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Redefining security in sub-Saharan Africa

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REDEFINING SECURITY IN SUB-SAHARAN AFRICA

By

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Bachelor of Arts
University of Las Vegas, Nevada
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A thesis submitted in partial fulfillment
of the requirements for the

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College of Liberal Arts**

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ABSTRACT

Redefining Security in Sub-Saharan Africa

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New and challenging threats to humans are currently on the rise. These threats to human well being have been neglected and ignored within the traditional conception of security. Security studies have mainly focused on traditional threats, mostly military and political. Although still important, this perspective lacks the ability to address non-traditional threats that are killing and injuring millions each year. Each year, millions die of diseases such as HIV/AIDS, tuberculosis, malaria, hunger, and water related diseases among others. Although these threats are widespread throughout the world, Sub-Saharan Africa bears the brunt of these threats. This thesis proposes an ecological approach to security in Sub-Saharan Africa due to its high number of premature deaths and sufferings from environmental problems, infectious diseases and resource scarcity. Four Sub-Saharan African countries have been selected to demonstrate the various insecurities in the region. The ecological security approach, proposed here, will mainly look at the human being as the unit of analysis and tries to lessen premature deaths of people by creating an understanding of human relationships with the environment, other species, and each other.

The four countries selected for this study have shown similar results. In all four countries the number of people dying from infectious diseases and others far exceeds that of war and intentional injuries. Therefore, the thesis proposes that a new ecological approach to security is necessary for Sub-Saharan Africa in order to prevent and minimize the premature death and suffering of its citizens.

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To my brothers and sisters, I love you all.

And most important to My GOD, You are my strength.

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CHAPTER I

INTRODUCTION

The post-cold war era has revealed very significant and pressing challenges to the security and prosperity of people and societies. Policy makers are now forced to address nontraditional threats to state interests such as environmental degradation, resource scarcity and migration (Price-Smith 2002). The world has seen many changes in the last half century, which include increased life expectancy in most developing countries and increase in per capita income in few of them. However, this progress is overshadowed by the fact that during that same time large parts of the world remained impoverished (United Nations 2004).

In its report, the United Nations stated that:

More than a billion people lack access to clean water, more than two billion have no access to adequate sanitation and more than three million die every year from water related diseases. Fourteen million people, including six million children, die every year from hunger. There were 842 million undernourished people in 2000. Ninety-five percent lived in poor countries (United Nations 2004, 12).

Over the past few decades, it has been recorded that some developing countries have increased their per capita income but the standard of living in many others has dropped even more. Sub-Saharan Africa is no stranger to poverty and still is the region the most affected by it. In the last couple of decades, the average life expectancy in Sub-Saharan Africa has decreased by four years while most countries in the world have seen an increase. In some parts of the region, this number is even higher. Children in Sub-

Saharan Africa are ten times more likely to die before they reach five years of age compared to children in developed countries. Furthermore, in contrast to other regions, undernourishment increased in Africa during the 1990s. Since 1990, the region is experiencing a significant decrease in the standard of living of its people (United Nations 2004). The rural Sub-Saharan African population is highly affected by poverty more than other areas. As the majority of Sub-Saharan African populations are rural dwellers, it is estimated that more than half are living in extreme poverty. The urban areas are not much different either with nearly “43 percent of the population living on less than \$US 2 per person per day” (United Nations Economic Commission for Africa 2001, 3; hereafter UNECA). It is believed that Sub-Saharan Africa is home to 300 million poor people (UNECA 2001).

In 2004, the UN estimated that 39 million people were living with HIV/AIDS worldwide (United Nations Millennium Development Goals 2005; Hereafter UNMDG). Twenty-three million are in Sub-Saharan Africa which accounts for sixty-seven percent of all infections. The number of people living with HIV continues to increase every year. It is estimated that AIDS-related illnesses will continue as a significant global cause of premature mortality in the coming years (Joint United Nations Programme on HIV/AIDS 2009; hereafter UNAIDS).

HIV/AIDS greatly affects the most productive segments of society. This in turn can erode a state’s ability to defend, provide, and protect as well as devastate economies in various ways. In addition, food and agricultural production is also threatened in many of these countries (United Nations 2004).

African countries are highly dependent on agriculture to support their people. Agriculture is the most important economic activity in nearly all the region. However, its land has become uncultivable and severely degraded. These problems are mainly associated with issues such as increased populations, unsuited agricultural activities and natural disasters (UNECA 2001). Within a thirty year period, arable land per person in Sub-Saharan Africa has decreased by half (Griffin J. et al 1999; UNECA 1999, 2001). In combination, decrease in arable land due to rapidly growing populations, government policies on land, and degradation are forcing rural populations to relocate to urban areas for better opportunities. Since the standard of living in the cities is higher and more expensive than the rural areas, the migrants are forced to live in slums in order to survive. As a result, they reside in areas without any adequate sanitation or clean water, which further exacerbates health problems (UNECA 2001).

The African continent has gone from a healthy environment to the present condition in few decades. According to the ECA, as most of Africa gained independence, natural resource exploitation was extensive in order to gain prosperity. The success did not last long, when the region experienced a decline in its economy and environment (UNECA 2001). “Many countries [then] embarked on structural adjustment programmes [SAP] with the hope of addressing widespread poverty and the debt burden, without much success” (UNECA 2001, 3).

As defined by the World Health Organization, Structural Adjustment Programmes (SAPs) are economic policies that were mainly meant to stabilize the economies of developing countries. These policies were highly advocated by the two biggest and most influential international financial institutions - the World Bank and International

Monetary Fund (IMF). In order to get loans, developing countries would agree to get on the Structural Adjustment Programmes. These policies reflect the “neo-liberal” economic policies of open markets, minimal government regulations and involvements in the market that aim to achieve rapid and continuous economic prosperity (World Health Organization 2010a; hereafter WHO). As Argued by Stiglitz, although privatization, liberalization and laissez-faire policies can bring about economic growth, there are preconditions such as strong institutions, some government regulation and others that need to be met in order for these economic policies to work as desired. The IMF and the World Bank, however, had a narrow ideological perspective that these policies were to be pursued rapidly in developing countries. As a result, these policies often did not bring the benefits that were promised (Stiglitz 2002). Most of the thirty-seven African countries that have agreed to the Structural Adjustment Programs by 1989 would start restructuring their economies from a government regulated economic development to a to a “free market” orientation. When these countries act according to SAP policies which are: devaluations of the country’s currency, privatization, removal of government subsidies on social services and others, they become eligible for loans (World Bank 1990 and Ayittey 1991). However, in 1990 the World Bank reported that, “adjustment lending appeared to have been relatively less successful in highly-indebted countries and Sub-Saharan Africa” (World Bank 1990 and Ayittey 1991, 3-4). Among those who have signed the agreement, the World Bank considered only Ghana and Tanzania to have achieved some financial success (World Bank 1990 and Ayittey 1991).

As mentioned above, trying to reform just the economic development of a country did not succeed in most cases. Countries then realized that in their plan to restructure the

economy, they needed to address environmental issues due to their “complex system of cause and effect” (UNECA 2001, 3-4). Then came the Stockholm conference in 1972 and the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. During the earth summit in 1992, Agenda 21 became the adopted document that would lead the world in the path of achieving sustainable development (UNECA 2001). Agenda 21 is a global partnership for sustainable development which addresses pressing issues such as poverty, hunger, ill health, illiteracy and continuing deterioration of ecosystems and tries to prepare the world for the challenges that might occur in the next century. This partnership is a global agreement and political commitment on development and environment cooperation (United Nations Environment Programme 1992; hereafter UNEP).

In Rio, it was believed that Agenda 21 would be implemented in all countries in order to promote a better balance between achieving economic growth and maintaining a well balance environment. However, ten years later, most Sub-Saharan Africa countries did not see any changes. Both their economies and environments were still in decline. The land and natural resources were being depleted at a rapid pace (UNECA 2001).

According to the United Nations,

Any event or process that leads to large scale death or lessening of quality of life and undermines states as the basic unit of the international system as a threat to international security... [such things include but not limited to] economic and social threats, including poverty, infectious disease, and environmental degradation, Inter-state conflict, Internal conflict, including civil war, genocide and other large-scale atrocities, Nuclear, radiological, chemical and biological

weapons, Terrorism, [and] Transnational organized crime (United Nations 2004, 23).

Although all of the threats mentioned above are very important and continue to shape security agendas around the world, this research will only look at the complex interactions between environmental deterioration, infectious diseases, food security and how it affects the states in the Sub-Saharan African region. These non-traditional issues are creating serious security threats in the region by killing millions every year, forcing millions to flee their homes, creating further food insecurity and taking major economic tolls on already poor countries. These non conventional threats should be on the forefront of security agendas in the Sub-Saharan region due to the impact they are having in each country.

In this thesis, I argue that a broader security perspective is needed in order to address and create solutions to non-conventional threats that act as stressors on state capacity and national security. These non-traditional security threats are largely neglected within the traditional security perspective that is currently dominant. The research will show the various non-conventional threats that have been considered as issues rather than threats are undermining state and human security in the Sub-Saharan African region. Major security threats to states and human beings in the African continent are generally environmental degradation, infectious diseases, food security that work together to undermine state capacity, human security, and exacerbate further poverty, and devastation in the region.

Chapter II looks at the concept of security worldwide and regional in light of the traditional security perspective, which has dominated much of the security studies in the

twentieth century. It looks at ways to redefine security in light of an ecological perspective. This is then applied to the Sub-Saharan African region, where it discusses how and why Sub-Saharan Africa should redefine its security agenda to encompass other security threats that are non militaristic in nature but have tremendous impact on the state and its citizens.

Chapter III looks at human and nature induced environmental degradation such as deforestation, desertification and erosion in the region and its impact on the livelihood of people and on the resources of the states. This chapter further examines the impact of resource scarcity such as land and freshwater on the people and the region overall. These issues are further worsened by demographic change, in this case high population growth and urbanization. Environmental changes are examined in this section in order to evaluate the impact they are having on states and societies. This will allow policy makers to assess the gravity of environmental changes and create policies that can accommodate these changes.

Chapter IV looks at emerging and re-emerging infectious diseases that are killing millions every year and are devastating countries in the region. The region is greatly affected by the new and re-emerging infectious diseases. It looks at different diseases that are engulfing the region such as malaria, HIV/AIDS, tuberculosis, and diarrheal diseases and the effects on human livelihood, health systems, and economies in the region. It also examines the link between environmental change and the emergence and spread of certain infectious diseases.

Chapter V examines conditions in randomly selected four Sub-Saharan countries where it shows how the various non-traditional challenges have created major ecological

insecurities in the countries. The countries selected are Angola, Ethiopia, Kenya and Sudan. South Africa was considered in the process but I was afraid it would be an extreme case (anomaly) in terms of its HIV infection rates. These countries were selected in hopes that they would fairly represent somewhat of the similar challenges Sub-Saharan African countries are facing. The chapter further looks at the various effects environmental degradation, infectious diseases, and malnutrition have on the specific countries vis-à-vis the region.

Finally, Chapter VI concludes on all the findings from the region and shows why I believe that Sub-Saharan African states need an immediate paradigm shift.

CHAPTER II

REDEFINING SECURITY IN SUB-SAHARAN AFRICA

In theory and practice, security studies have traditionally focused on protecting a state from any foreign or domestic threats, mainly military and political. This security concept has dominated the security agendas of many states for several decades (Del Rosso and Baldwin, King and Murray 2002). As argued by King and Murray, “the traditional view of security has focused on using the military to ensure the territorial integrity of sovereign states. Security studies and the security establishment have long been focused on foreign and defense policy mechanisms to avoid, prevent, and, if need be win interstate military disputes” (Del Rosso and Baldwin, King and Murray 2002, 588).

2.1 Traditional Security concept

Originally derived from the Latin word *securitas*, security is defined as tranquility and freedom from care or, according to Cicero, it is the “absence of anxiety upon which the fulfilled life depends” (Liotta 2005, 56). Walt argues that traditionally security studies have mainly focused on war, assumed that states can possibly go to war with each other at any time and that they can greatly affect other states and societies (Bull 1968, Martin 1980, Walt 1991). Security study is therefore defined as, “the study of the threat, use, and control of military force” (Nye and Lynn-Jones 1988, Walt 1991, 212). Traditional security is mainly measured through a state’s ability to protect itself from outside threats (Haftendorn 1991, Miller 2001). Furthermore according to Miller, threats to national security in the traditional conception of security are believed to be mainly posed by other

states that want change and are against the norms of the international system (Vasquez 1995, Miller 2001). Any accumulation of arms or any military reinforcement by one state is viewed as a threat by another. Moreover, in order to be prepared for this “supposed” threat, the only relevant response as a result is a military one. The state, as the most important unit of analysis within the traditional concept of security, is the only entity that is able to provide for its own security (Miller 2001). In turn to preserve its “sovereignty, and national independence, and maintaining territorial integrity” (Miller 2001, 17) and defend against interference from external forces, the state will therefore go to war (Miller 2001).

This traditional security concept has dominated much of the twentieth century and was popularized in the west with the world wars ending and the cold war becoming the primary force governing East-West relations. Therefore the core component of the security concept became the preservation of the state through the ability to prevent or contain external attack. Although the concept of security in Africa came directly from a different historical experience of colonization, scholars still apply the traditional view of security to Africa. After gaining independence during the 1960s, African countries wanted to make sure their new found freedom lasted, therefore making it their first security concern (Oyebade and Alao 1998). In an Organization of African Union (OAU) conference in 1963 most African leaders expressed their determination “to safeguard and consolidate the hard-won independence as well as the sovereignty and territorial integrity of our states, and fight against neo-colonialism in all its forms” (Oyebade and Alao 1998, 5).

In most OAU summits, the main security concern for African leaders became the

preservation of African independence. In order to preserve this new born independence, African states agreed to respect the inherited colonial boundaries to avoid any further problems. However, not long after this clause was put in the OAU charter, ethnic minorities who experience oppression soon were asking for secession, this lead to the reconsideration of the colonial boundaries by some African states, who eventually wanted to redraw their boundaries with neighbors. This resulted in several civil wars and border disputes throughout the continent. These disputes however were more intense in regions where perceived rich in mineral resources (Oyebade and Alao 1998). Therefore the Sub-Saharan African security concept came from this traditional security concept where the state has to defend and preserve itself from external and internal threats at all times.

This traditional view of security is supported by military expenditures of states around the world. In 1991 for example, the world's expenditure on military activities had reached almost one trillion dollars. In the year 2008, this number had soared to a total of nearly 1.5 trillion dollars. This indicates a rise of four and forty-five percent from 2007 and the turn of the twenty-first century respectively (Stockholm International Peace Research Institute 2009, 10; hereafter SIPRI).

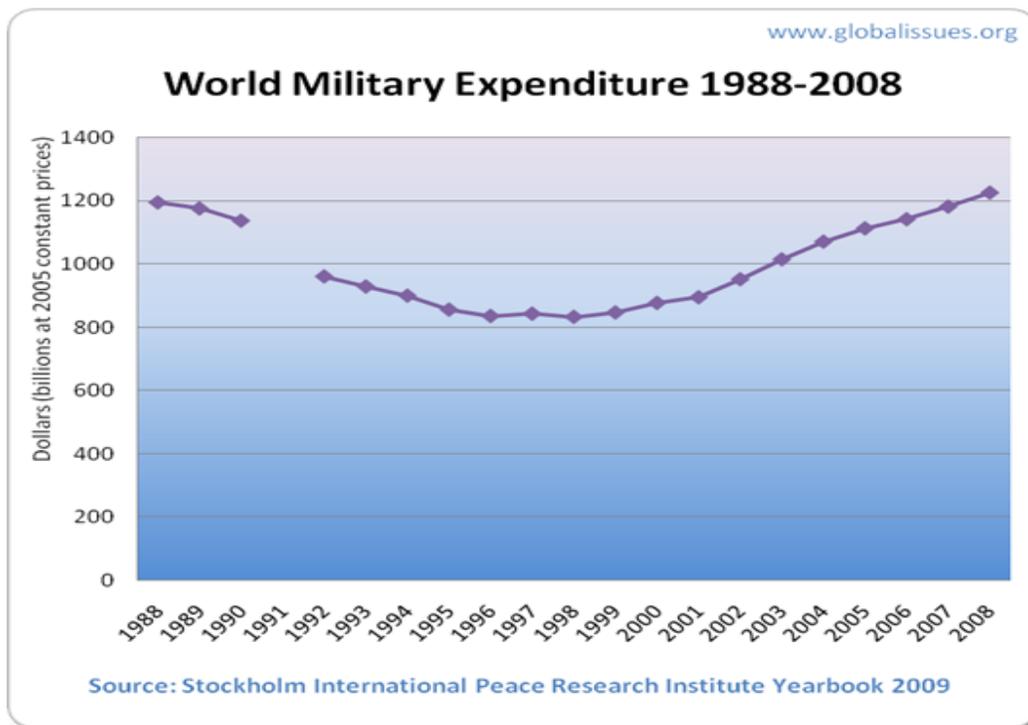


Figure 1. World Military Expenditure Estimates, 1988–2008.

