are expected to act in the best interest of all people, are accountable because everyone has a legal right to what goes on behind closed doors, and are able to meet interests in terms of non-quantifiable benefits (social profit) as well as economic profit. At the end of the day, public administration proliferates through society via programs, goods, and services that are offered to citizens. Effective administration ensures proper allocation of societal values and resources; therefore, when it is ineffective it is not only goods and services that are lost but also the value those goods and services were trying to convey (Russo).

An interdisciplinary approach should be undertaken when examining what is the most effective mode of action in a public entity. When multiple disciplinary approaches are not considered, administration policies which are meant to instate social profit will overlook a vital component that alters the effectiveness of public administration. An example in which vital components were not considered is Kenya’s increase in parasitic disease due to environmental
administration. Much of Kenya’s environmental administration has been pursued to increase economic profit via tourism, but these policies have overlooked the parasitic animal reservoirs that ultimately led to more Kenyans becoming inflicted with parasitic disease.

The scope and nature of theories of governance in public organizations are important in the public administration as a profession and a scholarly discipline. Laurence E. Lynn, Jr., Carolyn J. Heinrich, and Carolyn J. Hill are some of the most important contributors to the field of governance. Lynn recognized the interrelated elements of governance, but did not explicitly state a comprehensive explanatory framework. Due to the shortcomings of Lynn’s work, New Public Management rose as the “new managerialism” that is characterized by a “global public management reform movement that has redefined the relationship between government and society” (Frederickson & Smith 214). Donald Kettl argues that the new public management arose because of six main issues: productivity, marketization, service orientation, decentralization, policy, and accountability (Frederickson & Smith 215).

Organizational development (OD) thinking began in the twentieth century alongside management theory. OD often uses a method known as action research; this is a “method of collaboration between a change agent and members of an organizational system” (Carnevale 1). The foundation of OD is based in democratic values and encourages employees to participate in organizational decisions. OD is one of three major schools of organizational theory. Collectively, these schools are like a prism; each school highlights in its own “kind of light.” The table below is one that I made which summarizes the three schools and the divisions within them, if any (derived from Shafritz et al.).
Table 6.1. Organizational thought.

<table>
<thead>
<tr>
<th>School</th>
<th>Scholar</th>
<th>Type</th>
<th>Model of Actor</th>
<th>Relationship of Actor to System</th>
<th>Level of Analysis</th>
<th>Bottom Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classical Formal</td>
<td>Weber</td>
<td>Org</td>
<td>Rational</td>
<td>Sys 1st Actor 2nd</td>
<td>Macro</td>
<td>Rationality</td>
</tr>
<tr>
<td>Classical Formal</td>
<td>Taylor</td>
<td>Admin</td>
<td>Simple Economic</td>
<td>Sys 1st Actor 2nd</td>
<td>Subunit</td>
<td>Productivity</td>
</tr>
<tr>
<td>Classical Formal</td>
<td>Gulick</td>
<td>Admin</td>
<td>Rational, especially coordination</td>
<td>Sys 1st Actor 2nd</td>
<td>Macro</td>
<td>Rationality</td>
</tr>
<tr>
<td>Human Relations</td>
<td>Maslow-Herzberg</td>
<td>Admin</td>
<td>Social</td>
<td>Sys 1st, Actor 2nd</td>
<td>Subunit-Immediate groups</td>
<td>Productivity</td>
</tr>
<tr>
<td>Organizational Development</td>
<td>Argyris Benis &amp; Lickert McClelland</td>
<td>Admin &amp; Org</td>
<td>Self-Motivated</td>
<td>Actor 1st, Sys 2nd</td>
<td>Multi-Level Analysis</td>
<td>Multi-faceted</td>
</tr>
</tbody>
</table>

**Collaboration**

When issues of public management become too complex for traditional structures and management methods of a single organization, collaboration is an effective tool. Snyder and Briggs suggest three ways in which federal governments can promote improvement at the community level on a national scale. First, national governments should “sponsor and support communities of practice to achieve national outcomes that require ongoing innovation and action-learning” (Snyder & Briggs 174). Second, agency strategic imperatives and policy mandates should be aligned with community goals. Lastly, agencies should utilize and later broaden the scope and scale of pilot initiatives through the unique position of the federal government. *Communities of practice*, as defined by Snyder and Briggs, “operate as ‘social learning systems’ where practitioners connect to solve problems, share ideas, set standards, build tools, and develop relationships with peers and stakeholders” (Snyder & Briggs 175). There are three basic dimensions of a community of practice: domain, community and practice. Not mutually exclusive, these dimensions cross organizational, sector, and geographical boundaries (Snyder & Briggs 177).
Once in place, collaborations must be assessed. There are three primary perspectives that one can take when evaluating partnerships. The foci of these perspectives are each partner, each partnership, and all partnerships; each of these concerns has pros and cons. Cost benefit analysis and classification of goods are two examples of the tools used when evaluating collaborations (Klitgaard & Treverton 29). Robert Picciotto and Albert O. Hirschman are two mainstays in the field of collaboration assessment and are discussed in Klitgaard and Treverton’s piece.

**A Case Study of Collaborative Efforts**

The African Development Foundation (ADF) is an American public organization that serves as an excellent example of an institution practicing public administration. One of this organization’s publications, *Mobilizing the Grassroots for Community Health: An ADF Research Reader*, advocates participatory methodology in the establishment and management of Public Health Organizations. This methodology urges African researchers to directly interact with their local communities. An ADF sponsored community eradication program used a methodology that employed questionnaires, observation, group interviews, and intervention strategies. This initiative found effective participation to be based on the level of education of their members, the interest of such organizations in community development activities, and the availability of human and material resources to provide necessary facilities (Toure 39).

ADF was designed to be removed from the political environment, but address the socioeconomic environments. Due to the very nature of the Foundation, collaboration and policy within and among agencies as well as the broad alterations of ADF are organizational changes that are fundamentally important to a systematic institute. Although ADF is an excellent example of an American based public administrative agency that helps to better Africa, it is by no means the model for what Africans should attempt to instate in their own countries. Each African country should set up their administrative agencies in the context of cultural ideologies and within governmental structure. I am in no way saying that democratic initiatives are the most effective
and only method of PA that administrators should undertake. To illustrate the principles of public administration and evaluative models, ADF will be the agency employed.

Created by U.S. Congress in 1980, the ADF was designed as an independent agency so its operations would not be affected by short-term U.S. foreign policy considerations (Toure 1). It is the only U.S. government agency working solely at the grassroots level in Africa; ADF’s mission is to be a “public corporation (that) supports the self-help initiatives of the poor in Africa” (Toure 1). ADF aims to alleviate poverty and promote broad-based, sustainable development.