Source: Stockholm International Peace Research Institute. 2009. *SIPRI Yearbook 2009: Armaments, Disarmament, and International Security*. New York: Oxford University Press.

While the traditional security view has dominated much of the twentieth century, the world has been changing in ways that traditional concept of security is not broad enough to explain and tackle the new threats to security. As argued by Newman, for most states and their people, the greatest threat to their security and well-being comes from “disease, hunger, environmental contamination, street crime, or even domestic violence” (Newman 2001, 240). The twentieth century has witnessed many wars within and among countries. Our leaders were mainly focused on protecting territories for obvious and good reasons. However, the neglect of other insecurities such as infectious diseases and hunger resulted in countless deaths (Crosby 1989; Pirages and Degeest 2004). According to Pirages and Degeest, “It is estimated that all of the wars of the last century resulted in the deaths of

111 million combatants and civilians, an average of 1.1 million per year. This figure is roughly comparable to the toll of the twentieth-century famines, which accounted for 75 million deaths, an average of 750,000 per year. But infectious diseases are currently killing 14 million people yearly” (Washington Post 1999; WHO 2000; Devereux 2000; Pirages and Degeest 2004, 20). Similarly, for other states and their people, the greater security threat can also be internal, perpetrated by the state itself. Although the traditional conceptions of state security are valid and essential, they are not “sufficient conditions of human welfare” (Newman 2001, 240). The traditionalist view of security assumes that citizens within states are “secure” and protected from threats. However, this is not always true due to the fact that nontraditional threats can significantly cause them to be insecure (Newman 2001, 2040). The traditional ways of looking at security is unable to accommodate human insecurities caused by the environment, diseases, and hunger around the world. In an era of deepening globalization, rapid demographic change, severe environmental degradation, and climate change, there is a need for a more comprehensive theoretical framework that can address the various insecurities caused by non-military threats to the individual and in turn the state.

Historically, various ravages of nature have been responsible for killing and injuring countless numbers of people over time. However, since the causes of these kinds of threats were not well understood, they were considered to be mysterious and, most likely, the work of a higher power. These sources of insecurity were therefore considered well beyond the powers of humans to deal with them. In times when such disasters took place, like the Black Death or Bubonic Plague, about forty percent of Europe’s population perished. But since the source of the disease was unknown and misunderstood, the only

remedies that were thought to possibly work were prayers (Pirages and Cousins 2005). Unlike military conflicts, people have known of no effective solution for dealing with them. As a result, even in the twentieth century, where human conflicts still exist, security is defined as security from threats by other people, or other states. However, through technological innovation and better understanding of the world around us, we have discovered that ecological insecurities are not the works of God or gods but human interference with nature or changes in nature itself; thus allowing us to do something about it.

2.2 Ecological Security

Although the world still remains a dangerous and violent place, there are many threats to the security of people, the state, and the world that are nonmilitary or nontraditional in nature. In an era of deepening globalization, promoting national interests and welfare is being increasingly understood to include economic, environmental, and ecological issues. Today, the focus of conventional military efforts has shifted considerably from inter-state warfare to managing intra-state disputes in ethnically divided and sometimes failing states (Pirages 2009).

This thesis makes the argument that traditional security policies have to be redefined to include the various non-traditional threats to human well-being. The idea underlying this perspective is that in an era of deepening globalization and interconnectedness, the challenges to human well-being are just as likely to come from destabilized relationships with the physical environment as they are from military conflicts across borders. Since these various threats to human well-being are mostly ignored within the traditional

security perspective, a broader, more effective approach to security is needed in order to address these serious threats to human well being (Pirages 2009).

The past few centuries have allowed states to have greater control on the activities and connections of their citizens with the rest of the world. Social goods and services were also provided by states in order for their societies to flourish. Currently, however the processes of globalization and greater economic interconnectedness are infringing on the state's ability to govern (Strange 1996; Pirages and Degeest 2004). Industrialization in combination with rapidly growing populations has resulted in global climate changes and pollution that need international attention. Individual states in this matter are unable to address the issue of global warming and its related consequences on their own (Allen 2000; Pirages and Degeest 2004).

Innovations in transportation have drastically changed the movement and number of people, species, organisms, and other things moving from place to place. Borders are becoming more porous. In the last half century, the distance flown internationally has reached more than two trillion kilometers each year from twenty billion kilometers in the 1950's. Although this technological advancement and innovation has accomplished many great things, it has also allowed the movement of unwanted and mostly destructive species and organisms into new areas. This massive movement also contributed to the rapid spread of new and re-emerging diseases across borders (French 2000).

This in turn makes us realize that states are less able to control these various challenges that come into their territories. Some corporations in the world are far more financially and politically influential than numerous developing countries. (World Bank 1999; Pirages and Degeest 2004). It is estimated that, "If annual corporate incomes are

compared with gross national products (GNP), of the one hundred largest economic units in the world, fifty- two are corporations and forty-eight are countries” (World Bank 1999; Fortune Global 500 1999; Pirages and Deggest 26). The changes in the nature of how we do business in the world due to globalization are greatly impacting current governments. The intensity and speed of it all requires new ways of thinking about how to cope with these challenges. Yet, traditional theories of international relations neglect the dramatic changes in ecological, technological, socio-cultural, economic, and philosophical contexts in which sovereign states are constantly competing for security (Pirages and DeGeest 2004).

The structure of the international system changed greatly after the cold war. All the changes in the international system such as the role of the global market economy, the process of globalization, and the information revolution are making it increasingly difficult for states to deal with these new non-territorial security issues through traditional state-centered, militaristic responses. Furthermore, the traditional approach does not account for the increasing role of international institutions, non-state actors that are beyond the control of the nation state system. The change in international politics exposes the limitations of the traditional approach to international relations in understanding and providing effective solutions to current issues on the international agenda (Sheehan 2005).

The new millennium has seen a modified version of the security paradigm that somewhat acknowledges the growing importance of new kinds of challenges to human well-being. Intense ethnic conflicts in many parts of the world, terrorist attacks in United States, numerous natural disasters in many places, and a rapidly rising energy and food

prices followed by a global economic collapse have played a major role in broadening the thinking about the nature and causes of insecurity. The security paradigm is further broadened by the ongoing HIV/AIDS pandemic, followed by a brief outbreak of the SARS virus, and persisting fears of states that viruses such as the avian flu and others will mutate into a form that could kill millions of people, which focused attention on infectious disease as an additional important component of an emerging alternative security paradigm (Pirages 2008).

Since the end of the cold war, the meaning of security has become problematic. Many scholars and activists have argued that the concept of security needs to be redefined to include various non-conventional threats to human security. This argument will make a transition from looking at entire states to looking at individuals within states (Thomas 2004; Roberts 2005). Others also argue that traditional security concepts exclude the main problems and concerns humans are facing in their everyday life such as health problems, devastated environments resulting in reduced agricultural products, extreme poverty, and lack of clean water and many more (Sheehan 2005, Roberts 2005).

Human security, as defined by the United Nations Development Programme, “has four essential characteristics: it is universal, its components are interdependent, it is best ensured through prevention, and it is people centered” (United Nations Development Programme 1994; hereafter UNDP; King and Murray 2002, 589). Threats to human security come in many forms, including “economic, food, health, environment, personal, community, and political” (UNDP 1994; King and Murray 2002, 589). It has been recognized by many that even if states secure their territories, the citizens within that state may not be secure due to various non-conventional threats (McNamara 1968; King

and Murray 2002). Scholars such as Brown and Ullman also recognize that the effects of non-traditional threats like epidemics and degraded environments are capable of creating as much insecurity as wars and unrests (Brown 1977; Ullman 1993; King and Murray 2002). It is said that, “the price for old thinking about world security is paid in the death, disease, poverty, and oppression of millions” (Booth 2005; Roberts 2005, 4). Since the concept of human security is debatable, some scholars have suggested looking at what constitutes human insecurities. The main human insecurity can be seen to be avoidable or premature human deaths, which are caused by various social, economic, political, and environmental problems (Roberts 2005). This is measured through the years of potential life lost (YPLL). According to the World Health Organization, “years of potential life lost are calculated from the number of deaths multiplied by a standard life expectancy at the age at which death occurs” (WHO, 2011).

Traditional security policy has progressed to have a focus on protecting the people and property from predatory neighbors. Knowing the very visible history of violent conflict among peoples and countries, it is logical why security has largely been conceptualized in military terms. Conflicts bring devastation, violence and destruction to people and countries. However, research and understanding of other sources of insecurity, such as threats from the physical environment, which have been responsible for killing and injuring great numbers of individuals, is less developed. As a result, the paradigm that dominated much of the security agenda emphasizing the application of military force to protect power and privilege ignores the less understood but often much more serious ecological threats to human well-being (Pirages 2008)

The thesis challenges the traditional concept of security and makes the argument for

developing a broader approach to defining security in order to better understand, identify, explain and provide effective solutions to current security challenges in Sub-Saharan Africa. It is believed that an ecological security approach will be more helpful in explaining the causes of insecurities and better able to suggest policies to remedy them than traditional approaches to security. The thesis focuses on Sub-Saharan Africa, one of the most ecologically insecure regions of the world.

The approach to conceptualizing security builds on the human security perspective that was defined by the United Nations Development Program in its 1994 report. The UNDP argues that human security is, “first, safety from chronic threats as hunger, disease, and repression. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life” (UNDP 1994, 23). The ecological approach takes the human security perspective a little further with the observation that *Homo sapiens*, is but one species among millions of others that co-exist in an ever changing and increasingly integrated ecosystems. Therefore, this approach’s main focus is on how to best maintain the present and future well-being of human beings in this ecosystem. In order to preserve human security, this approach also requires concern with the preservation of the biosphere as a whole, including other species (Pirages 2008). Human populations have shaped and been shaped by their physical environments that they share with other societies such as animals and microorganisms. Components of the ecosystem in which all these societies are embedded in and the relationships societies have among and between them are constantly in flux. Changes in human behavior or changes in nature can create ecological insecurities. In order to preserve ecological security, dynamic equilibriums can be maintained in four key relationships which constitute the

framework for this study:

1. The first relationship is between the increasing material demands made by growing societies with the capabilities of the physical environment to sustain them.
2. The second relationship is between human societies and other species.
3. The third relationship is between people and pathogens.
4. The fourth relationship is between human societies (Pirages 2009)

Ecological security is made more effective when stability and balance of these significant relationships are maintained. Disequilibria in these relationships create ecological insecurity which in turn can aggravate human suffering and increase premature deaths. This thesis focuses this theoretical framework on various relationships such as war and diseases, refugees and environmental degradation. Since conflict in the Sub-Saharan region is still a significant problem, it will look at conflict and its effects on the increase in disease threats, environmental refugees, and further environmental degradation. In addition, this thesis will look at the relationships between resource scarcity and malnutrition, disease, and possible conflicts. Finally, the relationships between various environmental ills and diseases to the economies of African countries are explored. This theoretical framework is applied to the Sub-Saharan African region that will include looking at several different Sub-Saharan countries and their insecurities.

Ecological security can be measured on the societal level, the level of the state, or, during this time of increasing interconnectedness, for humanity as a whole. As people are concerned with the future of their well being, the level of ecological security or insecurity is largely revealed in the human life expectancy data, given that environmental

degradation, plagues, malnutrition, conflict and other signs of disequilibrium are the central causes of almost all of the premature deaths of human beings (Pirages 2008).

Ecological security in this thesis is measured through the various data indicative of ecological insecurity such as human life expectancy, deaths and suffering from environmental degradation, starvation, infectious disease, malnutrition and military combat deaths. This thesis is directed toward the region of Sub-Saharan Africa because it is the most affected region in the world with highly malnourished population, high burden of infectious diseases and a large share of premature deaths. Disequilibria between the four key relationships mentioned above are seen in Sub-Saharan Africa, therefore increasing the need for a redefinition of its security agenda. Africa's burden of diseases, malnutrition, food insecurity, environmental degradation and further poverty forces it to consider and apply a new and broader security perspective.

These insecurities are exacerbated through ecological changes that are taking place. According to the United Nations Environmental Programme, environmental degradation and depletion is generally worsening throughout the world, especially in Africa, Asia-Pacific, and West Asia. Human activities are having a substantial impact on the physical and biotic systems within which humans act and on which humans depend (Lonergan 1999). Good weather conditions and abundant natural resources have given civilizations chances to grow and prosper. However, the rapid growth of human populations and the resources requirements of higher levels of living in the current world, are now severely exhausting supplies of many kinds of natural resources (Pirages and DeGeest 2004).

Ecological security challenges are mostly due to humans overexploiting the environment or changes in nature itself. We are exploiting our natural resources and

damaging our ecosystems to a point of no return, knowing full well that our livelihoods are highly dependent on them. Human activities have resulted in the exploitation of numerous resources such as water, forests, and others faster than they can be replenished (Simon and Khan 1984, Deudney 1990, and Lee 1997).

Demographic change is one of the main drivers of ecological insecurity. Rapidly growing populations can create enormous stress on natural ecosystems and resources such as, “environmental degradation, increased vulnerability to disease, and occasionally to violent conflict” (Homer-Dixon 1991; Homer-Dixon 1994; Pirages 1997, 38). Within the next decade, the world is expected to have more than eight billion inhabitants. Developing countries are estimated to house more than eighty-five percent with more than sixty percent living in areas where the environment is susceptible to disasters (World Population Data Sheet 1996; World resources 1992-93; Pirages 1997). In 2005, the Millennium Ecosystem Assessment reported that nearly two-thirds of our natural ecosystems are “degraded to the point that they can no longer provide adequate benefits to people” (G.C. Daily 1997, Millennium Ecosystem Assessment 2005; hereafter MEA; Mainka, Mcneely and Jackson 2008).

As the poorest continent, Sub-Saharan Africa is the most affected region in the world with environmental change because it is unable to financially deal with the consequences of environmental disasters. Its people are the consequences of environmental change in lower agricultural outputs, lack of water, and increased contact with infectious diseases. Today, Africa’s fundamental concerns are mainly related to food security, increased weather variability affecting agriculture and health problems (World Meteorological Organization 2001; hereafter WMO; UNECA 2001).

As Barnett argues, environmental security is a security or survival issue for one and an adaptation issue for the other. Some can adapt to environmental ills better than others due to various reasons such as technology, economy and such. For example, he states that, “an average woman from the Marshall Islands has a life expectancy fourteen years less than an Australian woman, her child is thirteen times more likely to die as an infant compared to an Australian child and she earns only 8% of her Australian counterpart” (UNDP 1998, UNDP 1999, Barnett 2003, 14). It is clear that these two countries are not equally affected by environmental change because, “Australians produce fifty times more greenhouse gases than Marshall Islanders, yet a meter rise in sea-level would subsume 80% of the Marshall Islands, whereas a much smaller amount of Australia’s surface is likely to be flooded” (Commonwealth of Australia 1997, Holtus et. Al 1992, Republic of the Marshall Islands 2000, Barnett 2003, 14). This is then a security issue for the Marshall Islanders whereas for Australia it is a matter of adjustment (Barnett 2003).

It is a similar situation with Sub-Saharan Africa which contributes minimally to global climate change but is highly affected compared to more developed regions. It is also evident that since Sub-Saharan Africa suffers from extreme poverty, states and peoples are unable to deal with the consequences of environmental disasters.

Africa has many problems that need to be addressed such as its economic, political, and social instabilities. However, climate change further exacerbates these various issues. Africa is highly susceptible to the effects of climate change. Some of its areas have seen a rise in temperature leading to drier soils. Although international efforts to address the issue of climate change are progressing, the changes however are even faster (WHO 2003; Hulme, Githeko, and Mathies 2005). The World Health Organization estimated

that, “in 2001, around a quarter of the global burden of human disease was borne by Africa- home to little more than 10% of the world’s population” (WHO 2003; Hulme, Githeko, and Mathies 2005, 28-29). Infectious diseases are one of the major killer diseases in the continent. Some of the diseases are vulnerable to environmental changes and disruption (Hulme, Githeko, and Mathies 2005).

It is reported that ninety percent of deaths from malaria worldwide are found in Africa. Malaria and cholera are among those diseases sensitive to temperature changes. It is believed that the rises in temperature during the El Nino events are mostly associated with the breeding and spreading of the cholera disease. Around eighty percent of the world’s cholera cases were reported to be in Africa (WHO 1998; Hulme, Githeko, and Mathies 2005).