Throughout the last 20 years, “ADF has funded more than 1,500 community-based projects, with 250 projects currently receiving support” (Day 3). Via a network of indigenous Partner Organizations in Africa, ADF continually builds local capacity and long-term sustainability; partnerships have been established in Mali, Niger, Nigeria, Benin, Ghana, Guinea, Senegal, Cape Verde, Uganda, Tanzania, Zambia, Zimbabwe, Botswana, Namibia, and Swaziland (Day 8). “ADF’s philosophy and operations are in sharp contrast to virtually all other bilateral and multilateral donor agencies” (ADF WWW). Their bottom-up approach helps promote economic growth, strengthen basic democratic values and institutions while avoiding the “trickle down” effect (ADF WWW). Promotion of these values is attained through addressing development and health concerns (see Fig. 1 App. A) via grants of varying monetary value (see Fig. 2 App. A).

Is ADF really removed from “short-term U.S. foreign policy?” “The latest in a series of regional initiatives in the United States trade policy (is) based on the general philosophy of ‘trade, not aid’ as the chief tool for promoting economic development” (United Nations 1). A report was prepared for the United Nations Conference on Trade and Development in response to The African Growth and Opportunity Act; in this piece, the movement of legislation was noted as promoting (nearly forcing) sub-Saharan African countries to adopt Western views of “economic, investment and trade policies” (United Nations 1). Despite this legislation, ADF has continued to
provide grassroots economic, investment, and trade opportunities to local communities throughout Africa. Therefore, ADF’s organizational structure has been sufficiently removed the agency from short-term U.S. foreign policy.

Collaboration occurs at multiple levels in ADF. First and foremost is the effort made with the “true development ‘experts,’” the African entrepreneurs, traders, farmers, and villagers who know best what they need and what works for them. This first collaboration is an assumption of the agency. Next, networking occurs between ADF and indigenous, grassroots organizations in Africa. Finally, ADF has organizational ties to USAID (United States Agency for International Development) and USAID’s partner organizations. “In November 1999, the President signed Public Law 106-113, which amended the Inspector General Act of 1978 by assigning audit and investigative responsibilities for the ADF to the USAID/OIG” (ADF 44). Thus, organizational shifts in USAID or OIG directly affect the ways ADF must organize and present its work to their investigators.

When two organizations collaborate, they often share concerns and hold one another accountable. However, collaborations can also dampen the thoroughness of an investigation of an agency. “As (OIG) line managers’ budgets and ability to measure their programs’ performance are stretched, so are the strategies used by the inspector generals to keep up with the agencies” (Newcomer 135). In their strife to please both executive and legislative officials, inspector generals are struggling to overcome declining resources and continuing challenges. The lack of or the presence of congressional indifference has also been noted by Newcomer as a significant source of investigative performance trends (Newcomer 135). Public administrators, including top ADF staff, must be cognizant of the environment in which inspectors recommend organizational changes; needed organizational collaborations or changes might be overlooked because of apathy on the part of inspector generals.
Moving towards Self-Evaluation and Autonomy

All organizations naturally gravitate toward being autonomous and away from the reliance of inspector generals to make organizational recommendations, but the Foundation has not attained such a state. Wildavsky’s model of self-evaluating organizations looks at six pre-conditions that must be fulfilled when moving toward a self-evaluating agency (Boyne 463). ADF does not fulfill every pre-condition internally; rather, they rely on many of their collaborators to, together, satisfy the conditions. Examining the restructuring of ADF in context of Wildavsky’s model allows one to discuss how re-organization is improving the self-sufficiency and efficiency of the agency.

The first pre-condition of a self-evaluating organization is organizational leadership. “There is a positive relationship between leader support and the extent of self-evaluation” (Boyne 465). Having begun its operations in 1984, ADF is “governed by a seven-member, bipartisan Board of Directors appointed by the President with advice and consent of the Senate. By law, five members of the Board are from the private sector; two are from the public sector” (Toure 1). These organizational leaders have faced a number of managerial challenges in recent years. Country Liaison Offices (CLOs) were established and funded by ADF prior to fiscal year 2002; CLOs were in countries with active grantee projects to help recipients establish benchmarks, maintain accounting systems, and submit performance reports (ADF 44). ADF had neglected to establish project-monitoring guidelines and reports often contained irrelevant and inaccurate information. These shortcomings of ADF’s implementation were found in an OIG audit and ADF terminated its agreements with CLOs. A new, two component field operations model was assumed by ADF.

Local non-governmental organizations that have the potential to assist grassroots groups are linked to ADF through cooperative agreements in this model. Secondly, this model establishes representative offices at the national level to represent ADF with public and private host country entities; these offices are responsible for coordination with the US government,
conduction of program outreach, screen grant applications, provide oversight, and monitor ADF-approved grants and operations (ADF 44). In the latest semiannual report to Congress, ADF had found field representatives for 13 of the 15 countries and was actively looking to fulfill the other 2 positions (ADF 45). ADF is, therefore, moving towards organizational leadership through representative accountability.

Bikson, Treverton, Moini, and Lindstrom discuss the challenges of organizational leadership in the context of international organizations such as the Foundation. The evidence they compiled suggests that all types of international organizations (public, for-profit, and non-profit) have shortages, similar to ADF, of needed competencies at higher professional and managerial levels. Bikson et al. expected this result given the pressures of globalization in a post September 11th world (Bikson 40). ADF’s changes in organizational leadership have been receptive by auditors and OIG expected ADF to find competent individuals in international leadership shortly after their last audit.

Secondly, having adequate financial resources is a pre-condition. “There is a positive relationship between the allocation of financial resources and the extent of self-evaluation” (Boyne 465). ADF has implemented an Integrated Financial Management System where ADF prepares financial statements, private accounting firms audit the statements and the National Archives and Records Administration (NARA) Office of Inspector General (OIG) oversees these audits; the inspector reports to both the Archivist and Congress (NARA 2). Following the concepts outlined in the Government Performance and Results Act of 1993, the OIG strives to “improve federal program effectiveness and public accountability, and help federal managers improve service delivery by requiring them to plan to meet program objectives and provide information on program results” (NARA 1). NARA is, however,

dependent upon the willingness and ability of other federal agencies to (1) identify and make available records of historical value, (2) manage their records to meet both their own and long-term public needs, (3) invest in systems that meet government recordkeeping requirements, (4) provide information about
their records management programs, and (5) follow NARA’s guidance in order to identify, schedule, and process records in a timely manner (NARA 9).

In a review of financial statements from fiscal year 2003, OIG gave ADF a negative opinion of its financial accounting system because of a few shortcomings. Primarily, OIG was not pleased that ADF used separate accounting systems and, thus, the general ledger was not the sole source of financial statements. Another point of inadequacy was ADF’s maintenance of asset, liability, and expense accounts (ADF 45). ADF’s 2002-2003 report, however, highlights their collaborative potential and ability to attain financial resources.

As a result of ADF’s unique approach and high impact of its assistance, African governments, other donors, and private companies have sought to collaborate with the Foundation. These strategic partnerships enable ADF to leverage vital sources of capital and technology for grassroots development and to influence funding agencies (Day 24). ADF needs funding to not only cover the cost of grants, but also to cover the “sunk costs” of the agency. In terms of the size of the agency, ADF is one of the smaller protégés of Congress but still must fulfill the regulations, procedures, and reporting requirements of much larger organizations. Therefore, a greater percent of ADF’s budget is devoted to daily organizational activities as well as grassroots work requires intensive support and oversight (ADF WWW).