Scholars like Epstein argue that, “El Nino, events are accompanied by weather anomalies that are strongly associated with disease outbreaks, and spatial ‘clusters’ of mosquito-, water- and rodent-borne illnesses” (Epstein 1999, Kovats, Bouma, and Haines 1999, Checkley et. al 1997, Pascual et. al 2000, Epstein 2001, 750). In 1997/1998, diseases like malaria and cholera were among the deadliest diseases that were highly affected by the warming of the Indian Ocean. These were devastating events that cost the lives and money of many African countries. Although, extreme weather affects the entire world, the most affected areas are developing countries (Lithicum et. al 1999, International Federation of Red Cross and Red Crescent Societies 1999; hereafter IFRC and RCS, Epstein 2001). Epstein further argues that extreme weather events that the world is experiencing today “are having long-lasting ecological and economic impacts on a growing cohort of nations, affecting infrastructure, trade, travel and tourism...[and that]

since 1976, the pace, intensity, and duration of ENSO events have quickened, and extremes have become more extreme” (Lithicum et. al 1999, IFRC and RCS 1999, Epstein 2001, 750). Diarrheal diseases are further exacerbated by weather extremes such as flooding and drought. These extremes are further causes for various epidemics such as malaria and other diseases. Livestock is also seen to be affected by extreme weather conditions like the El Nino of 1998, where a Rift Valley Fever “outbreak in Somalia and Northern Kenya killed up to 80% of all livestock” (Hulme, Githeko, and Mathies 2005, 30).

Interstate conflicts are very much a possibility especially in an ethnically diverse region such as Sub-Saharan Africa. Conflicts are surely devastating and take the lives of thousand if not millions. However, the immensely high number of lives lost due to other threats such as infectious diseases and famines are making the number of conflict deaths appear small.

In large scale conflicts, The United Nations estimated that around thirteen million people died from 1994-2003 and that twelve million of these were in Sub-Saharan Africa, Western and Southern Asia. Although this is a very tragic and regrettable loss of lives, it is not comparable to the number of lives lost due to infectious diseases, malnutrition and famines that are taking the lives of more than the thirteen million people in a single year (UNMDG 2005). The world’s military expenditure however has been growing for the last few decades. Almost all regions and sub-regions have shared in the general increase of global military expenditure over the period of 1999-2008 (SIPRI2009).

The World Health Organization has reported in 2002 that the three main infectious diseases, “together HIV/AIDS, tuberculosis, and malaria claimed 5.7 million lives last

year, and caused debilitating illnesses in many millions more. These were the lives of infants, young children, and young mothers and fathers in their most productive years” (WHO 2002, 12). In 1998, HIV/AIDS had become even deadlier than war when it took the lives of more than two million people. Unless there is ground-breaking discovery to turn this trend, it is believed that, “AIDS will have caused more deaths than any other disease epidemic in history” (WHO 2002, 13).

AIDS is the leading cause of premature deaths in Sub-Saharan Africa and the fourth largest killer in the world. In other parts of the world like the Commonwealth of Independent States, HIV is spreading at an alarming rate. Since the AIDS epidemic began three decades ago, it has killed more than twenty million people. In 2004, it was estimated that nearly forty million individuals were HIV positive. Furthermore, in countries where the disease has been rampant, it is believed to have “reversed decades of development progress” (UNMDG 2005, 24) that countries have gained with difficulty (UNMDG 2005).

Other diseases that are slowing countries’ economies and killing millions are malaria and tuberculosis. Each year, malaria is killing more than one million people, with ninety percent in Sub-Saharan Africa. It is also responsible for the death of 2,000 children a day in the Sub-Saharan African region (UNMDG 2005). Those who survive, suffer from “episodes of fever and amaenia that take their toll on those children’s mental and physical development” (UNMDG 2005, 26). Adults are also affected by malaria which often removes them from the workforce for days or even weeks at a time. It is estimated that it slows African countries’ economic growth by about 1.3 percent a year (UNMDG 2005). A previously eradicated disease that has made a comeback is tuberculosis. Each year, 1.7

million people die of tuberculosis, most of them in their “prime productive years”. Sub-Saharan Africa has been among the regions with the fastest increase in new TB cases (UNMDG MDG 2005, 29). In 2003, it was estimated that about nine million new cases of tuberculosis emerged, which included about 674,000 among people with HIV or AIDS. It is believed that its spread has been attributed to the “emergence of drug-resistant strains of the disease, the increase in the number of people with HIV or AIDS, which reduces resistance, and, the growing number of refugees and displaced persons” (UNMDG 2005, 29).

HIV/AIDS, tuberculosis and malaria – the basic facts, 2000			
Disease	Deaths per year	New cases per year	Percentage in developing countries
HIV/AIDS	3 million	5.3 million	92%
Tuberculosis	1.9 million	8.8 million	84%
Malaria	More than 1 million	300 million	nearly 100%

Table 1. HIV/AIDS, Tuberculosis and Malaria – The Basic Facts, 2000.

Source: World Health Organization. 2002. *Scaling up the Response to Infectious Diseases: A Way out of Poverty, Report on Infectious Diseases*. Geneva: Schuler Books.

Hunger and malnutrition are major insecurities in Sub-Saharan Africa that are undermining human security in the region. In 2002, the United Nations estimated that more than 800 million in less industrialized countries were food insecure, slightly less than 1990. However, the number of hungry people has increased by tens of millions in the Sub-Saharan African and Southern Asian regions. The UN states that rapid population growth, poor agricultural productivity and environmental degradation are the main factors that result in food insecurity in these regions (UNMDG 2005). Most of the world’s hungry people live in rural areas highly dependent on the consumption and sale of natural products for both income and food. Approximately over half of child mortality

is due to malnutrition. It is caused not only by food deprivation but also by the debilitating effects of infectious diseases and lack of care. The number of underweight children in Sub-Saharan Africa has increased from twenty-nine to thirty-seven million between the years of 1990 to 2003 (UNMDG 2005).

Sub-Saharan African states face a great dilemma, in that they are engulfed with various conflicts and disasters. These are also the highest from any other region in the world. Sub-Saharan Africa regrettably loses many people due to conflict and injuries. However, the number of people dying from infectious diseases, malnutrition, famines, and other non-military security threats are becoming far more devastating. Therefore, it is an absolute necessity that Sub-Saharan African states modify their security agenda to include various non-conventional threats to the well being of their people.

The ecological security approach that is proposed in this thesis will help to address the many challenges that affect the region of Sub-Saharan Africa. This paradigm has a broader conception of security which allows it to explain, understand and show the seriousness and interconnectedness of the threats that are making millions insecure in Sub-Saharan Africa. As soon as states understand what constitutes insecurities for human well-being, the region of Sub-Saharan Africa and others will be able to take the necessary steps to address, explain and possibly find solutions to the problems they face.

The following chapters will discuss in detail the various ecological insecurities such as environmental changes, degradation, displaced peoples, and infectious diseases that are devastating the Sub-Saharan African region.

CHAPTER III

ENVIRONMENTAL CHANGE AND SECURITY IN SUB-SAHARAN AFRICA

3.1 Introduction

The world has been seeing major environmental changes in recent decades. As the number of people on the planet increases, the earth's capacity to provide for the people has been compromised. Growing populations need more natural resources than ever before. However, the combination of global climate change with the increasing number of people on the planet are reducing the availability of resources such as forests, lands and freshwater. The environment's physical capability to sustain life on earth in the future is becoming questionable (Florini 2005). The impacts of climate change will vary from affecting agriculture, to endangering food security, sea level rise, and the acceleration in erosion of coastal zones. It also increases intensity of natural disasters, species extinction, and the spread of infectious diseases (UNEP 2006) According to Homer-Dixon and Blitt, scholars believe that, "humans are releasing large amounts of carbon dioxide and other gases that help trap heat within the earth's atmosphere" (Houghton et al.1996; Watson, Zinowera, and Moss 1996; Homer-Dixon & Blitt 1998, 4). This buildup of greenhouse gases in the atmosphere is due to various human activities. The increased release of the carbon dioxide gas into the air highly contributes to climate change. Currently, it is estimated to reach more than four times the emission from 1950. The continued process of industrialization and fossil fuel intensive economies are projected to double the amount of carbon dioxide in the air by the turn of the next century. This is expected to result in the rise in temperature between three to eight degrees Fahrenheit.

The Intergovernmental Panel on Climate change has reported that pressures on the environment from humans are being identified. Furthermore, it estimated that continued severe emission can result in the rise of sea level waters from fifteen up to nearly one meter during this century. Some island nations may not survive this phenomenon. Furthermore, irregularity in weather conditions, spread of infectious diseases, disturbed ecosystems and more can result from concentrated levels of CO₂ in the atmosphere. Climate change is expected to also exacerbate water scarcity many areas, and reduce agricultural products in many of the world's poorest countries (French 2000).

Climate Change can also contribute to already existing economic declines. The 1990s for example were considered by the UN to be, "The International Decade of Natural Disaster Reduction [however] it was a decade marked by more than \$608 billion in disaster-related economic losses worldwide" (Pirages & Cousins 2005, 169). Some scholars have estimated that, "Coral bleaching will reduce future GDP by some 40-50% by 2020 in smaller Pacific islands, remembering that these losses are those expected to occur only as a result of coral bleaching and its knock-on effects" (Hoegh-Guldberg et. al., 2000; Barnett 2003, 9).

Although climate change is part of the problem, other factors such as irrigation and industry are also contributing to reduced water levels in places Lake Chad and the Colorado River. Currently the world is facing grave water shortages where one in ten people do not have freshwater. However, by 2020 this problem is estimated to escalate to one in three people and more than twice the countries that are currently water stressed (Rischard 2002). Although the African continent has seen the effects of droughts and floods many times in the past, climate change has further intensified the damages and the

devastation of these disasters on the people and the environment. Climate Change further increases the number of people suffering from famine. For example, it is estimated that “At the beginning of 2003, about 25 million people faced famine, and by April 2003, this figure had jumped to 40 million” (UNEP 2006, 93).

Environmental change can also lead to the emergence of new diseases as well as increase the range of existing ones. Due to loss of ozone and increase in ultraviolet radiation, the rate of cancer and cataracts is expected to increase dramatically. As the earth’s temperature rises, there will be an increase in the geographic range of serious diseases, which were mostly restricted to the tropics. These diseases are a threat to human health and the economic well being of the world (Pirages & DeGeest 2004).

An example of a resurging disease is malaria. Its effects have been devastating with two million deaths each year and more than 400 million infections. Especially in Africa, the disease has become a disaster with its drug resistant characteristics. It was claimed to be the eleventh deadliest diseases in the world in the late 1990s, mainly attacking children (Butler 1997; McMichael, Patz, and Kovats 1998). Cholera is another example of supposedly vanquished disease that has reemerged. In 1991, this disease erupted with vengeance in Peru. It infected some 322, 000 people and killed 2, 900. The outbreak had a devastating effect on the country’s economy, causing importers to ban Peruvian fish and fruit from their markets and tourist avoid the country. As a result, Peru lost about \$770 million in exports. This outbreak spread beyond the borders of Peru, contaminating the water supply of every country on the continent but Paraguay and Uruguay before it stopped two years later. Across the Americas, the disease infected about one million people and killed about 11,000 during the first half of the 1990s (French 2000).

Currently, one of the main contributors to environmental change is population growth. Rapidly growing populations in Sub-Saharan Africa are having tremendous impact on its environment and resources such as its forests, water, and land.

3.2. Demographic change

Human population and the environment have coexisted by shaping one another for centuries. However, the past few decades have shown an unprecedented growth in human population around the world that has in turn affected the environment in ways never witnessed before. The rapid population growth is estimated to have enormous impact on land, air and water in the African continent (UNEP 2008). Demographic change is also a major factor in maintaining a balanced ecological system.

In order to have a balanced ecosystem, Pirages identifies, “Four kinds of equilibriums [that] have to be maintained: between the demands of human populations and the sustaining capabilities of environmental systems; between the size and growth rate of various human populations; between the demands of human populations and those of other species; between human populations and pathogenic organisms” (Pirages 1997, 38). The rapid growth in population creates the most stress on the ecological systems. Currently, the world’s human population has reached 6.7 billion and is also expected to reach nine billion by the year 2050 (United States Bureau of the Census, 2010a). From 1650 to 1850, the world population doubled in number from 500 million in 200 years. By 1927, the world’s population doubled again to two billion. The next doubling however only took forty-seven years by 1974. Furthermore, at the turn of the millennium, our world population is close to seven billion (Pirages and DeGeest 2004. Rapid population

growth is among the main factors that create ecological insecurity. Humans are pressing into areas that were previously considered inhabitable like river basins and coastal lowlands. As our numbers rapidly grow, human activities such as deforestation, increased need of water, and land are also intensifying and contributing to further malnutrition and starvation. As Pirages stated, even food production has increased around the world, many countries have not been able to feed their own people. He states that, “When data for the period 1982-1984 are compared with 1992-1994, food production per capita actually declined in 72 countries” (Wijkman and Timberlake 1984; World Resources 1996; Pirages 1997, 39).

According to the Food and Agriculture Organization, the last half a century have resulted in rapid changes in the environment. Some parts of the environment have been degraded to where they have very little benefits to human beings (Food and Agriculture Organization of the United Nations 2007, 2; hereafter FAO). The Food and Agriculture Organization stated that although many environmental agreements have been signed, “carbon emissions continue to rise, species extinction is continuing and desertification continues to be of great concern in arid, semi-arid, and sub-humid areas” (FAO 2007, 2).

One of the most significant impacts of exploding population on the environment is deforestation (Pirages and DeGeest 2004). Within the past fifty years, degradation of forests has become a serious problem. It is estimated that an average of 15.4 million hectares of tropical forests disappeared per year during the last two decades, which is a fifty percent increase from the 1970s. An annual loss of 4.6 million hectares of rainforest and 6.1 million hectares of moist deciduous forest was recorded during the 1980’s (Pirages and Cousins 2005, 190).

Rapid population growth is one of the main causes of deforestation. Since arable land for agriculture is scarce, people cut into forests. According to Jessica Mathews, very large areas are deforested annually. This has led to, “The interruption of nutrient cycling above and below the soil” (Mathews 1989, 165), which results in it becoming infertile and unable to provide a habitat for plants and animals making them extinct. Directly and indirectly, deforestation is estimated to impoverish nearly a billion people, mostly in Central America, Asia, Sub-Saharan-Africa, South America (Mathews 1989). Deforestation also means declining biodiversity. Tropical forests cover only seven percent of the earth’s surface but yet contain an estimated fifty percent of plant and animal species; therefore deforestation has reduced biodiversity substantially. It is estimated that up to fifty plant species become extinct every day (Barnett 2001).

As one of the main drivers of change, population growth has been associated with much of the environmental ills that occur today. Rapid population growth and its destabilizing effects has been a major concern for the last fifty years. While such population growth persists in most of the developing world, the industrialized countries have been able to reduce birthrates and achieve much lengthier life spans (Pirages and DeGeest 2004). Many industrialized countries have reached a point of stability in their population growth. The fertility rates in these countries have been in decline due to various reasons such as more women in the work force. If this trend continues, it is believed that their population may even decline. The population growth rate has slowed down from two percent in 1970 to 1.2 percent in 2004. This slow down is not only due to rising living standards and expanding opportunities for women, which is the case for all thirty-five European countries and Japan, it is also due to the deaths from HIV /AIDS and

other diseases (Brown 2004). “Nearly 3 billion people are expected to be added to our world during the first half of this century - slightly fewer than the 3.5 billion added in the last half twentieth century” (Brown 2004, 23). However, unlike the next fifty years, the population growth during the past fifty years was spread throughout developed and developing countries. While the growths in the next few decades ahead are believed to occur mostly in the developing world (Brown 2004).

World Population: 1950-2050

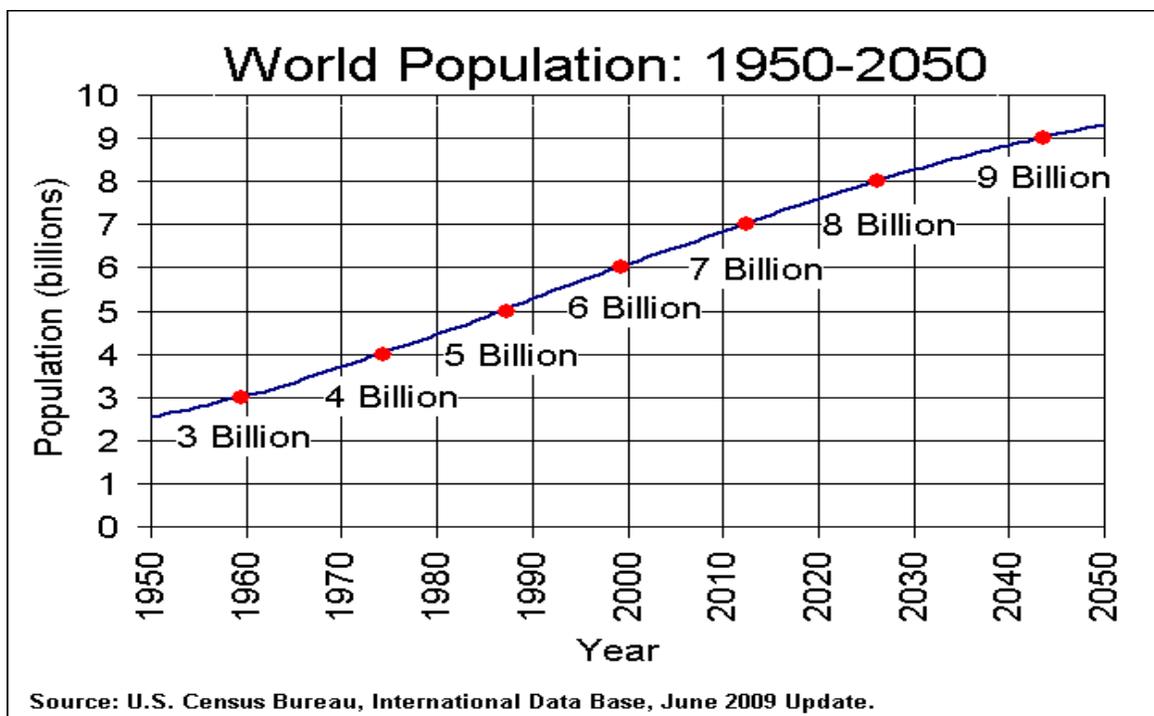


Figure 2. World Population 1950-2050.