The third pre-condition is performance information. “There is a positive (and curvilinear) relationship between the amount of performance information and the extent of self-evaluation” (Boyne 465). ADF’s latest annual report notes the process of “ADF Project Development and Implementation Process:” reconnaissance to community/group mobilization to diagnostic/analysis to developing community action plan/project paper to capacity building/training to implementation/monitoring/remediation to evaluation/lessons learned (ADF WWW). A pictorial representation of this process is found in Appendix A (Fig. 3). Performance information is attained at the final two steps of the project process. During the past two years, ADF has also strengthened its “performance-monitoring system” by “(1) aligning grantee project
performance indicators with ADF’s strategic plan objectives, (2) instituting quarterly monitoring and reporting on projects, and (3) conducting semi-annual reviews of its country portfolios” (ADF 45). This strengthening maneuver has provided ADF with greater insights to strengths and weaknesses of its project development.

Greater amounts of performance information are being found by OIG as a result of “results-oriented management.” Following theories offered by Paul Light in his study of inspector generals, the National Performance Review argued “inspector generals should be forward-looking and should build capacity in management control systems” (Newcomer 130). This proactivity, which is also a principle of the President’s Council on Integrity and Efficiency and the Executive Council on Integrity and Efficiency, indicates a more consultative approach between public agencies and inspector generals (Newcomer 130). Representatives and program official positions created by ADF suggests the agency has taken a consultative approach recently.

Organization and employee development is the fourth pre-condition. “There is a positive relationship between employee involvement in evaluative activities and the extent of self-evaluation” (Boyne 465). Alternative mechanisms for delivering public service, such as purchase-of-service agreements, privatization, franchise agreements, subsidy agreements, vouchers, volunteers, self-help, and regulatory and tax incentives, are recognized by Klingner and Lynn. In theory and most often actuality, privatization in the public sector means the public agency gains access to more appropriate means to get a job done while the corporation gains financially.

Klingner and Lynn found that in a relation between ADF and a corporation that ADF provides experience and know-how, reputation and a good name, local networks, and accountability while the corporation can provide joint adventures, investment capital, fee-based training, and development fund contributions (Klingner 158). The Foundation has privatized for automated financial management support to be able to maintain an adequate general ledger as well as ADF has out-sourced its contracting services to the Bureau of Public Debt in the
Department of Treasury. Another alternative mechanism that ADF has used in its structural arrangement is *purchase-of-service agreements*. ADF utilizes local non-governmental organizations in African countries and pays them for their services that work toward an ADF goal (Klingner 157).

For any partnership to reinforce organizational development there must be participation. The organization that is partnered with ADF should “maintain an adequate level of support…align objectives (and)...be willing to give back” to have the partnership increase its success (Milinski 15). Milinski also addresses employee development; this issue is often provided via appropriate training and skills development. Areas of skill development that have proven to be fruitful are problem solving, process improvement, communication, public relations, meeting management, work measurement, budgeting, purchasing and conflict resolution. “In a world of limited resources, the most effective training dollars spent will be in teaching teams to be self-directed rather than by teaching within the traditional classroom” (Milinski 16). Institutionalizing participatory practices is an effective administrative strategy, but opposition should be anticipated. Therefore, arguments for participation should be framed carefully; key words like *efficiency* as well as *sustainability* are often employed in arousing participation. Consideration of constraints should also be examined, including both internal regulations and external demands.

Although ADF currently executes $11.5 million in grant projects and this value is expected to rise in the near future, “ADF’s management goal is to get operating expenses to below 25 percent of total funding, and the Foundation will cut overhead by 16.7 percent between FY 2004 and FY 2005” (ADF WWW). They expect to cut costs, some of which are employee incentives, and headquarters will decrease costs by more than 18 percent between FY 2003 and 2004, and will cut an additional 13 percent in FY 2005. In addition, ADF will reduce fiscal resources to Country Representatives by 20 percent next year (ADF WWW). ADF must be careful to fulfill the pre-condition of organization and employee development with its limited resources and innovative, administration techniques.
The fifth pre-condition is *publication of performance information*. “There is a positive relationship between the amount of performance data published for external scrutiny and the extent of self-evaluation” (Boyne 466). ADF’s collaboration with the OIG strengthens the organization’s ability to publish and manage published documents of performance information.

The OIG assesses the effectiveness, efficiency, and economy of NARA programs and operations; recommends improvements in policies and procedures to enhance operations and correct deficiencies; recommends cost savings through greater efficiency and economy of operations, alternative use of resources, and collection actions; and investigates and recommends legal or management actions to correct fraud, waste, abuse, or mismanagement (NARA 3).

The sixth pre-condition is the **number of organizational elements**. “There is a negative relationship between the number of organizational elements attempting evaluation at any one time and the extent of self-evaluation” (Boyne 466). The complex webs of accountability in all public institutes that must be strategically addressed. Some organizations have begun to link “person-specific efforts” to the strategic plans of the agency in an effort to fully address which organizational elements are fulfilled and which are lacking. In most organizations, individual development plans are filed as a part of performance review or to establish that employee training objectives are being met or both, but these person-specific efforts are “rarely linked to the organization’s strategic plans and are unlikely to cumulate to yield competencies critical to future international leadership” (Bikson 36-37).

When career development is engaged to link all employees to its organization and the self-evaluation is conducted by one person or a few individuals, the complexity of the self-evaluation is more manageable and fewer organizational elements disrupt the process. It is during the stage of evaluation that an agency attempts to simplify information; at most other times, organizations seek out information. “Gordon Tullock (1965), Anthony Downs (1967), and William Niskanen (1971), all of whom regarded the bureaucracy as if it were maximizing or self-
seeking individual...In this premise the bureaucracy hoards information (information asymmetry), seeks autonomy, and shirk” (Frederickson 37).

Wildavsky’s model of self-evaluating organizations and its pre-conditions are grounded in organizational theory, but developmental theory has noted additional considerations that should be made when using the Wildavsky model. Boyne et al. found that “research should assess whether the preconditions necessary to sustain self-evaluation programs are similar to those required to begin evaluation” (Boyne 471). The stage of an organization is critical to its structure and which structural changes it chooses to make.

Kaboolian reported on a symposium of renowned scholars that are challenging the boundaries of organizational structure through leadership, democracy, and the New Public Management.

In the call to use the ‘logic of governance,’ Lynn, Cook, Kelly and Terry are challenging researcher to link the political context with institutional arrangements. These authors agree that the role of public managers and systems of public administration are endogenous to specific political systems (Kaboolian 192).

It is not only important for public administrators to be cognizant of organizational structure for the sake of being efficient, but it is also necessary for the organizational dynamics to be in the proper context of the environment. Examining an agency using Wildavsky’s six pre-conditions is helpful to note why most organizational changes occur, but multiple models and perspectives must be employed to fully appreciate the complexity of operating an organization; the political context of the agency is one such perspective.

Examination of organizational issues is a never ending process; ADF is no exception to this rule. In the future, hypothetical communities may be used by ADF to represent African communities. Employing a “community of practice” has the potential to foster learning and innovation and would allow ADF to internally explore organizational structure prior to notification of issues from external sources (Snyder 176).
Kaboolian foresees two opportunities of The New Public Management: “to see the unfolding of an international reform movement defined by clearly enunciated principles… (and) to engage in theoretically grounded empirical work and theory building that crosses the boundaries of disciplines that have studied the public sector” (Kaboolian 192). The mission and objectives of the Foundation are unique in principle and are, obviously, international; both opportunities that Kaboolian recognizes have the ability to better ADF and its organizational structure in the future.

**Chapter Conclusion**

Lessons that are important to ADF are applicable to agencies worldwide. Whatever agencies Kenyans decide to implement, the principles of public administration will apply as well. Besides governmental organizations in Kenya, there are also many Kenyan non-governmental organizations (NGOs) as well as multi-national NGOs that have a stake in Kenya’s environmental and game reserve policy.

Non-governmental roles in Kenya are shaped by the fundamental theories of aid policy. Hearn describes these as being dominated by the New Policy Agenda of neo-liberalism and liberal democratic theory. “The first scramble of non-governmental development organizations (NGDOs) was to be involved in the continent’s development, second is the scramble of official aid agencies to find, finance and work with and through NGDOs” (Hearn 89). Focus on economic performance and increased public expenditure is contrasted by Hearn against the introduction of user-fees, increasing the role of insurance, and reducing the role of the government as a health provider as strategies to combat the Kenyan health care crisis (Hearn 92). Institutional integration is another important sect of non-governmental organizations.

A specific sector of integration that is pivotal to the argument of this thesis is public health. Chapter 7 contains the approaches of public health throughout history and today in both developed and developing nations.
Chapter 7: Approaches to Public Health

The discipline of public health must be studied as well as the approaches one has to take in implementing public health strategies. Public health strategies are not only vital in organizations being successful, but they are also vital in humane terms to those people policies benefit or don’t benefit. This chapter explicitly states concepts that must be addressed in public health—building, organization, management, and administration. Practices in the United States are first discussed as well as its largest public health organization. Concluding the chapter is the framework of Kenya’s public health policy.

Recent History of Public Health

In 1992, the Global Burden of Disease Study was initiated by the World Bank and the World Health Organization to “foster an independent, evidence-based approach to public health policy formulation.” Burden of disease is a conceptual representation of the difference between the ideal and true health of a population. Manifested as a function of the frequency, duration, and severity of illnesses affecting a population, this burden can actually be quantified, using coefficients such as disability-adjusted life years (DALYs). Burden of disease estimates may assist in planning health services, prioritizing various health interventions, and estimating economic losses or gains due to diseases and their control (Elder 4).

George Rosen’s 1993 classic A History of Public Health traces the foundational roots of the modern public health practice through five stages (Elder 2-4).

1. “During the Greco-Roman period, the foundations were laid for the medical profession (Greek), use of engineering to ensure a safe water supply, sewage management efforts, and public health administration (Roman)” (Elder 2). Strong scientific thought and empirical observation characterized Greek medicine; Chinese and Indian medicines are the only medicines that predate Greek for this categorization.

2. The Middle Ages, an era with the Black Death and other plagues, saw development in urban areas, sanitation problems, hospitals, and issue specific administrative methods for health concerns.
3. “In the age of Mercantilism and Absolutism (1500-1750), great advances in science led, among other things, to a renaissance in medicine, the precise recognition of diseases, and a quantitative approach to health problems” (Elder 3).

4. From 1750 until 1830, the Enlightenment and Revolutionary period stimulated political and intellectual leaders to make advances for the betterment of humanity. “During this era, Lind demonstrated the role of diet in the prevention of scurvy, and Jenner discovered the smallpox vaccine. Societies began to awaken to the human costs of industrialization and urbanization (Elder 3).

5. Although this final period is not a widely recognized historical period, it is pertinent to Rosen’s examination of public health. Rosen denotes from 1830 to 1875 as “the era of industrialism and the sanitary movement.” American and European scientists and public officials were recognizing the nature of communicable diseases and began mandating garbage, sewage, and safe water. “Theories of human miasma and divine intervention were replaced by laboratory observations and biological formulations, catalyzed by the publications on evolution by Darwin” (Elder 3).

Near the end of Rosen’s fifth period and at the onset of the bacteriological era, public health became, more or less, a subdiscipline of medicine. Since the nineteenth century, public health has received continually growing recognition in the field of medicine. The definitions of what public health means to an individual, to a politician, and to a physician are sometimes very different; yet, in the last thirty years, many researchers have concluded we are in the “New Public Health” era. In 1992, Ashton defined “New Public Health” as

an approach which draws crucially from the environmental, personal, preventative, and therapeutic eras and seeks a synthesis. Its focus is on public policy as well as on individual behavior and lifestyle and increasingly it is being seen in an ecological context which has a focus on holistic health (Elder 4).

In essence, Ashton noted public health as being an interdisciplinary field.

The articulation of the Jakarta Declaration by the World Health Organization in 1997 is one of the most important proclamations of the past decade. This statement asserted that “health is a basic human right and essential for social and economic development” (Elder 11). Within this contention, prerequisites for health are respect for human rights, equity, peace, shelter, education and social security. According to the Jakarta Declaration, programs promoting health should achieve the following: Social responsibility should be promoted by both public and private sectors. This should be done by “pursuing policies and practices that avoid harming the
health of others; protect the environment and sustainable use of resources… safeguard both the

citizen in the marketplace and the individual in the workplace; and include equity-focused health
impact assessments as an integral part of policy development.

Schwefel presents public health in a globalized perspective and explicitly connects them via eleven issues. Health care and health itself are affected by globalization; risk factors, treatments, and communicable diseases are traveling more fluidly than ever before (Schwefel 177). One issue that Schwefel discusses at length is division of public health mentality based on class. Many aristocrats, like Bill and Melinda Gates, have pledged for the provision of public health goods since the global market is neglecting public health and often creates “public evils.” Some scholars, Schwefel included, feel this is a move done out of public interest that requests governance, stewardship, and pro-poor notions. The majority of people view health to be a public investment while some “bureaucrats and even advocates still consider health to be consumption and even a luxury good” (Schwefel 179). Currently, knowledge about health and its relations to politics, poverty, and production are filtering upwards and spread among the world’s elite to increase funding of global health initiatives. The initiative to educate the world about public health is certainly not limited to the wealthy. Former Japanese Prime Minister Ryutaro Hashimoto acclaimed during the 1997 G8 Summit that there is a large need for parasitic disease control and stressed the need for international cooperation. Hashimoto’s initiative has been coined The International Parasitic Control Initiative and subsequent African scholars have found this initiative needs to be started at school—in other words, for children of all socioeconomic classes. Programs have been developed to “cover parasite control program design and management, resource mobilization and advocacy, data management, recent advances in parasite control, and effective communication” (Siringi 497). In 2003, Kenya’s Health Minister, Charity Ngilu, designed and implemented the first program internationally.
**Importance of Vector-Borne Diseases**

The challenging public health issue of vector-borne disease control is one that “will surely continue to demand advances both in the overall welfare of the population and in specific clinical and public health technology—including the technology of promoting behavior change. Indeed, attention to a behavior—change emphasis, particularly if it involves the behavior of policy makers as well as the population, will diminish frustration and pessimism that often accompany efforts to break the Wheel of Disease” (Elder 137).