Source: United States Bureau of the Census. 2009. *World Population Growth: 1950-2050*. World Population Information, United States Bureau of the Census. <http://www.census.gov/ipc/www/idb/worldpopinfo.php>.

The world population increased from three billion in 1959 to six billion by 1999, a doubling that occurred over forty years. The Census Bureau's latest projections imply that population growth will continue into the twenty-first century, although more slowly. The world population is projected to grow from six billion in 1999 to nine billion by 2043, an

increase of fifty percent that is expected to require forty-four years (United States Bureau of The Census 2009).

Over the last century, the African population has increased at least six folds with a still high growth rate above two percent currently. Although slight decrease in population growth has been witnessed, this may be attributed to the premature deaths due to diseases such as HIV/AIDS and others. The UN estimates that in 2025 the African population will reach 1.5 billion. Although most Africans live in the rural areas, urbanization is faster than ever before (UNECA 2001). In 2005, more than half of its people were living in rural areas. However, fast urbanization is estimated to reverse this trend (International Union for the Scientific Study of Population 2007; hereafter IUSSP; UNEP 2008). The next couple of decades are estimated to add millions of people to the already congested African cities and towns (Auclair 2005; UNEP 2008). Currently, Africa has a population growth rate twice the global rate of 1.24 percent and is expected to maintain this growth at least for the next fifty years. Urbanization in the region is also the highest in the world and is also expected to continue as well (UN 2007; UNEP 2008). In order for Africa to sustain its population growth, it is obligated to convert land to agricultural use, leading to further deforestation. The massive increase is creating more stress on the environment and damaging forests that can result in conflicts and increased poverty throughout the region (Gibbs 2006; UNEP 2008).

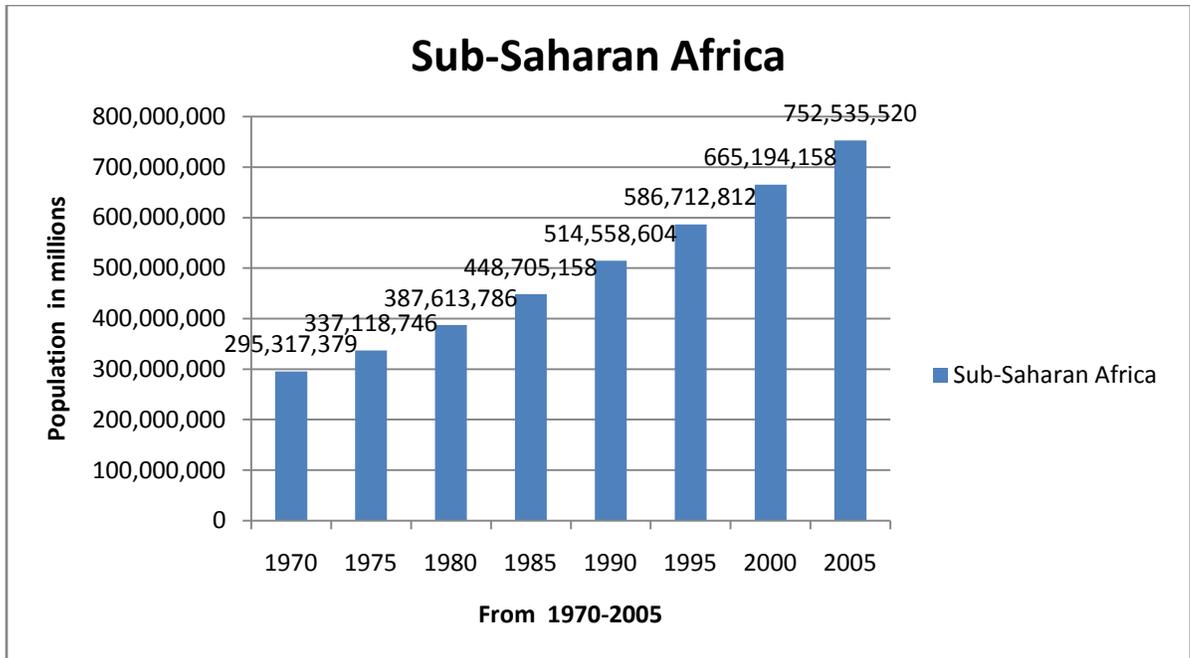


Figure 3. Sub-Saharan Africa Population Growth from 1970-2005.

Source: United States Bureau of the Census. 2009. *Sub-Saharan Africa Population Growth from 1970-2005*. World Population Information, United States Bureau of the Census. <http://www.census.gov/ipc/www/idb/worldpopinfo.php>.

The high population growth rate in Sub-Saharan Africa has been a major factor in food insecurity in the region. Food insecurity in Sub-Saharan Africa has remained unchanged between 1970 and 1998, at thirty-four percent which is the highest of any region. Over the twenty-eight years, the number of food insecure Africans has more than doubled over this period, from eighty-eight million to one hundred ninety-four million (Pirages and Cousins 2005).

Rapid population growth places stress on natural systems. As humans occupy ecologically dangerous areas, they experience increased number of disasters. Nearly sixty percent of the poor are thought to live in areas of ecological risk. The growing populations in developing countries are rapidly cutting their forests in order to use in their daily life. As a result, soils are exposed to a greater degree of erosion. Developing countries are also in great need for arable land. The rapid population growth further

exacerbates this scarcity and other like water. The world is currently experiencing shortages of water (Pirages and DeGeest 2004).

3.3 Resource scarcity and Degradation

Africa's land is as diverse as the people that live in it. Land resources are considered as one of the most important asset for the African economy. It is believed to be the backbone of its development and survival. Land resources in Africa are mainly utilized for agricultural and industrial purposes (The World Bank 1995; UNECA 2001). The African population is highly reliant on agriculture for good reason. According to the UN, "Agriculture contributes 40 per cent of GDP, 55 per cent of total export value and employs more than 60 percent of the labour force" (UNECA 2001, 35).

However, Land degradation has become one of the contributing factors to human insecurities in the region. As most Africans reside in rural parts of the region, their daily lives are highly reliant on the environment and its products (UNEP 2008). According to UNEP, "Three fifths of African farmers subsist by directly utilizing land resources. Africa's land resources are rapidly changing, and in some cases shrinking, due to changes in land cover, land use, and land productivity" (UNEP 2008, 16).

Farmers in Sub-Saharan Africa heavily depend on nature to succeed in their harvest. Rain and good weather conditions are very critical for smallholder farmers, which are the majority in Sub-Saharan Africa. However, desertification and degraded lands are further creating insecurities by affecting the size and nature of their crops (The World Bank 2009a). According to the World Bank, land degradation "reduces the availability of food, fodder, and fuel wood, and compromises critical life-sustaining functions including water

filtering, flood control, drought resistance and carbon storage in soil and vegetation...When these factors are taken together, land degradation places an unnecessary drag on economic growth” (The World Bank 2009a).

3.3.1 Land Degradation

Natural habitat conversion such as forests or wetlands for agriculture and cultivation of marginal areas not only contributed to land degradation but has impacted people’s livelihood options (UNEP 2002a). According to the United Nations Environment Programme, “Land degradation is the process of reducing the capacity of land to produce food or materials” (UNEP 2008, 19). This is mainly due to the combination of various factors such as human activities and natural disasters among others. During the early 1990’s, UNEP estimate that, “About 910 million ha of land were classified as ‘moderately degraded’, with greatly reduced agricultural productivity. A total of 305 million ha of soils ranged between ‘strongly degraded’ (296 million ha) and ‘extremely degraded’ (9 million ha, of which more than 5 million ha were in Africa). ‘extremely degraded’ soils are beyond restoration” (Oldeman, Hakkeding, and Sombroek 1990; UNEP 2002b, 64). Soils protect against pollutants and contribute to a healthy ecosystem. Their destruction results in further land degradation (UNEP 2002b). When soils are degraded, farmers are forced to use more chemicals (that further contribute to degradation) in order to meet food demands. Even then, most African farmers are unable to buy these products leading low productivity (UNEP 2002b, 71).

According to the United Nations Environment Programme, Land degradation in Africa is enormous with more than sixty-five percent of its farming lands, one third of its

pasture land, and nearly twenty percent of the forests degraded (FAO 2005, UNEP 2008, 19). Land conversion, overgrazing, and urbanization are also worsening land degradation in the region (White and Others 2000, UNEP 2008, 19).

Desertification is a type of land degradation that affects large parts of the world. UNEP estimation indicates that desertification pressures more than a third of the earth's lands. As a result, it directly or indirectly affects food security, increased famine, and impoverishment in different regions of the world. Furthermore, it is also believed that desertification can play a role in the stability of a country by causing tension that can then lead to conflicts and more environmental degradation. Desertification affects the lives of more than one billion people worldwide. It is estimated that this will result in the displacement of more than 135 million people. Sub-Saharan Africa is the most affected region (United Nations Convention to Combat Desertification 2004; hereafter UNCCD; UNEP 2006).

According to the United Nations Environment Programme, dry lands mostly in Eastern and Southern parts of Africa are highly vulnerable to desertification. It estimates that, "some areas in Africa are losing over 50 metric tonnes of soil per hectare per year. This is roughly equivalent to a loss of 20 000 million metric tonnes of nitrogen, 2 000 million metric tonnes of phosphorus, and 41 000 million metric tonnes of potassium per year" (FAO 1995, UNEP 2008, 19). There are about thirteen Sub-Saharan African countries that are greatly affected by desertification and erosion including Ethiopia and Sudan (FAO 1995; UNEP 2008).

Desertification is highly intensified by Africa's rapidly growing populations who exploit its resources and put more stress on an already vulnerable environment. Each

year, farmers are forced produce more food for more than twenty million people added to the ever increasing population (Darkoh 1998)

According to the World Bank:

An estimated 485 million Africans (65 percent of the entire population) are affected by land degradation. Approximately 22 percent of vegetated land (almost 500 million hectares) of Africa has been degraded, and 66 percent of this area is classified as moderately, severely, or extremely degraded. About 11 percent of total African land area (332 million hectares) is drylands affected by human-induced soil degradation (The World Bank Group 2009a, 2).

3.3.2 Economic effects of degradation

Land degradation is also taking an economic toll on the African continent. The World Bank estimates that each year Uganda loses close to \$132-396 million due to eroded soils. Ghana's productivity loss of 2.9 percent each year is a great economic setback for a developing country. Ethiopia, one of the poorest countries in the world, loses nearly \$500 million annually due to various forms of environmental degradation. Furthermore, nearly eighty million dollars and sixty-eight million dollars losses are recorded for both Malawi and Mali respectively (The World Bank 2009a, 2).

3.3.3 Environmental Refugees

Environmental refugees are people who are displaced from their homes mainly due to various environmental problems such as droughts, floods and deforestation. These people are unable to maintain a safe life in their place of origin, and therefore are forced leave it.

Environmental refugees are either internally (in country) or externally (out of country) displaced, and their return to their lands is not guaranteed (Myers 2005).

The number of refugees has become very significant. In combination, climate change, other environmental degradation and population growth are increasing the number of environmental refugees worldwide. Although environmental refugees are not exceptional to Sub-Saharan Africa, their numbers are larger than almost any other region. According to Myers, in 1995 nearly half of ten million environmentally displaced people have not returned to their homelands in the African Sahel Region. At the turn of the twenty-first century, Sudan, Somalia, and Kenya had eight, six, and three million people respectively near starvation (Myers 2002).

3.3.4. Water Scarcity

An essential component of life on earth, water is becoming scarce. Currently, water scarcity has become a concern to most of the world, especially Africa. Water quality and quantity are Africa's most pressing issues that are concerning its livelihood. Exploding populations and already minimal water supply are further worsening the availability of water (UNEP 2008). As defined by UNEP, water scarcity occurs when there is, "less than 1000 m³ of potable water available per person per year, while water stress means less than 1700 m³ of potable water is available per person per year" (UNEP 2002b; UNEP 2008, 20).

Africa uses less water per capita than most other regions, but still encounters shortages of water. Most of Africa's water goes to its agricultural and industrial activities that require a lot of it. Water consumption in agriculture as defined by the United Nations

Educational, Social, and Cultural Organization is, “the amount of surface and groundwater absorbed by crops and transpired, or used directly in the building of plant tissue, together with water that evaporates from the area where crops are located...Water consumption also includes all activities where the use of water results in a loss of the original water supplied, such as industrial or community consumption” (United Nations Educational, Social, and Cultural Organization 2007; hereafter UNESCO; UNEP 2008, 20). As its population increases, the African region is also increasing its water consumption and use. It is estimated that between 2003 and 2006, Africa lost 334 cubic kilometers volume of water and consumed just as much during that same time. Africa loses and consumes the same amount of water further leading to its scarcity. Climate change and its effects on rainfall and other disasters further create stress on water availability in Africa (UNEP 2008). The currently water stressed areas in the region are estimated to increase by twenty-nine percent by mid century. The Nile River is a critical source of water for several countries in the Sub-Saharan African region. However, its flow is projected to decline by seventy-five percent by the turn of the next century. This will highly affect irrigation practices in the region further increasing food insecurity (UNEP 2008). According to UNEP, “Lack of clean water and sanitation leads to a wide range of potential diseases including malaria, yellow fever, filariasis, river blindness, sleeping sickness, guinea worm, bilharzia, trachoma, and scabies. Most importantly dirty water is often the cause of childhood diarrhea, a leading killer in African children” (UNEP 2008, 21).

3.3.5 Food Security

The international community and many organizations have made numerous efforts to address the issues of human security. While significant progresses have been seen in some parts of the world, Africa does not seem to share these same experiences. There are about a third of Africans who are either malnourished or hungry at this time. Food insecurity is greatly visible especially in rural areas due to high dependence on natural events such as rain (Haile 2005). According to Haile, “rainfall plays a major role in determining agricultural production and hence the economic and social well being of rural communities” (Haile 2005, 2169). An extreme change in the climate affects the farmers’ harvest and further contributes to the lack of food (Haile 2005). Mwaniki states that: “ninety-five percent of the food in Sub-Saharan Africa is grown under rain fed agriculture” (InterAcademy Council 2004, Mwaniki 2006, 3). Aside from the natural causes that affect food security in the region, globalization and market liberalization are also major factors that create an uneven playing field in the market for developing and developed countries. In this process, developed nations dump their subsidized agricultural products on the third world and eliminating them from the competition. These are the few things, among many, that challenge Sub-Saharan Africa from pulling itself up from poverty and food insecurity (Oxfam 2002; Mwaniki 2006).

The United Nations defines food security as having, “access by all people at all times to enough food for an active, healthy life. Food security has three components namely: availability of food, access to food, and provision of adequate nutrition” (UNECA 2001, 39). In most of Africa, supply and demand of food is unproportional. As its population grows, there is more demand for food than is available or produced, leading to more

undernourished and hungry people. Malnutrition is widespread in Sub-Saharan Africa where thirty countries and thirty-four percent of children are affected by it. Within the next decade, this number is projected to increase by thirty percent (UNECA 2001). Although a slight decline between 1995 and 1997, overall, the number of undernourished in the world has increased from 1990 to 2006. Among the developing regions, Sub-Saharan Africa and Southern Asia are the two regions that have tremendously increased the number of undernourished people between 1990 and 2006 (Table 2) (FAO 2009).

African countries have not seen much progress in the amount of food they produce, which is still way below domestic demands. Conflicts are also part of the problems contributing to food insecurity in Sub-Saharan Africa. In 2001, nearly three million Sudanese were food insecure due to conflict. Ethiopia was no different with nearly seven million people needing food aid. The African Great Lakes region is highly affected by conflicts and refugees that further exacerbate the need for more food assistance. Nearly two million conflict refugees in the Democratic Republic of Congo were food insecure (FAO 2001; UNECA 2001).