**Building Public Health Organizations**

The building of public health infrastructure is accomplished with people, training, and tools; the American Public Health Association (APHA) urges that health professionals think of Science and politics as moving towards Science and Politics. APHA recognizes that politicians have the ability to utilize capital for the betterment or worsening of the nation’s health as well as the majority of their policies both indirectly or directly affect public health.

Environmental recognitions allow the foundation of many public health issues to be laid. “Simply put, the variable quality of the environment—be it the physical environment represented by air or water quality or the condition of housing, or the social environment represented by levels of social exclusion or the fear of crime—impinges upon the physical and psychological condition of the resident population” (Mason 75). This view of environmental impact rests upon the foundation that human exposure to environmental hazards results in adverse health conditions. Health depends not only on the presence or the absence of disease but also on complete physical, social, and mental well being. Mason conceptualizes the health of a population in terms of three important relationships—health and environment, environment and economy, economy and health; all public policy needs to embrace these three relationships.
Management of Public Health Organizations

-Establishing Objectives and Goals

The largest and most respected public health organization certainly in the United States and perhaps the world is the American Public Health Association (APHA). At APHA’s opening session of the 132nd annual conference, APHA executives stated the global view of public health can be reached through the building and strengthening of national organizations, strengthening of local organizations to become more efficient, continually build partnerships and collaborations, and enacting strong science based policy. Goals of APHA are to build public health infrastructure, increase access to health care, and eliminate racial and ethnic disparities.

-Organization

The internal and external structure of public health organizations must be fluid enough to allow the collaboration between agencies. Organizations often face strained budgets as well as cutbacks; collaboration will minimize the effects of such governmental measures. In addition, private donors and non-profit agencies should be sought to supplement or (in some cases) fund public health initiatives.

-Management

Since 1900 in the United States, there has been a thirty year increase in life expectancy; 25 years are due to prevention whereas 5 years are attributed to the medical care system. Yet, allocation of resources in the United States is 99% medical infrastructure and only 1% is prevention-oriented (APHA 7 Nov 2004 OS). Public health professionals must work as public managers and advocate putting the dollars and cents to areas that are producing real public health results. From the managerial standpoint, the United States public health sector is probably not the model country for reforms of developing nations.
In the United States as well as in countries worldwide, the debate of rural versus urban access and quality of medical care is apparent. Dr. Lois Wright Morton is a sociologist at Iowa State University who studies the relationship of American rurality to health status and mortality rates. Her investigation has shown that investments in rural medicine infrastructure will not reduce mortality; rather, there must be preventative measures taken to increase longevity. Inequality is a growing concern as the economic gap and health disparities are increasing worldwide; two areas that Dr. Morton contributes to this concern are rural occupations and wealth distribution (APHA 9 Nov 2004).

**Administering Sustainable Health and Environmental Practices**

Musgrove (APHA 8 Nov 2004) identifies nine criteria for public spending on health care: poverty, catastrophic cost, externalities, public goods, public demands, rite of rescue, horizontal equity, and vertical equity. What determines the cost efficiency of an effort are the epidemiological environment, individual characteristics, and structure.

Instigation and continuation of participation is key to administering sustainable health and environmental practices. When participation is not summoned effectively, a sustainable practice may collapse or never be formed in the first place. Contandriopoulos critically analyses three weaknesses in the view of public participation in health care. First, the definition of the role of public participation is normative which creates a “bias towards pessimistic or negative conclusions” (Contandriopoulos 321). Second, literature about public participation is “ naïve and idealistic or, as Barry puts it, ‘Realistic assumptions about administrative behaviours are not among the strengths of the literature on citizen participation’” (Contandriopoulos 321). Finally and as a result of American domestic feelings in the 1970s, there is an implicit assumption that all favor public participation. Issues surrounding these weaknesses must be addressed so new public health initiatives will be better able to serve the public and in a manner that is parallel to community participation mentality.
Public Health and Health Sector Reforms in Kenya

The role of public health in Kenya is not as defined as it is in the United States and other developed countries. There is no world-renowned public health organization comprised of highly trained professionals either. These differences between Kenya and other nations should not be viewed as insurmountable feats for Kenya’s public health arena. Rather, all countries have, at some point in their history, gone from nothing to something. Therefore, Kenya must first learn from its own mistakes in public health and, second, look to other nations’ plans for what has and hasn’t worked in their health schemes.

While many economists presume that increase in Gross Domestic Product (GDP) correlates with the accessibility of health care. Dr. Jamison of UCLA found the change in full income in Kenya to be a more accurate measure of monetary influence on health than the change in GDP. Full income differs from GDP in that it also includes the monetary value of mortality. These differing yardsticks were compared examined from 1960 to 2000 and it was found that change in full income resulted in conclusions much nearer to reality (APHA conference). This example has further implications for the Kenyan health sector: Kenya must track its progress with factors that align with local reality rather than what is accepted internationally. Tracking of universal variables does have a place in the health care system to allow for international comparison, but in order to truly help the citizens of Kenya variables that accurately portray the health situation are more beneficial to health initiatives.

Since independence in 1963, Kenya’s central government has had the same central objectives for the development of health services. These objectives are “to strengthen and carry out measures for the prevention, eradication and control of diseases, and to provide adequate and effective diagnostic, therapeutic and rehabilitative services for the whole population” (Oyaya & Rifkin 113). Achievement of these objectives have been curtailed because of financial hardship, namely, a dwindling per capita tax base and an ever-accelerating number of citizens to whom services must be provided. Kenya’s population “is currently estimated at 28 million people and
increasing poverty levels with over 50% of Kenyans living in absolute poverty. To add to this gloomy environment, state support for health and education has been radically reduced” (Oyaya & Rifkin 113). While Kenya’s economic growth (GDP) is estimated at 1.5% per annum, the growth of the population has averaged to 2.8% per annum. With growth of the economy less than the growth of the population, Kenya has become “one of the countries in Africa with the fastest declining economy” (Oyaya & Rifkin 114). Per capita spending on health care was US$9.50 in 1980/1981 to US$3.40 in 1997. Due partially to the decrease in health expenditure and greatly by the strong presence of HIV/AIDS, Kenyans life expectancy has fallen from 60 years in 1993 to 47 years in 2003 (Oyaya & Rifkin 114).

The Ministry of Health’s shrinking budget attempting to address public health concerns is exacerbated by the reality that “about 70% of funds are actually allocated to the recurrent budget thereby leaving in absolute terms, insufficient resources for operational expenses and in particular, the provision of quality and accessible health care services” (Oyaya & Rifkin 114). An attempt to make one level of the governmental health process accountable resulted in a hierarchy with the district as the basic level responsible for operational tasks with relatively limited strategic functions.

The goal of decentralization is therefore to ensure the rationalization of the management and delivery of health care and the gradual transfer of the process of decision making and management of health resources from the central administration at the national level to the local levels (Oyaya & Rifkin 116).

While this is philosophy is grounded in sound organizational theory, Kenya’s health delivery has failed at the district level. The primary point of failure has been the embezzlement of money by those working for the Ministry of Health.

Kenya’s government published a *Health Policy Framework* in 1994. This framework is still in place today as the primary source of structuring and addressing public health issues in Kenya. Oyaya and Rifkin state that the Kenyan government’s goals are to strengthen and carry out prevention, eradicate and control disease, and provide adequate and effective diagnostic,
therapeutic and rehabilitative services for all Kenyans. These objectives have been hindered by a rapidly rising population, an increase in poverty (50% of Kenyans live in absolute poverty), and a reduction in state support of health and education. The role of the government in Kenya is fundamental in the examination of public health in Kenya because it is not only the primary policy initiator and enforcer but it has also been the major provider of health care since 1963 when colonialism ended.

The Health Policy Framework has clear visions on health sector reform in Kenya and presents “convincing arguments that the deteriorating health care situation in Kenya can be halted and reversed by both sustained improvement of the institutional functioning and performance of the health sector” (Oyaya & Rifkin 119). Oyaya and Rifkin, however, urge further examination of the framework and identification of the assumptions in which this framework employs. Assumptions must be examined and reevaluated for this 1994 proposal to be successful. The four assumptions are (Oyaya & Rifkin 123):

1: the health sector has resources; the fundamental problem is they are mismanaged
2: both NGO and governmental health stakeholders have the capacity to successfully implement health sector reform policy
3: moving from “needs-based” to a “resource-based” planning will make the provision of health care more cost-effective and accessible
4: decentralization will provide an enabling environment for the provision of responsive health care

Only after examination of these assumptions in the context of the environment in Kenya by public health professionals would the gap between policy makers and policy implementers have the possibility of being closed.

Moving beyond colonial approach to health care is an initiative that is still happening in Kenya. George Oduor Ndege examines the epidemics in Kenya and their relation to ideology of order in a post-colonial state. This discussion presents interesting information on the sanctity of space and the grasp of the health problems; in addition, the passage of information from the laboratory to government officials in times of epidemics is relevant to this project (Ndege). Cook contributes to the notion of expanding public health initiatives beyond just national
governments, especially in terms of tropical medicine. As a discipline, Cook says that tropical disease should mean watching over health concerns in developing nations. The concepts of globalization and of “one world have never been more real than in the present day, and we must address these public health problems as forthrightly as possible—if not out of a humanitarian impulse, then out of our own self-interest” (Cook 143).

Public health south of the Sahara desert is extremely complicated because of the high occurrence of disease. Sub-Saharan Africa has been named both the “hot spot” and the “White Man’s Grave” (Lucas 12). The factors that contribute to the poor health status and the health of Africans create a vicious cycle. Cook has named several factors that contribute to the health status in Africa: local geographical and ecological factors, poverty, poor infrastructure, high fertility, low literacy rates, civil wars and unrest, inefficient, corrupt, and unstable governments (Cook 13). The table below is a statistical representation of how these factors have mortality.

<table>
<thead>
<tr>
<th>Region/ Group</th>
<th>Child Mortality Rate (deaths of children under age five per 1,000 live births)</th>
<th>Maternal Mortality Rate (deaths per 100,000 live births)</th>
<th>Childhood Malnutrition (percent)</th>
<th>Total Fertility Rate</th>
<th>Primary Education (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>183</td>
<td>980</td>
<td>31</td>
<td>6.5</td>
<td>48</td>
</tr>
<tr>
<td>Middle East &amp; N. Africa</td>
<td>86</td>
<td>100</td>
<td>24</td>
<td>5</td>
<td>81</td>
</tr>
<tr>
<td>South Asia</td>
<td>13</td>
<td>560</td>
<td>60</td>
<td>4.4</td>
<td>50</td>
</tr>
<tr>
<td>East Asia &amp; Pacific</td>
<td>57</td>
<td>190</td>
<td>26</td>
<td>2.6</td>
<td>81</td>
</tr>
<tr>
<td>Central America &amp; Caribbean</td>
<td>48</td>
<td>140</td>
<td>17</td>
<td>3.5</td>
<td>66</td>
</tr>
<tr>
<td>South America</td>
<td>54</td>
<td>210</td>
<td>8</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>Industrialized Countries</td>
<td>11</td>
<td>13</td>
<td>n.a.</td>
<td>1.8</td>
<td>96</td>
</tr>
</tbody>
</table>

Other scholars, such as Nnadozie, commend on post-colonial Africa on its health achievements. Nnadozie says it is imperative to understand the theoretical framework behind health demand function before discussing the progress of public health in Africa.

The problem with applying the neoclassical demand theory to Africa is that at present, Africans do not ask for quantities of healthcare for the sake of being healthy, so they do not express their demand in terms of quantitative
preferences subject to specified constraints. Rather, they ask for good health as a means of accomplishing more advanced socially defined goals such as raising children, providing for the family’s security, and protecting the family. This behavior is not irrational even though it differs from the neoclassical norms existing in Western society (Nnadozie 123).

Therefore, African public health policies must be inclusive of non-Western social and cultural norms as well as utilize traditional African methods of medicinal treatment. Policies must also be aware that medicinal consultations are conducted by others in addition to physicians and nurses, namely non-licensed apothecaries,

*Chapter Conclusion:*

The position of public health as a subdiscipline of medicine has significant implications for parasitic disease policy. Ideological disease notions such as virulence, resistance, susceptibility, reservoirs and vectors are, therefore, intrinsically considered by public health policy. It is imperative that policy has strong biological science basis. This is an important distinction in leishmaniasis because of its effects worldwide and the possible severity of disease if public policy is not executed properly. Concurrent to APHA’s movement towards integrating science and politics, African development should take a similar approach. Public health should continue to build upon Schwefel’s notion of representing public health in a globalized perspective that allows for strong domestic policy with enough fluidity to allow for multi-national collaborations.
A Conclusion- Moving Toward Being Medically Self-Helping

Economic endeavors, such as game reserves, are employed by governmental and non-governmental organizations in developing countries to aid people, but often overlook important social, cultural and health issues. An important health issue in developing, southern hemisphere countries is leishmaniasis. Leishmaniasis is a protozoan, vector-borne parasitic disease. In Kenya, this parasite resides in large game animals and rodents that often populate game reserves. Therefore, opening game reserves and increasing biodiversity are two ways environmental and economic policy can go array. Policy in developing African countries must integrate theories of ecology, public health, epidemiology, and economics. Ultimately, African policies must move countries toward being medically self-helping.