Number of undernourished persons (millions)				
Country groups	1990 - 1992	1995 - 1997	2000 - 2002	2004 - 2006
MDG (UN) regional classification				
WORLD	845. 3	824. 9	856. 8	872. 9
Developing Regions	817. 8	796. 8	827. 3	851. 4
Northern Africa	4.0	4.3	4.5	4.9
Sub-Saharan Africa	170 .5	195 .9	207 .0	213 .9
Latin America and the Caribbean	52.6	51.8	49.4	45.3
Eastern Asia	183. 3	152. 0	141. 7	136. 3
<i>Eastern Asia (without China)</i>	5.5	8.3	9.2	8.9
Southern Asia	293 .5	290 .1	315 .7	350 .0
<i>Southern Asia (without India)</i>	83.3	96.6	92.7	98.5
South-Eastern Asia	105. 7	88.6	93.9	84.7
Western Asia	7.7	13.5	14.2	15.6
Commonwealth of Independent States	16.7	18.4	19.6	11.9
Commonwealth of Independent States, Asia	10.1	9.1	12.8	7.9
Commonwealth of Independent States, Europe	6.6	9.3	6.9	4.0
Developed regions	8.5	7.7	7.3	7.7
Transition countries of south-eastern Europe	2.4	2.1	2.6	2.0
Official groupings				
Least developed countries	211. 1	253. 6	248. 3	255. 4
Landlocked developing countries	92.2	105. 8	105. 5	102. 2
Small Island developing states	8.3	9.4	8.2	8.7

Table 2: Number of Undernourished Persons (Millions).

Source: Food and Agriculture Organization (FAO). 2009. *Undernourishment*. Food Security Statistics, Food and Agriculture Organization of the United Nations. <http://www.fao.org/economic/ess/food-security-statistics/en/>

3.4 Conclusion

Over the years, humans have managed to alter the planet's environment and its physiology leading to a disrupted ecological system. Population growth is one of the main problems causing environmental degradation (FAO 2007). According to the FAO, "humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history" (FAO 2007, 2). Exploding populations are causing most of the environmental ills such as deforestation, land degradation, and water scarcity. Although some parts of the world have lower population growth, Sub-Saharan Africa still has the highest growth rate of any other region. This has proven to be highly detrimental to food security in the region. The environment is a critical part of Sub-Saharan Africa's survival. Large numbers of its people are dependent on the environment for everyday life. Agriculture in Sub-Saharan Africa is one of the main economic activities that employ more than half of its population (UNECA 2001). Altering the environment has created insecurities in the region. As populations grow, there is need for more land, water, food which in the case of Sub-Saharan Africa translates into deforestation, land degradation, water scarcity leading to further environmental refugees, poverty and insecurities. The number of undernourished people in Sub-Saharan Africa has increased over the years.

As will be shown in chapter four, unsustainable environmental conditions will also contribute to the emergence and resurgence of infectious diseases and their spread. In order for Sub-Saharan Africa to reduce its insecurities, environmental change and its contributing factors need to be reassessed.

CHAPTER IV

INFECTIOUS DISEASES AND SECURITY IN SUB-SAHARAN AFRICA

4.1 Introduction

Humans have altering the environment for many centuries. Its existence in a sustainable condition is essential to humans and their health. Environmental destruction can result in many different insecurities including health problems (McMichael et al. 2008). According to Pimentel et al., “Today, just six infectious diseases (acute respiratory infections, human immunodeficiency virus/autoimmune deficiency syndrome (HIV/AIDS), diarrhea, tuberculosis, malaria, and measles) cause approximately 90% of all deaths from infectious diseases worldwide” (WHO 2005a; Pimentel et al. 2007, 653). The environment is responsible for nearly half of the deaths from infectious diseases (Robbins 2000; Pimentel et al. 1998, 2007). Annually, diarrhea kills more than two million children due to lack of sanitary conditions and clean water (Pimentel et al. 2007).

Changes in the environment have different effects on health among countries. However, the worst effects are predicted to highly affect developing countries and more susceptible populations around the world. The most dangerous effects of environmental change that directly or indirectly affect human health are extreme weather conditions such as flooding, heat waves. Furthermore, these changes will also affect diseases patterns, food production, water supply, and environmental refugees among others (McMichael et al. 2008).

According to McMichael, “In Sub-Saharan Africa over 110 million people currently live in regions prone to malaria epidemics. Climate change could add 20-70 million to this figure by the 2080s (assuming no population increase, and including forecast malaria reductions in West Africa from dying)” (McMichael et al. 2008, 192).

Natural or human induced environmental changes modify the setting where diseases are formed and transmitted. Environmental degradation such as deforestation, industrialization, and changes in the climate have contributed to the rise of infectious disease related deaths (Patz et al. 2000). Patz et al. states that, “Deforestation is one of the most disruptive changes affecting parasitic vector populations...The replacement of forests with crop farming, ranching, and raising small animals can create a supportive habitat for parasites and their host vector” (Service 1991; Patz et al. 2000, 1395-1396). Waterborne infections account for eighty percent all infectious diseases worldwide and ninety percent of all infectious diseases are in developing countries (One World Health, 2004). Developing countries do not have efficient systems such as sewers that dispose of wastes. These are what mostly contaminate drinking waters like lakes and rivers and result in waterborne diseases (Gleick 1993; MacDonald 2001; WHO 2004; Pimentel et al. 2007). It is estimated that nearly half of the developing world’s population lacks clean water (UNESCO 2004, Pimentel et al. 2007, 654). According to the UN, “approximately 2.5 billion people lack adequate sanitation, contributing to more than 5 million deaths each year of which more than half are children” (United Nations 2001; Pimentel et al. 2007, 654).

By the turn of the twenty-second century, global warming will be felt throughout the world. The increase in temperature is expected to contribute to the disruption of

ecosystems. Climate change will contribute to irregularity in weather conditions such as flooding and drought. Some infectious diseases are vulnerable to weather conditions (Price-Smith 2002).

According to Haines et al., “global warming will shift standard isotherms toward the polar regions, and as a result vector-borne diseases will shift their ranges accordingly, with yellow fever at the 10 C isotherm, vivax malaria at 16 C, and falciparum malaria at 20 C” (Haines, Epstein, and McMichael 1993; Price-Smith 2002, 143-144).

Humid but warm conditions are also great for Cholera to rapidly increase in number. While in cold water, the bacteria that causes cholera is mainly inactive. The increased warmth of water at about twenty degrees creates the ultimate condition for cholera to reproduce and spread. As temperatures increase, previously unknown diseases to some areas suddenly become a concern (Patz et al., 1996; Price-Smith 2002).

According to Price-Smith,

Significant victories against malaria (and other vector-borne diseases) were recorded in the 1950s and the 1960s, the disease has made a significant recovery since 1973, returning to areas where it was previously thought to have been eradicated. The *plasmodium* parasite cannot reproduce at temperatures below 16C, and so malarial transmission is confined to the range of the 16C winter isotherm. Thus, as global minimum temperatures continue to increase, the isotherm border will extend into higher latitudes and altitudes, affecting immunologically naïve populations and generating increased morbidity and mortality in vulnerable regions (Patz et al., 1996; Price-Smith 2002, 144-145).

The twentieth century has had significant success in eliminating certain diseases such as polio. However, the trends have changed for the worst making new and reemerging diseases much more difficult to eradicate as they have become more drug resistant (United Nations 2004, 24).

4.2 Malaria

Since the 1970s, malaria has been on the rise in many parts of the world. According to Nchinda:

Malaria in humans is caused by a protozoon of the genus *Plasmodium* and the four subspecies, *falciparum*, *vivax*, *malariae*, and, *ovale*. The species that cause the greatest illness and death in Africa is *P. Falciparum*. The disease is transmitted by the bites of mosquitoes of the genus *Anopheles*, of which the *Anopheles gambiae complex* (the most efficient) is responsible for the transmission of disease in Africa (Nchinda 1998, 398).

Malaria mainly kills people who have never been exposed to it such as those from countries where the disease does not exist (Nchinda 1998, 398). According to the World Health Organization, there were about 247 million cases of malaria in 2006 resulting in the deaths of almost one million children mostly in Africa. Currently, every minute, this disease kills over one hundred children worldwide (WHO 2010b).

A country's altitude combined with the rise in temperature can cause an increase in malaria incidence. Malaria mosquitoes breed and survive in mostly humid but warm areas. Different environmental changes like the El Nino are major contributors to

increased malaria outbreaks. These weather conditions allow malaria parasites to survive longer and therefore result in more infections (Patz et al. 2000).

In the past two decades, Africa has seen a rise in the prevalence of malaria at an alarming rate. Each year, millions die of malaria infection, however, more than eighty-five percent are children. Africa is home to nearly eighty-five and ninety percent of all malaria cases and deaths respectively (WHO 2010c).

4.3 Diarrheal diseases

Waterborne infections kill and cause suffering to millions around the world. This is especially true for people in developing countries that account for almost all waterborne infections. Most less-industrialized countries are unable to provide adequate sanitation and clean water that result in the deaths of millions of their citizens. It is estimated that more than 1.2 and 2.5 billion people do not have access to clean water and sanitation respectively. Most untreated wastes are dumped into areas that are the main sources of water and food for many households in developing countries; each year, this results in the deaths of more than five million people (Pimentel et al. 2007).

According to the World Health Organization, Diarrhea is defined as, “the passage of three or more loose or liquid stools per day. Diarrhea is generally a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral, and parasitic organisms. Diarrheal disease is treatable with a solution of clean water, sugar and salt, and with zinc tablets” (WHO 2010d).

4.4 Tuberculosis

Tuberculosis (TB) is one of the leading causes of death worldwide. In 2004, the World Health organization reported that about nine million people were newly infected with Tuberculosis and nearly half were infected with the most infectious form of the disease. Densely populated countries are highly vulnerable to Tuberculosis and account for nearly eighty percent of all infections (Dye 2006). TB germs are largely found in the air that we breathe. Its cold like symptoms such as coughing are what cause the spread of the disease. Overcrowding accelerates the spread even faster (WHO 2010e). According to the World Health Organization, “left untreated, each person with active TB disease will infect on average between 10 and 15 people every year” (WHO 2010e). People infected with HIV/AIDS virus are more susceptible to contracting TB due to their already weakened immune systems. As the most populous region in the world, South East Asia accounts for thirty-four percent of new tuberculosis cases, but Sub-Saharan Africa takes still takes first place in highest mortality and incidence rate per capita worldwide (WHO 2010e). Nearly three million die each year from tuberculosis. According to Pimentel et al., “from 1990 to 2000, the number of reported cases per year has increased from 51 to 90 per 100,000 people” (Center for Disease Control 2004; hereafter CDC; Pimentel et al. 2007, 660).

4.5 HIV/AIDS

HIV/AIDS is one of the major killers in the world. Developing countries are again the most affected by HIV/AIDS accounting for over ninety percent of all infections. Sub-Saharan Africa has the highest number of infections in the world (WHO 2002).

According to the World Health Organization, in 2001, “more than 36 million people lived with HIV/AIDS worldwide -50% more than were predicted a decade ago...Over 21 million people – including 4.3 million children – have already died of AIDS since the start of the epidemic, leaving behind a legacy of more than 13 million orphans” (WHO 2002, 13). Although there are signs that HIV/AIDS has somewhat been controlled, Southern Africa does not share this experience. It is estimated that it accounts for thirty-five and thirty-eight of new infections and deaths respectively. Most children in Sub-Saharan Africa not only lose their parents to HIV/AIDS but are also victims accounting for ninety percent of all infections in ages fifteen and below (The World Bank 2009b).

HIV/AIDS’s effect on Sub-Saharan Africa is even worse than the many wars that damage and kill millions in the region (WHO 2002). The World Health Organization reported that, “in 1998, war killed 308,000 people in Africa, but AIDS killed more than 2 million” (WHO 2002, 13). If it continues on its current course, HIV/AIDS is estimated to be the deadliest virus in history (WHO 2002). HIV/AIDS is not only responsible for the deaths of millions in Sub-Saharan Africa but also affects people in their economy and social life (Barnett, Mwaniki, and Serwadda 2005). This in turn creates stress on their finances that will force them to sell their greatly valued assets like land. The disease further worsens poverty especially in rural areas (WHO 2002). For example, the world health organization stated that, “a sugar estate in Kenya reported a 50% drop in productivity between 1995 and 1997, combined with higher overtime payments for workers filing in for the sick colleagues...A study in north-western Tanzania, found that a woman with a sick husband spent 60% less time on agricultural activities than normal” (WHO 2002, 16). This in turn affects production. Similar experiences throughout Sub-

Saharan Africa are reported further confirming the severe effects of infectious diseases on the region's economic socio-political life (WHO 2002). In 2008, UNAIDS estimated that three quarters of all deaths from the AIDS virus are found in the Sub-Saharan African region. "In 2008, more than 14.1 million [11.5 million–17.1 million] children in sub-Saharan Africa were estimated to have lost one or both parents to AIDS" (UNAIDS 2009, 21).

Although most of Sub-Saharan Africa is greatly affected by the HIV/AIDs epidemic, some parts of the region have it worst than the rest. The effect of AIDS on the southern part of Africa is highly unproportional accounting for about thirty-two percent of infections and deaths related to the epidemic. Infection rates are very high in the region, "with national adult HIV prevalence exceeding 15% in eight countries in 2005 (Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe)" (UNAIDS 2007, 1). HIV is having a great impact on the various economies in southern Africa. This is shown in a study that has quantified the sectoral impact of AIDS in South Africa (Table 3).

Sector	HIV+ per 100 Workers 2005	AIDS Deaths per 100 normal deaths 2015
Agriculture, Forestry and fishing	23.2	503.9
Mining	29.3	759.2
Consumer Manufacturing	23	867.2
Forestry Products	20.2	636.6
Chemicals	21.6	632.5
Metals	19.9	658.4
Machinery	21.2	563.6
Construction	23.9	694.6
Retail	21.3	876.4
Catering and Accommodation	23	601.9
Transport and Storage	23.5	652.6
Communication	16.5	528.4
Finance and Administration	12.4	479.6
Business Services	15.6	788.8
Health	20	471.9
General Government	24.5	229.1

Table 3. The Sectoral Impact of HIV/AIDS in South Africa.

Source: Fourie, Pieter and Martin Schonteich. 2001. "Africa's New Security Threat: HIV/AIDS and Human Security in Southern Africa." *African Security Review* 10 (4): 1-12.

HIV also takes a toll on food security. The HIV/AIDS epidemic is responsible for the deaths of seven million people who work in agriculture in the Sub-Saharan African region. It estimates that by 2020, this number will exceed forty million. As most people rely heavily on agriculture for a living, the epidemic is greatly reducing its productivity (Fourie and Schonteich 2001, 4). According to Fourie and Schonteich, "A 1997 study of Zimbabwean subsistence farmers revealed a significant decline in production in households with an AIDS death: maize (decline of 61%), cotton (-47%), vegetables (-49%), groundnuts (-37%), and cattle owned (-29%)" (Aloan and Guinness 2000; Fourie

and Schonteich 2001, 4). Food security is therefore highly affected by infectious diseases like the HIV/AIDS epidemic.

4.6 Conclusion

Currently, few infectious diseases are the main causes of deaths in the world and nearly half are attributed to environmental problems. The changes in the environment, the rapid population growth, overcrowding, and lack of sanitary conditions are some of the major contributors to the breeding and spreading of infectious diseases in Developing countries, where ninety percent of all infectious diseases are found. Each year, four billion people are infected with diarrheal diseases that kill about two million individuals. Annually, more than a couple billion people are affected by the lack of sanitary conditions worldwide. This results in over five million deaths each year (Pimentel et al. 2007). Children are the most affected segment of population. The World Health Organization estimates that, “Every thirty seconds, a child dies of malaria” (WHO 2010c). At the present time, over one hundred million Africans are estimated to live in areas where malaria is present. This figure is expected to increase to nearly two million in 2080 (McMichael et al. 2008).

Tuberculosis and HIV/AIDS are leading causes of death worldwide. The World Health Organization reported nearly nine million new tuberculosis infections in 2004 alone. An active TB carrier is able to infect between ten to fifteen individuals each year (WHO 2010e). Tuberculosis is responsible for nearly two million deaths annually. AIDS has also shown its devastating effects on people. Developing countries are home to almost all of these infections, but Sub-Saharan Africa accounts for most of it. AIDS is thought to be the most devastating epidemic in our lifetime (WHO 2002).

Infectious diseases are affecting the lives of millions. Although slight progress is currently seen, the threats are severe causing millions of deaths in Sub-Saharan Africa. In the future, the increasing number of HIV infections within the military for example may lead to the weakening of a state's capacity to defend itself in case of an attack from outside or inside. As a result, this and preventable deaths and suffering of millions in Sub-Saharan Africa makes infectious disease one of the major security threats in the region.