This project urges the monitoring of parasitic loads and biodiversity to prevent infectious disease and epidemics of historical proportions. Such geographical tracking is pertinent to epidemics for virological, epidemiological, clinical, statistical, and humanitarian reasons. From the examination of environmental influences on infectious disease it became apparent that a multi-level portrayal of leishmaniasis must be employed. Layered strata improve the ability to identify long-term causes in the context of short-term correlations.

Where resources are limited and transportation is often a hindrance to attaining medical care, treatment of leishmaniasis in African nations must find a balance between efficacy, cost, and speed of treatment. Leishmania is noteworthy of continued surveillance as up to 40% of the population in 88 countries produced a Leishmania-positive skin test. The presence of Leishmania will surely continue to transform in Kenya due to demographic changes, deteriorating social conditions, and changing environmental conditions; thus, environmental, social, and public health monitors must re-evaluate proper prevention strategies in the context of the epidemiological environment. In addition, policy makers must work towards achieving sustainability from
multiple perspectives—economics, ethics, environmental, social, and political—to improve Africans’ quality of life in the face of possible infectious disease.

Tourism is often used in Kenya as a method for intertwining economic endeavors and environmental policy. International tourists are a large contribution to Kenya’s economy and, thus, Kenya makes more money per “arrival” than all but three African countries. In addition to monetary contributions, tourists occasionally sponsor children by paying school fees and go out of their way to help families in need. Negative externalities of tourism, however, must not be discarded. Overexposure of Western culture and pasture and water right conflicts that are a result of enclosure are two such negatives. If tourism is set up to promote social capital and thus societal systems, tourism in Kenya will predominately influence the community in healthy ways.

District level planning has been inefficient for improving public health due to often misallocation of resources and organizational structure. As noted by Oyaya and Rifkin, nearly 70% of Kenya’s health spending goes to the recurrent budget. Thereby minimal funds are left for operational expense and “the provision of quality and accessible health care services” (Oyaya & Rifkin 114). Public health initiatives must continue to move away from post-colonial theory towards globalization theory. In the case of Kenya’s game reserves, the urgency to effectively combine environmental and public health policy via proper public administration cannot be overstated. It is only after appropriate social policy has been written and implemented that Kenyans will have the ability to move towards being medically self-helping. As previously stated, Africans have the desire to compete socio-economically on an international scale; improving health status will be central in increasing their status as well as quality of life.

Information in this piece was presented from theoretical and observational perspectives to present scholarly thinking with supplementary examples of abroad experiences. While this methodology is effective in portraying the macro picture and gives specific micro insights, this thesis does not contain empirical data from a case study on different integration methods to prevent the spreading of *Leishmania* in Kenya’s game reserves. The employment of the African
Development Foundation case study is meant to show insight on how a Kenyan focused organization could move toward collaboration, implementation, and effective management. There was never an intention to conduct a case study. While case studies are insightful sources and were cited as so in this piece, the fact they were integrated with theoretical information is imperative. For when case studies are the sole source of knowledge, they are limiting in their scope, overlook relevant influences, and are rarely interdisciplinary. “‘By its very nature of focusing on one issue, a case study cannot serve as the basis for generalization about a wide range of policies’” (Dugbatey 235).

Unfortunately, figuring a stepwise method to effectively implement social policy in Kenya is becoming exceedingly difficult. Increasingly complex international political factors, economic uncertainty, and questionable budget allocations leads one examining this subject to, at best, recommend the most logical steps in ensuring that all perspectives of policy are viewed. What can be done to help alleviate the potential of overlooking a vital component is: disease mapping, cross-country and regional comparisons and investment in health spending. Kenya desperately needs to rise above the current per capita spending of $6 (US) annually and to increase the spending rate at least at the rate of inflation.

While environmental investment in game reserves is commendable if done with proper consideration for surrounding indigenous groups. Health investment would be the most effective in vaccine programs. For such programs to be successful and beneficial for society there must be fully encompassing vaccination strategies to prevent not only leishmaniasis but also microbial resistance. As Kenya becomes a more developed nation, it will need to gain financial independence from non-governmental organizations. While the philanthropic efforts of foreign NGOs are commendable, their actions have outside motives and their health is not at stake. Domestically driven initiatives will pick up more momentum and cause citizens to invest in their health for the sake of health rather than socio-economic status.
Glossary:

*Alimentary canal*- the tubular passage that extends from mouth to anus and functions in digestion and absorption of food and elimination of residual waste (Merriam-Merriam-Webster Dictionary).

*Amastigote*- any of the bodies representing the morphologic (leishmanial) stage in the life cycle of all trypanosomatid protozoa resembling the typical adult form of members of the genus *Leishmania*, in which the oval or round cell has a nucleus, kinetoplast, and basal body but lacks a free-flowing flagellum, the flagellum being either very short or entirely absent. Called also Leishman-Donovan body. Cf. choanomastigote, epimastigote, opisthomastigote, promastigote, and trypomastigote (Dorlands Medical Dictionary).

*Buccal*- of, relating to, involving, or lying in the mouth <the *buccal* cavity> (Merriam-Merriam-Webster Dictionary).

*Colonial phenotypic variation*- the variation of gene expression under the same genotype (Rivas *et al.*).

*Cutaneous*- of, relating to, or affecting the skin (Merriam-Merriam-Webster Dictionary).

*Episomal*- a genetic particle of certain cells, especially bacterial cells, that can exist either autonomously in the cytoplasm or as part of a chromosome (dictionary.com).

*Extracellular*- situated or occurring outside a cell or the cells of the body (Merriam-Merriam-Webster Dictionary).

*Faecal* (*fecal*) - of, relating to, or constituting feces (Merriam-Merriam-Webster Dictionary).

*Flagellated*- (to possess the structure) to drive or punish as if by whipping (Merriam-Merriam-Webster Dictionary).

*Hematogenously* (*haematogenously*)- As defined by dictionary.com, taking place or spread by way of the blood <a *hematogenous* route of infection> (dictionary.com).

*Heterotrophic*- requiring complex organic compounds of nitrogen and carbon for metabolic synthesis (Merriam-Merriam-Webster Dictionary).

*Immunosuppression*- suppression (as by drugs) of natural immune responses (Merriam-Merriam-Webster Dictionary).

*Inoculum*- material used for the introduction of a pathogen or antigen into a living organism to stimulate the production of antibodies (Merriam-Merriam-Webster Dictionary).

*Intracellular*- existing, occurring, or functioning within a cell (Merriam-Merriam-Webster Dictionary).

*Leptomonad*- a parasitic flagellate of the genus *Leptomonas* (dictionary.com).
**Macrophages**- a phagocytic tissue cell of the reticuloendothelial system that may be fixed or freely motile, is derived from a monocyte, and functions in the protection of the body against infection and noxious substances -- called also histiocyte (Merriam-Merriam-Webster Dictionary).

**Mucocutaneous**- made up of or involving both typical skin and mucous membrane (Merriam-Merriam-Webster Dictionary).

**Neems**- a large East Indian tree (*Azadirachta indica* of the family Meliaceae) whose trunk exudes a tenacious gum and has a bitter bark used as a tonic and whose fruit and seeds yield a medicinal aromatic oil (Merriam-Merriam-Webster Dictionary).

**Pathogenesis**- the origination and development of a disease (Merriam-Merriam-Webster Dictionary).

**Pharynx**- the part of the vertebrate alimentary canal between the cavity of the mouth and the esophagus (Merriam-Merriam-Webster Dictionary).

**Promastigote**- a protozoan that belongs to the family Trypanosomatidae and especially to the genus *Leishmania* and that is in a flagellated usually extracellular stage characterized by a single anterior flagellum and no undulating membrane —promastigote *adjective* (dictionary.com).

**Reticuloendothelial system**- a diffuse system of cells arising from mesenchyme and comprising all the phagocytic cells of the body except the circulating white blood cells (Merriam-Merriam-Webster Dictionary).

**Virulence**- ‘the pathogenicity of a microorganism genetically endowed with that capacity as manifested against a host with an intact immune system under normal conditions’ (Chang *et al*.).

**Visceral**- (affecting) an internal organ of the body; especially: one (as the heart, liver, or intestine) located in the great cavity of the trunk proper (Merriam-Merriam-Webster Dictionary).

**Zoonosis**- a disease communicable from animals to humans under natural conditions (Merriam-Merriam-Webster Dictionary).
References:


Appendix A: ADF References

Figure 1. ADF Program Funding: Projects Funded by Sector. FY 2002- FY 2003. Source: Day 7.

Figure 2. ADF Program Funding: Projects Funded by Size of Grant. FY 2002- FY 2003. Source: Day 38.
Figure 3. ADF Project Development and Implementation Process
Source: Day 22.
### Table 1.

<table>
<thead>
<tr>
<th>WHO Country</th>
<th>Total expenditure on health as % of GDP</th>
<th>General government expenditure on health as % of total expenditure on health</th>
<th>Private expenditure on health as % of total expenditure on health</th>
<th>General government expenditure on health as % of total government expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>8 8.4 7.9 8.7 7.8</td>
<td>21.7 24.1 18.7 23.8 21.4</td>
<td>78.3 75.9 81.3 76.2 78.6</td>
<td>6.1 7.2 5.1 8.6 6.2</td>
</tr>
<tr>
<td>South Africa</td>
<td>9 8.7 8.8 8.7 8.6</td>
<td>46.1 42.4 42.6 41.8 41.4</td>
<td>53.9 57.6 57.4 58.2 58.6</td>
<td>12.4 11.3 11.1 11.2 10.9</td>
</tr>
<tr>
<td>USA</td>
<td>13 13 13 13 13.1 13.9</td>
<td>45.3 44.5 44.2 44.2 44.4</td>
<td>54.7 55.5 55.8 55.8 55.6</td>
<td>16.8 16.9 16.9 17.2 17.6</td>
</tr>
</tbody>
</table>

### Table 2.

<table>
<thead>
<tr>
<th>WHO Country</th>
<th>External resources for health as % of total expenditure on health</th>
<th>Social security expenditure on health as % general government expenditure on health</th>
<th>Out-of-pocket expenditure as % of private expenditure on health</th>
<th>Private prepaid plans as % of private expenditure on health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
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<td>0 0 0 0 0</td>
<td>70 70.7 68.5 69.6 67.6</td>
<td>7.3 6.6 9.1 8.7 9.5</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.2 0.2 0.1 0.4 0.4</td>
<td>0 0 0 0 0</td>
<td>19.7 21.9 21.7 21.8 22.1</td>
<td>78.3 76.4 76.7 76.6 72.2</td>
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<tr>
<td>USA</td>
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<td>27.6 28 27.6 27.2 26.5</td>
<td>61.2 61 61.7 62.8 64.1</td>
</tr>
</tbody>
</table>

### Table 3.

<table>
<thead>
<tr>
<th>WHO Country</th>
<th>Per capita total expenditure on health at average exchange rate (US$)</th>
<th>Per capita total expenditure on health at international dollar rate</th>
<th>Per capita government expenditure on health at average exchange rate (US$)</th>
<th>Per capita government expenditure on health at international dollar rate</th>
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</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>29 33 28 30 29</td>
<td>110 116 111 124 114</td>
<td>6 8 5 7 6</td>
<td>24 28 21 30 24</td>
</tr>
<tr>
<td>South Africa</td>
<td>315 270 264 253 222</td>
<td>622 604 623 633 652</td>
<td>145 114 113 106 92</td>
<td>287 256 265 265 270</td>
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<tr>
<td>USA</td>
<td>3939 4095 4287 4540 4887</td>
<td>3939 4095 4287 4540 4887</td>
<td>1784 1824 1895 2005 2168</td>
<td>1784 1824 1895 2005 2168</td>
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### Table 4.

<table>
<thead>
<tr>
<th>WHO Country</th>
<th>Children under five years of age underweight for age (%)</th>
<th>Year</th>
<th>Under 5 mortality rate per 1,000 live births</th>
<th>Infant mortality per 1,000 live births</th>
<th>% 1 year-olds Immunized Against Measles (2001)</th>
<th>Maternal mortality ratio per 100,000 live births</th>
<th>Births attended by skilled health personnel (%)</th>
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<td>78</td>
<td>1000</td>
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<tr>
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<td>1994-95</td>
<td>71</td>
<td>49</td>
<td>72</td>
<td>230</td>
<td>84.4</td>
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<tr>
<td>USA</td>
<td>1.4</td>
<td>1988-94</td>
<td>9</td>
<td>7</td>
<td>91</td>
<td>14</td>
<td>99</td>
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</tbody>
</table>

### Table 5.

<table>
<thead>
<tr>
<th>WHO Country</th>
<th>HIV prevalence among 15-49 year-olds (%)</th>
<th>Malaria mortality rate per 100,000</th>
<th>Tuberculosis prevalence per 100,000</th>
<th>Tuberculosis mortality rate per 100,000</th>
<th>Population using solid fuels (%)</th>
<th>Population with sustainable access to an improved water source (%)</th>
<th>Population with access to improved sanitation (%)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Kenya</td>
<td>12.3</td>
<td>67</td>
<td>462</td>
<td>49</td>
<td>85</td>
<td>88</td>
<td>42</td>
</tr>
<tr>
<td>South Africa</td>
<td>19.6</td>
<td>0</td>
<td>483</td>
<td>46</td>
<td>28</td>
<td>99</td>
<td>73</td>
</tr>
<tr>
<td>USA</td>
<td>0.6</td>
<td>0</td>
<td>4</td>
<td>&lt;5</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Appendix C: Maps

Figure 1. Location of Kenya in Africa
Source: Google

Figure 2. General Map of Kenya
Source: Google.