CHAPTER V

ECOLOGICAL INSECURITY IN SUB-SAHARAN AFRICA

5.1 Introduction

Environmental degradation in Sub-Saharan Africa has been a major problem for the region for quite some time. As mentioned in Chapter 3, it is mostly comprised of land degradation, deforestation, desertification, biodiversity loss, and pollution of air and water. Although Africa contributes very little to global climate change, it is the most susceptible to the effects of climate change. Its vulnerability is mainly due to lack of resources and technology to adapt to the conditions that would be imposed by climate change. In recent decades, Africa has been affected by various climate-related conditions and disasters such as drought, floods, cyclones, and bushfires that have major impact on the people and economy of the region. Sub-Saharan Africa has been greatly affected by continued decrease in crop yields, decreased water availability, greater exposure to vector and water-borne diseases, and increased flooding. Furthermore, climate related disasters and diseases are on the increase. Millions of people in Sub-Saharan Africa are suffering from various disasters like droughts, floods, and cyclones. Starvation, migration and death are also becoming widespread in the region. Diseases such as malaria, cholera, and lower respiratory tract infections are also on the rise. Deaths and illnesses from diseases once thought to be under control, such as tuberculosis, have also increased tremendously (UNECA 2001)

HIV/AIDS has devastated the region since its start in early 1980s. Sub-Saharan Africa remains the most affected region in the world. In 2008, UNAIDS reported that, “Sub-Saharan Africa accounted for 67% of HIV infections worldwide, 68% of new infections among adults, and 91% of new infections among children. The region also accounted for 72% of the world’s AIDS-related deaths in 2008” (UNAIDS 2009, 21).

In this chapter, four Sub-Saharan African countries have been selected for closer examination. These four countries, Angola, Ethiopia, Kenya, and Sudan, were chosen because they are believed to be good examples to illustrate how ecological insecurities, discussed in previous chapters, are affecting the people and the states in Sub-Saharan Africa. The chapter compares traditional security threats with ecological security threats. It shows how conventional security is also related to ecological security. The chapter also examines the various causes of deaths in the four selected countries to make general assumptions for the region.

5.2 Angola

Angola is a southern African country that emerged in 2002 from a civil war after about four decades, which claimed the lives of about one million Angolans. As devastating as it is, the war has displaced about one third of the population and destroyed much of Angola’s infrastructure. Although Angola has natural resources, it is the poorest country in the world ranking 160th on the United Nations Development Programme Human Development Index (WHO 2005b). This is shown by the various demographic indicators used by the United Nations. Life expectancy in Angola has not changed very much over time. From 1980 to 2005, it has remained constant at about thirty-seven years

with a slight decrease in 2000 to thirty-six years (United States Bureau of the Census 2010b).

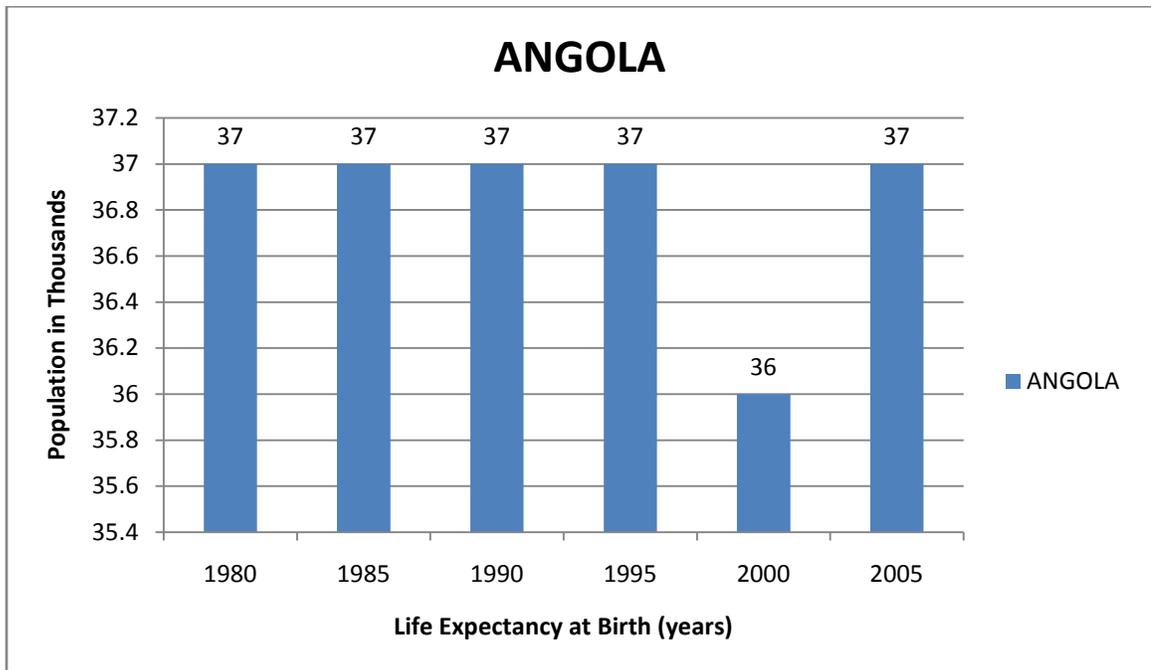


Figure 4. Angola's Life Expectancy at Birth (years) from 1980-2005.

Source: United States Bureau of the Census. 2010a. *Angola Demographic Indicator from 1980-2005*. <http://www.census.gov/ipc/www/idb/country.php>.

Infant mortality rates are high in Angola. Almost two hundred infants in one thousand die at birth. Similarly, 265 children in one thousand die before reaching the age of five. These mortality rates are very high compared to other regions in the world (WHO 2005b). Mortality rates in the country have increased over time. A forty year civil war in Angola has claimed the lives of about 1 million people, which amounts to about 25,000 annually. Although a very high number, infectious diseases in Angola claim the lives of about 126,000 people annually. Furthermore, in combination, communicable, maternal, and nutritional conditions all kill nearly 300,000 people each year, which is about twelve times the number of casualties from war in Angola (see figure 5) (WHO 2009a).

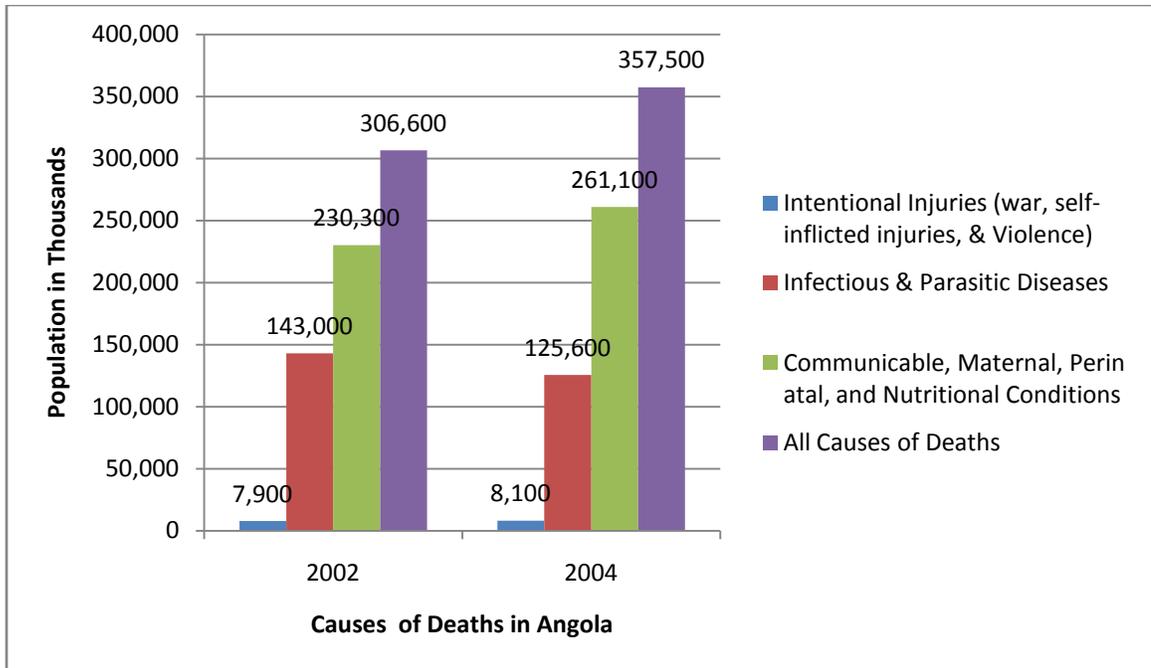


Figure 5: Causes of Deaths in Angola.

Source: World Health Organization (WHO). 2009a. *Estimated Total deaths ('000), by cause and WHO Member State: Angola 2002 & 2004*. Department of Measurement and Health Information, World Health Organization. <http://www.who.int/evidence/bod>

The lethal combination of diseases such as waterborne illnesses, respiratory diseases, malnutrition, lack of hospitals and doctors among others cause millions of deaths in the Angolan state. For every 100,000 births, approximately 1,700 women die in the process of giving birth. This is mainly due to lack of nearby health facilities and home deliveries that may result in complications. Infectious diseases also contribute to maternal mortality (WHO 2005b).

As one of the main drivers of change, population growth can further exacerbate the transmission of infectious diseases. Fertility rate in Angola is among the highest in the world. In 1980, the Angolan population was about 6.7 million, in 2005 this number had double to about twelve million people (United States Bureau of the Census, 2010a).

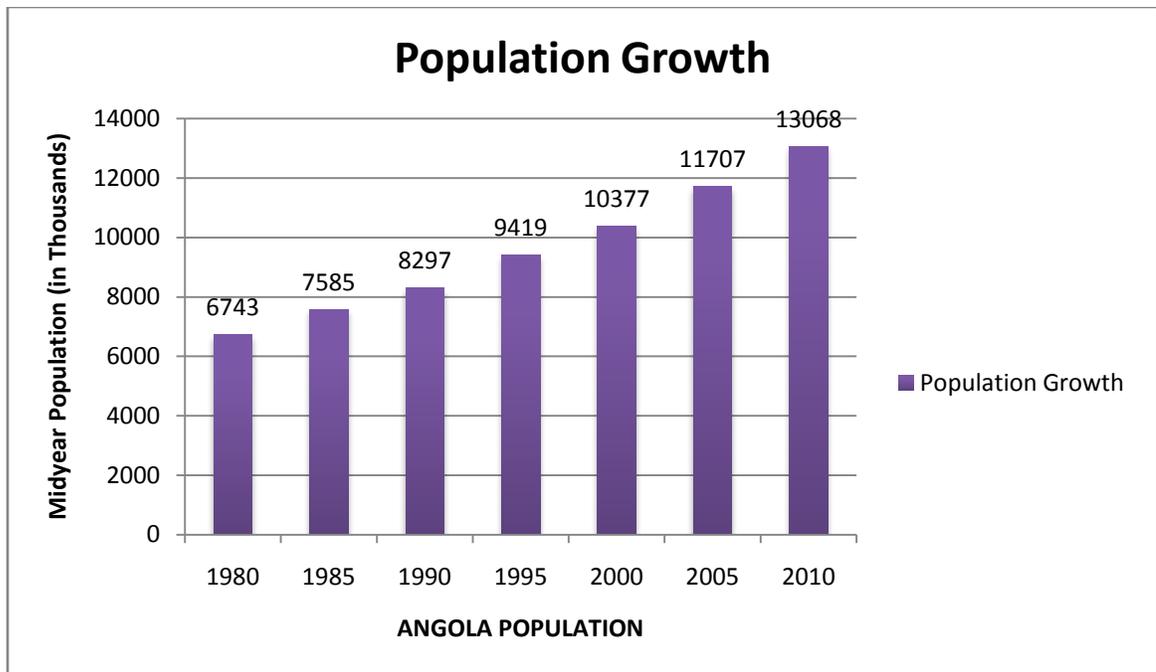


Figure 6. Angolan Population Growth from 1980-2005.
 Source: United States Bureau of the Census. 2010a. *Angola Demographic Indicator from 1980-2005*. <http://www.census.gov/ipc/www/idb/country.php>

Angola has been hit by an increase in malaria over the past few decades. Malaria has become one of the greatest threats to the Angolan population, especially to young children and pregnant women. Children below five are the most affected comprising of thirty-five percent of all cases and nearly $\frac{3}{4}$ of its deaths every year. Furthermore, in a world where boundaries are becoming porous, diseases find their way to new areas. Diseases like the Marburg Haemorrhagic Fever (MHF) threatened lives in Angola. Within a year period, Angola has seen an MHF outbreak that was reported as the largest, killing eighty-eight percent of all infected (WHO 2005b).

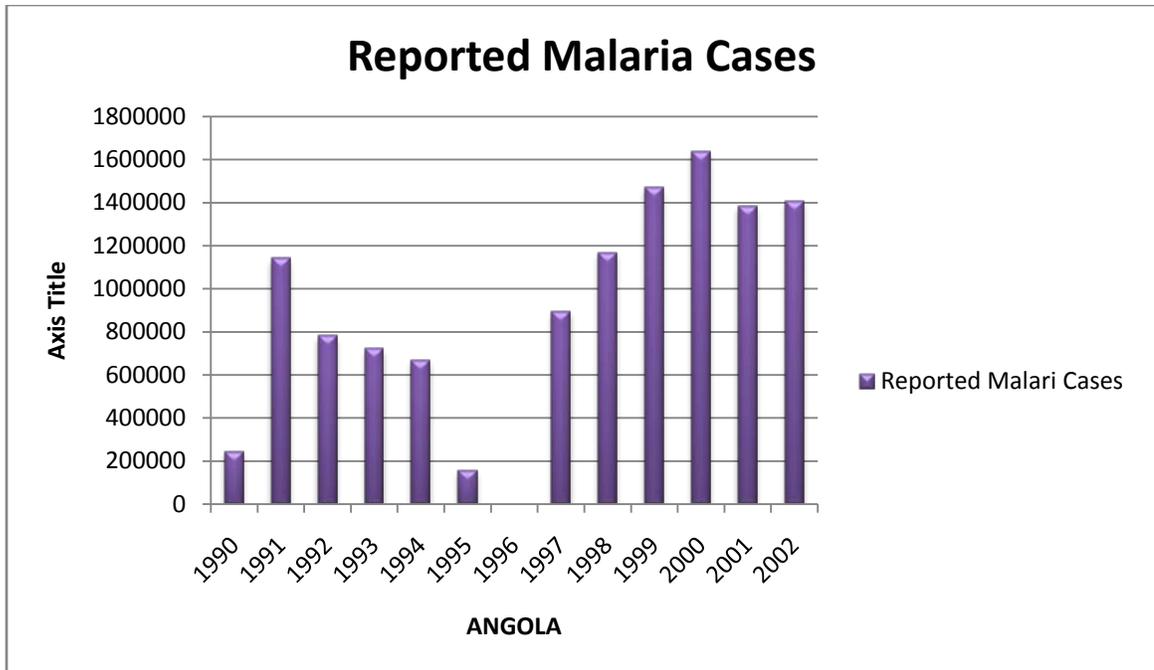


Figure 7. Reported Malaria Cases in Angola from 1990-2002.

Source: World Health Organization (WHO). 2005b. *Health Action in Crises: Angola*.

World Health

Organization. http://www.who.int/hac/crises/ago/background/Angola_Dec05.pdf

Angola is not only affected by war and an infectious disease, malnutrition is also a major concern. It is estimated that nearly half of its population are undernourished and most underdeveloped (WHO 2005b). Young children are still the largest target of severe malnutrition. Although malnutrition seems to have decreased, there is a very slight change from 1990 to 2006. During 1990-1992, there were about 7.2 million Angolans undernourished. This number did not change much in 2006, where 7.1 million Angolans were undernourished (FAO 2009).

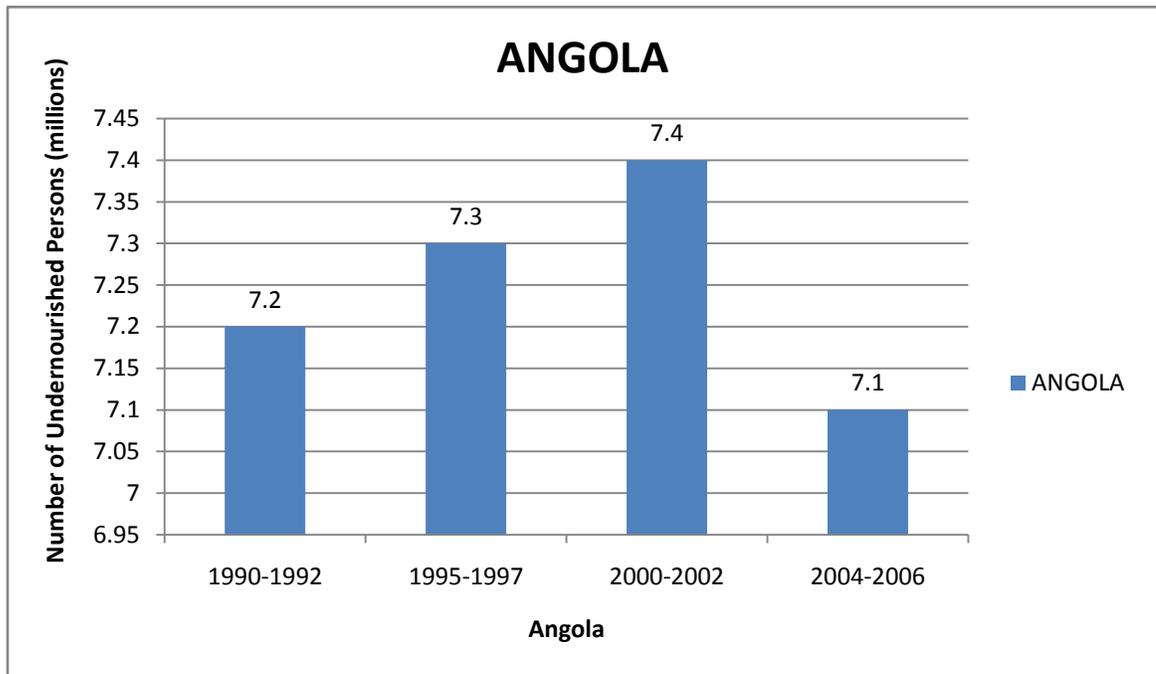


Figure 8. Number of Undernourished Persons (millions) in Angola.
 Source: Food and Agriculture Organization (FAO). 2009. *Undernourishment*. Food Security Statistics, Food and Agriculture Organization of the United Nations. <http://www.fao.org/economic/ess/food-security-statistics/en/>

While millions of Angolans suffer and die from preventable diseases, chronic malnutrition, and poverty, the Angolan government does not seem to make these insecurities a priority. According to Addison and Ndikumana, “Angola’s government spends a negligible US\$ 0.01 per capita on primary health care despite US\$ 2.6 billion per annum in oil revenues” (Adauta et al. 2001; World Bank 1995; Addison and Ndikumana 2001, 1). In addition, the allocations of monetary resources are heavily directed towards the urban areas, leaving the rural majority in despair. This is true for most Sub-Saharan African states. The Angolan government on average spends US\$ 309.4 million on health and US\$ 978.9 million on military. Its health expenditure is 31.6 percent of its military spending (Addison and Ndikumana 2001). Sub-Saharan African

countries such as Angola have allocated very little spending to social services such as public health. They have increased spending on defense while millions of their people are suffering and dying from non-traditional security threats such as infectious diseases, environmental degradation, and chronic malnutrition.

5.3 Ethiopia

Although it has currently slightly improved, Ethiopia is in a similar situation with Angola in its spending. The healthcare systems in the region are mostly underfunded. As such, the Ethiopian government is projected to spend about 1.9 percent of its GDP on healthcare, with only twenty percent of it allocated to healthcare in rural areas. In the year 2000, Ethiopia spent on average US\$ 68.8 million on health and US\$ 218.9 on military. Its total health expenditure is 31.4 percent of its military spending (Addison and Ndikumana 2001).

Currently with a population of nearly eighty-eight million, Ethiopia is one of the largest and most populous countries in Sub-Saharan Africa. Although agriculture is the most important source of income for the country food production lags behind its very rapidly growing population. The fact that agricultural outputs in Ethiopia are highly reliant on environmental conditions further emphasizes the importance of a sustainable environment. Although Ethiopia is considered to have some potential in its agricultural industry, food insecurity is widespread throughout the country. Ethiopia receives enormous amount of food aid every year due its rapidly growing population. Ethiopia's population grew from twenty-three million in 1960 to sixty-five million in 2001 and is

expected to double in the next twenty-five years further pressuring the environment (see figure 9) (Asefa and Zegeye 2003, 2).

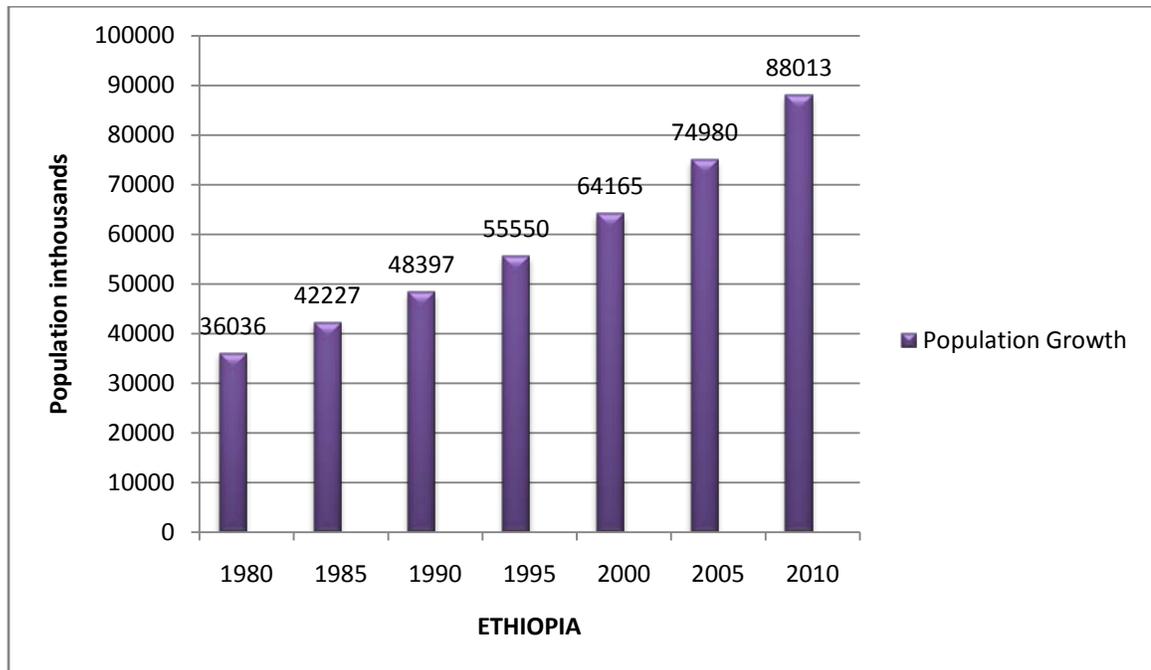


Figure 9. Ethiopian Population Growth from 1980-2010.

Source: United States Bureau of the Census. 2010b. *Ethiopia Demographic Indicators from 1980-2010*. <http://www.census.gov/ipc/www/idb/country.php>

Population growth heavily adds more stress on the natural environment that result in degradation. The majority of Ethiopian farmers are highly affected by land degradation and its consequences. The lack of sufficient nutrients in the soil results in reduced amount and quality of their agricultural products. Ethiopia is also losing its forests. Hundreds of thousands of hectares of land are deforested each year in Ethiopia for agricultural, industrial and overgrazing purposes. Although livestock is very important and useful, Ethiopia has one of the highest numbers of livestock per area (Dejene 2004). Dejene states that, “high livestock density of 160 TLU [Tropical Livestock Unit] per square kilometers results in overgrazing and land degradation, significantly reducing the productivity of the livestock sector” (Dejene 2004, 46). According to the FAO, “the

concept of Tropical Livestock Units (TLU) provides a convenient method for quantifying a wide range of different livestock types and sizes in a standardized manner” (FAO 2010).

Ethiopia remains one of the poorest countries in the world, ranking 169th on the United Nations Development Programme Human Development Index. It is estimated that only forty-five percent of Ethiopia’s population is literate, leaving the rest in the dark. The standard of living of practically half of Ethiopia’s population is very low. In many parts of the country, food insecurity is widespread, leaving many people to depend on food assistance (WHO 2007).

Environmental degradation is not the only concern Ethiopia has. Infectious diseases are also creating insecurities to more and more Ethiopians every year. In 2004, the World Health Organization estimated that about 1.1 million people died. Out of this 1.1 million people, around twenty thousand died of intentional injuries which include war, self-inflicted injuries, and violence. However, that same year, infectious and parasitic diseases claimed the lives of about 425,000 people. Furthermore, in combination communicable, maternal, perinatal, and nutritional conditions claimed the lives of over 760,000 people in Ethiopia (see figure 10) (WHO 2009b).

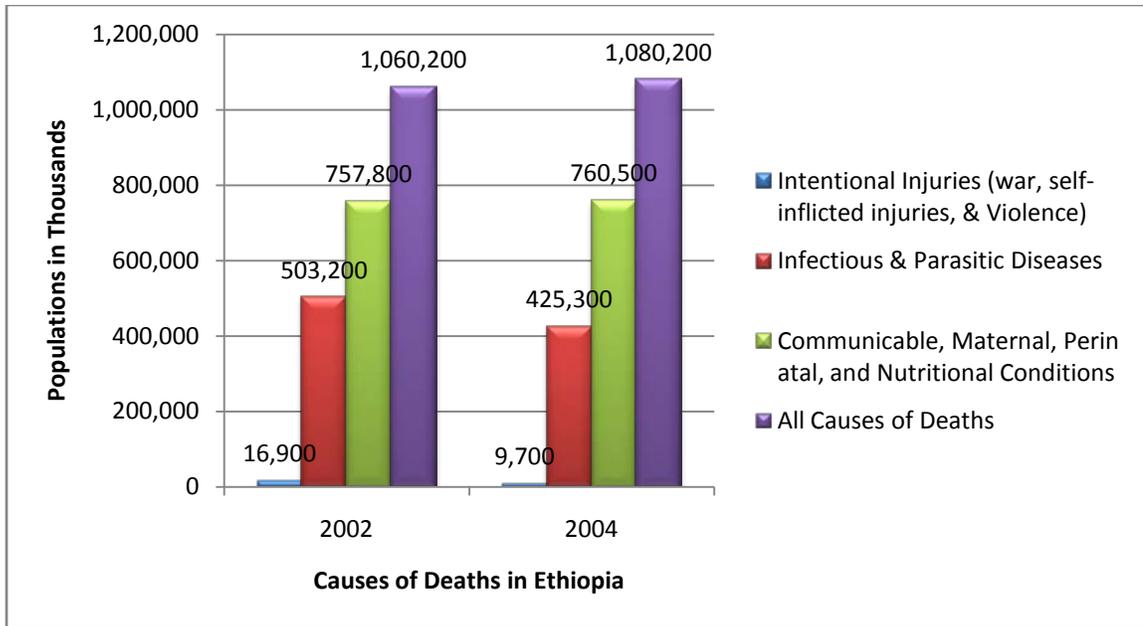


Figure 10: Causes of Deaths in Ethiopia

Source: World Health Organization (WHO). 2009b. *Estimated Total deaths ('000), by cause and WHO Member State: Ethiopia 2002 & 2004*. Department of Measurement and Health Information, World Health Organization. <http://www.who.int/evidence/bod>

Infectious diseases like malaria are on the rise and resulting in the suffering and deaths of countless Ethiopians. On average, over one million malaria infections occur annually leading to thousands of deaths in the country. At the turn of the century, Ethiopia experienced an outbreak that infected more than four million and killed over one hundred thousand people (WHO 2007). During this period, malaria was confirmed to be the number one killer in the country. More than sixty-five percent of the Ethiopians live in areas where malaria is present (WHO 2005c). In 2002, malaria in Ethiopia killed nearly 32,000 people. Two years later, this number had reached about 45,700 people (WHO 2009b).

Tuberculosis is also on the rise in Ethiopia. In 2003, more than one hundred thousand were newly infected with tuberculosis. More than forty percent were unable to get treatment. The greatest difficulty the people and the country are facing is the close to

inexistence of healthcare facilities at an approximate distance and overall (WHO 2007). In 2002, tuberculosis had killed about 41,300 people in Ethiopia. In 2004, this number had risen to about 49,100 people. Diarrheal and respiratory infections are also rampant in Ethiopia, claiming the lives of more than 3000,000 in 2004. Of all deaths in 2004 which accounted for about one million people, 760,500 were from a combination of communicable, maternal, perinatal, and nutritional conditions. Infectious diseases accounted for about 425,300 deaths in 2004 (WHO 2009b).

Hunger and malnutrition have been the face of Ethiopia for several decades now. In 2005, the World Health Organization reported that nearly half of all surveyed Ethiopians are thought to be underdeveloped and about forty percent underweight (WHO 2007). Although the number of undernourished persons declined over the years, it is still very high. Between 1990 and 1992, there were about 37.5 million people who were undernourished, in 2002-2006; this number had decreased to about 34.6 million people (Figure 11) (FAO 2009).

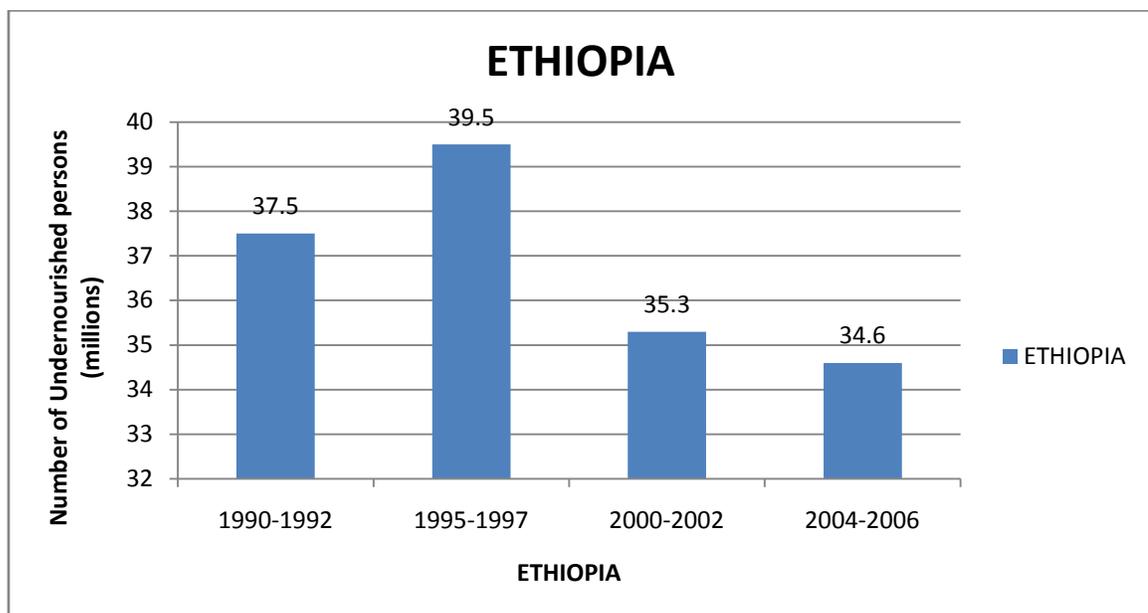


Figure 11. Number of Undernourished Persons (millions) in Ethiopia.

Source: Food and Agriculture Organization (FAO). 2009. *Undernourishment*. Food Security Statistics, Food and Agriculture Organization of the United Nations. <http://www.fao.org/economic/ess/food-security-statistics/en/>

A devastating epidemic that has ravaged not only Ethiopia but the whole continent is HIV/AIDS. The Ministry of health in Ethiopia reported that HIV/AIDS infects five thousand people each week. This deadly disease has deprived more than one million children of their parents (WHO 2007).

Estimated adult HIV (15-49) prevalence %, 1990-2007

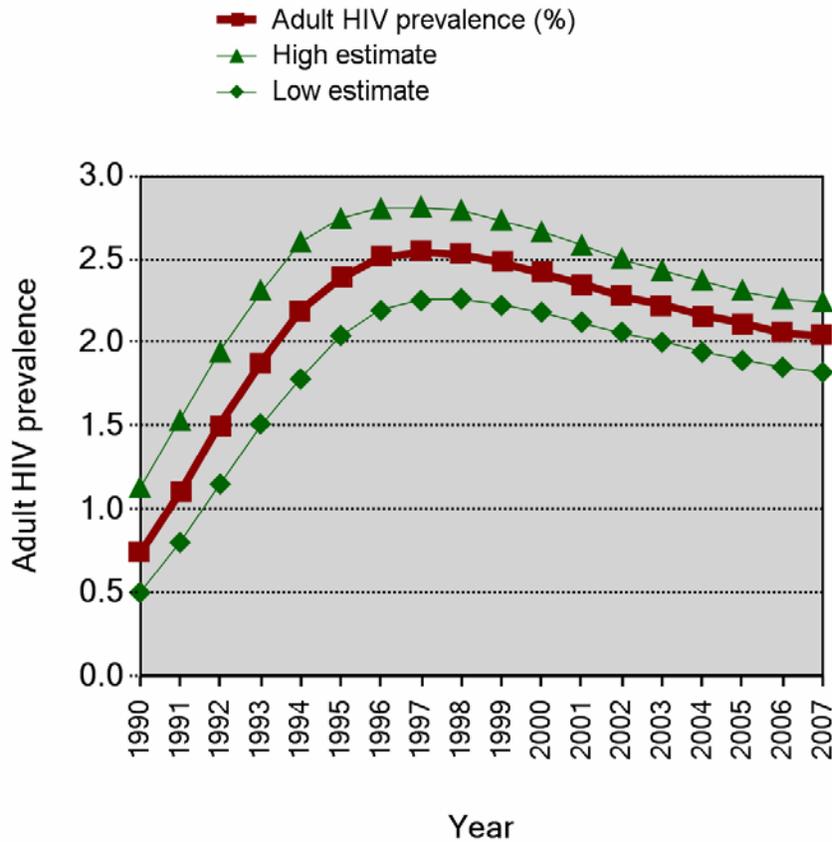


Figure 12. Adult HIV Prevalence in Ethiopia.
 Source: World Health Organization (WHO). 2007. *Health Action in Crises: Ethiopia*. World Health Organization. http://www.who.int/hac/crises/eth/background/Ethiopia_Sept07.pdf

5.4 Kenya

Kenya, a country located in eastern Africa, has a population of about thirty-five million. Its continued increase in poverty and food insecurity is expressed in the significant drop from 134th to 154th on the UNDP Human Development Index. Kenya, like many Sub-Saharan African countries is greatly affected by environmental problems and diseases among others (WHO 2006). Its population increases at more than 2.5 percent each year. In the last twenty five years, Kenya's population has more than doubled (United States Bureau of the Census 2011). In addition to its own population, Kenya hosts more than 200,000 external refugees, while more than 300,000 of its own people are displaced internally. This further exacerbates the environmental problems Kenya already faces. Moreover, more than half of its people do not have access to safe water and sanitation. Waterborne illnesses in the country contribute to high mortality rates. Diseases like AIDS, malnutrition and acute respiratory diseases are also great concerns for the country (WHO 2006). Unlike previous cases, Kenya has seen a steady rise in undernourished peoples from 1990 to 2006. In 1990 to 1992, Kenya had about eight million undernourished people. In 2002 to 2004, it had increased to about 10.8 million (see figure 13) (FAO 20109).

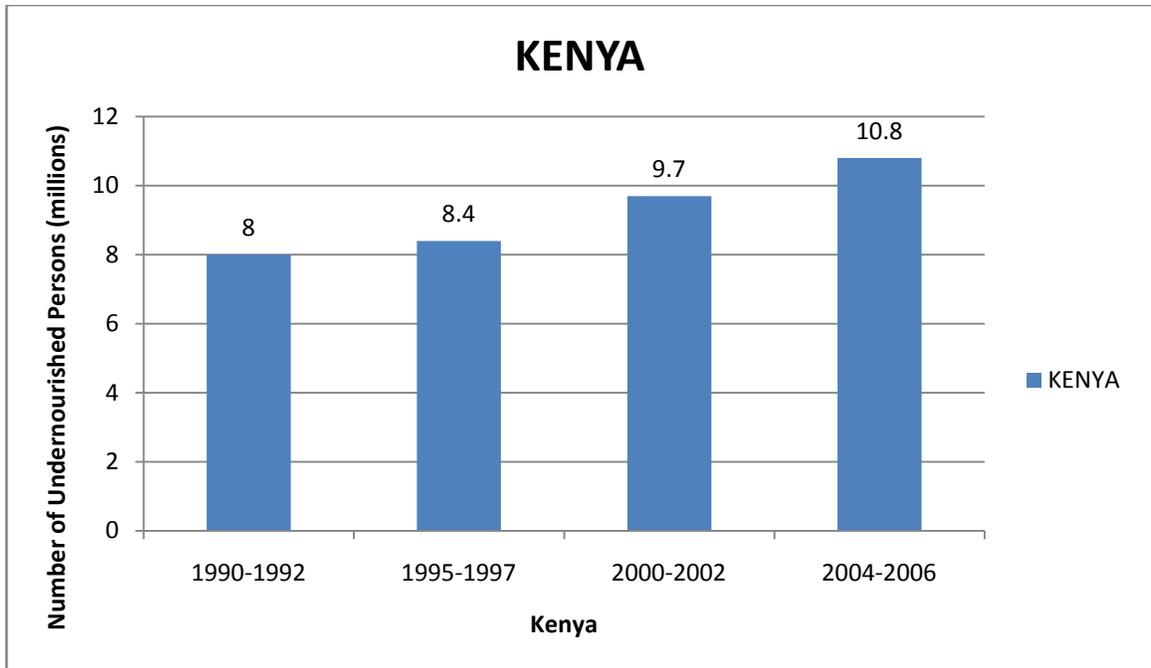


Figure 13. Number of Undernourished Persons in Kenya.

Source: Food and Agriculture Organization (FAO). 2009. *Undernourishment*. Food Security Statistics, Food and Agriculture Organization of the United Nations. <http://www.fao.org/economic/ess/food-security-statistics/en/>

Kenya suffers from many environmental degradation issues. As is true for most Sub-Saharan countries, Kenya's agriculture is central to the country's economy and the eighty percent it employs. This in turn makes environmental degradation and its effects on food production a major issue needing immediate and focused attention. Water, wind, and chemicals among other things result in large amounts of soil degradation in Kenya. Desertification also affects the majority of its land, however over twenty percent is believed to be severely affected. Deforestation is also a contributor to further erosion in that it allows for more rain and wind to reach the soil (Lang 1995).

Kenya's problem does not end with just environmental issues. The livelihood of its people is not only threatened by environmental degradation, but infectious and parasitic diseases and malnutrition are also taking a toll. Diseases such as malaria, tuberculosis, HIV/AIDS and others are devastating the country. In 2002, all causes of deaths in Kenya

amounted to about 407,000 people. Out of this 407,000, nearly 292,000 were from communicable, maternal, perinatal, and nutritional conditions. Infectious and parasitic diseases accounted for almost 229,000 of these deaths, while deaths from intentional injuries, including war, violence, and self-inflicted injuries for that same year were 7,800. This number does not even reach four percent of deaths from infectious and parasitic diseases that is devastating the country. In 2004, all causes of deaths in Kenya have risen to about 444,000 people. The number of communicable, maternal, perinatal, and nutritional deaths has also risen to 316,000 people. Deaths from infectious diseases have also increased to about 231,000 people. Although there was an increase in the deaths from intentional injuries to 9,800 people, it still is very low compared to deaths from infectious and parasitic diseases in Kenya. Within the two years of assessment, deaths from tuberculosis in Kenya have risen from 19,700 to 28,100. Malaria deaths increased from 18,100 to 25,800 between 2002 and 2004. During that same period, diarrheal disease deaths have risen from 24,600 to 26,700. However, deaths from HIV/AIDS have shown a decrease from 144,400 to about 129,900. This is mainly due to the antiretroviral therapy that is becoming available to the country (see figure 14) (WHO 2009c).

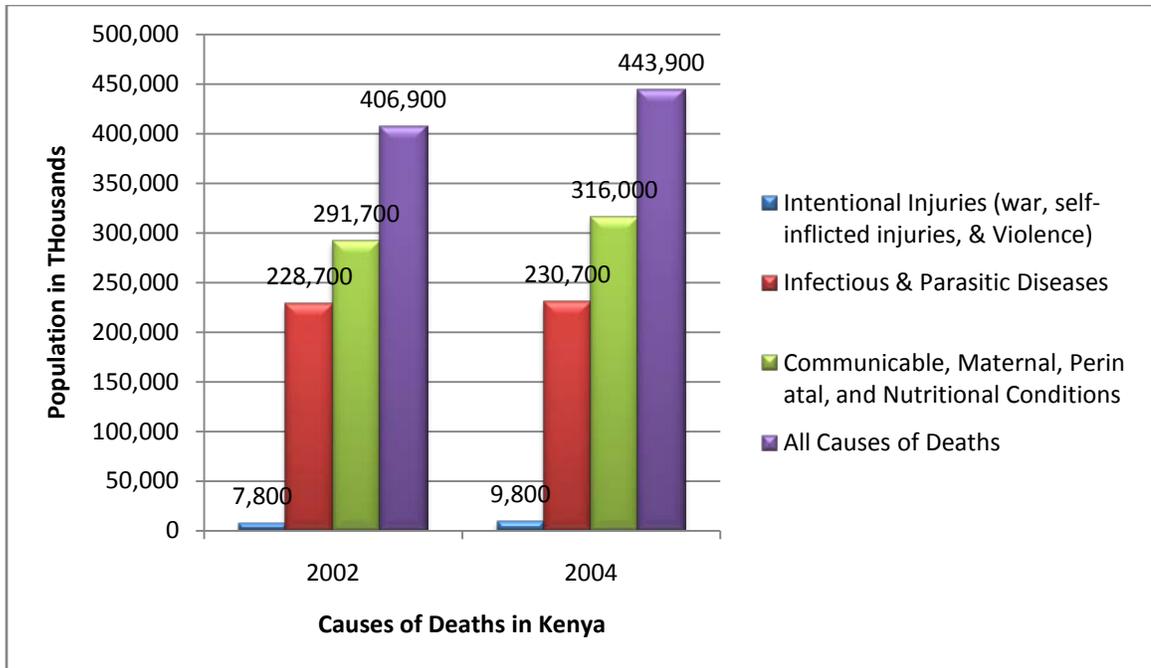


Figure 14: Causes of Deaths in Kenya

Source: World Health Organization (WHO). 2009c. *Estimated Total deaths ('000), by cause and WHO Member State: Kenya, 2002 & 2004*. Department of Measurement and Health Information, World Health Organization. <http://www.who.int/evidence/bod>

5.5 Sudan

Civil wars are the most devastating actions of humans that result in millions of deaths. Sub-Saharan Africa is all too familiar with civil wars. Many civil wars in the region last for decades making the consequences of death and injury even greater. In the case of Sudan, a resolution had been reached after a twenty year civil war. However, conflict in some parts of Sudan still goes on. Aside from conflict and unrest, the environment in Sudan is critically degraded. In some areas of the country, these environmental problems are believed to be linked to several civil wars (UNEP 2007). Similarly, Environmental degradations in Sudan come in different forms such as deforestation, overgrazing, deforestation and others. In a little over a decade, Sudan lost nearly twelve percent of its total forest cover and is believed to continue at this rate.

Sudan has been affected by climate change which has resulted in the disruption of rainfall patterns in the country. Northern Sudan suffers greater consequences of climate change and other environmental problems because it is believed to be linked to conflict and higher food insecurity in the area. The most affected areas are expected to see a seventy percent drop in their agricultural output. Environmental degradation has further contributed to already existing high number of refugees in the country. Nearly five million Sudanese have been forced to move from their homes. For some like the Nuba tribe, relocation of refugees to their region is regarded as a threat. Its negative effects on the environment and land are highly understood and considered a possible cause for conflict (UNEP 2007).

Conflict and environmental degradation are not the only threats to the Sudanese state and people. Increasing number of people are dying from infectious diseases, malnutrition and diarrheal diseases throughout the country. In 2002, 346,200 people died of various causes. Of this, 120,200 were killed by infectious and parasitic diseases, whereas intentional injuries or war killed about 27,700 people. In 2004, the number of people dying from all causes increased to 428,700 people. Although the number of deaths from infectious and parasitic diseases decreased to 117, 900 people, respiratory infections increased from 8,900 in 2002 to 28,600 in 2004 (see figure 15) (WHO 2009d).

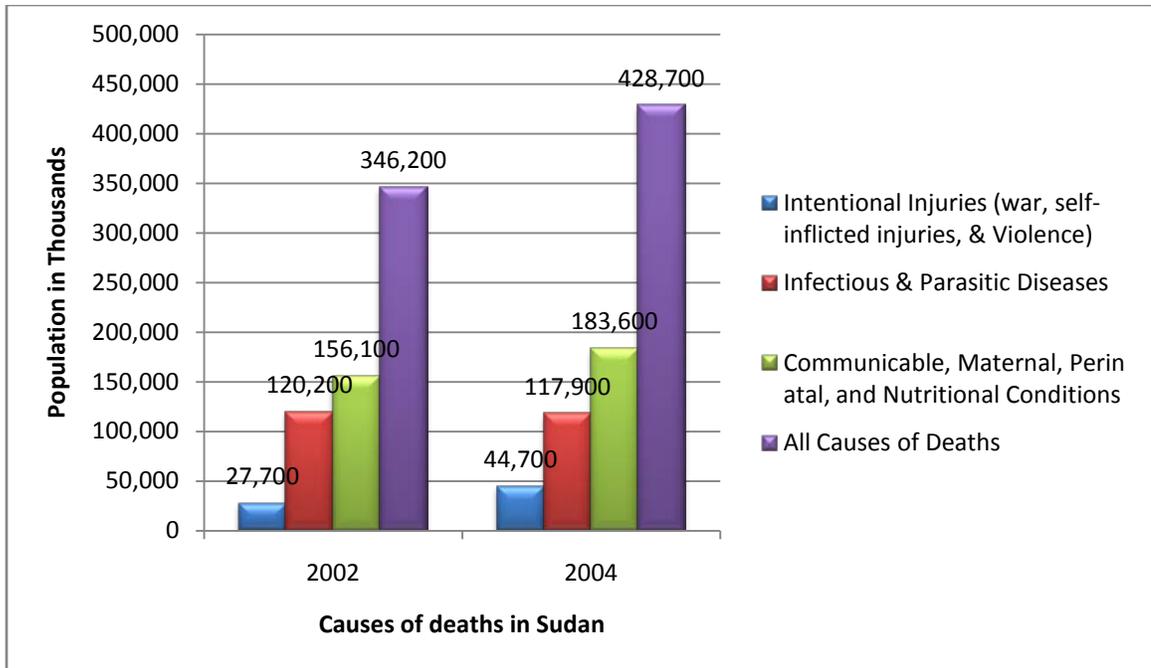


Figure 15: Causes of Deaths in Sudan

Source: World Health Organization (WHO). 2009d. *Estimated Total deaths ('000), by cause and WHO Member State: Sudan 2002 & 2004*. Department of Measurement and Health Information, World Health Organization. <http://www.who.int/evidence/bod>

In 2006, the World Health Organization had estimated that nearly six million people in different parts of Sudan were food insecure and needing assistance. Southern Sudan appears to have the highest mortality rate from other parts of the country, especially the north. Access to clean water and sanitation is also limited in the south. This results in a higher number of waterborne disease infections relative other regions. HIV/AIDS also affects Sudan enormously but its infection rate varies depending on the region. In 2005, Sudan also experienced a resurgence of the polio virus which was previously eliminated (WHO 2005d).

5.6 Conclusion

As shown with the examples of the four countries in the region, most Sub-Saharan African states rank very low on the UNDP's Human Development Index. Although slight

positive changes are seen, population growth is still increasing at a rapid rate, infant mortality rates are among the highest in the world, and infectious diseases are devastating the societies. The dangers of civil wars are claiming the lives of millions and displacing millions more then in turn creating more environmental problems. Most of the Sub-Saharan African economy is primarily based on agriculture making it highly reliant on the environment. Land and soil degradation and deforestation are costing the region millions of dollars annually, which could have been spent on other social services such as education, health, and chronic malnutrition. Food security in the region has been vulnerable to various environmental problems such as drought. Environmental degradation has also been shown to contribute to high number of refugees and conflicts in the region.

In the case of Sudan, there was a clear link between the environment and conflicts, where it is found that sixty-nine percent of the tribal conflicts from 1930-2000 in Darfur were caused by environmental disputes (UNEP 2007). Furthermore, due to severe poverty, it is mostly very hard for the states to deal with the various challenges that the environment, diseases, and other ecological insecurities bring on their people and the state. In all selected countries, it has been shown that ecological insecurities are endangering many lives and further impoverishing the states.

CHAPTER VI

CONCLUSION

6.1 Summary

In recent years, the world has seen many changes, including globalization, increase in life expectancy in some developing countries, increase in per capita income in others, environmental change, increase in infectious diseases, and natural disasters. Although the world and the nature of threats have increasingly changed, the security concept has remained fairly traditional and state centric (United Nations 2004). In its report in 2004, the United Nation stated that current security threats in the world do not recognize national boundaries, are connected and must be addressed at the global and regional level (United Nations 2004).

Security studies have traditionally focused on protecting a state from any foreign or domestic threats, mainly military and political. This traditional view of security has dominated much of the twentieth century and beyond by focusing on building strong military powers in order to protect state territories (Baldwin; Del Rosso; King and Murray 2002). This concept of security neglects the various non-traditional threats that are injuring and killing millions each year. The interaction of rapid population growth, environmental change, infectious disease, and many more are affecting the lives of millions in developing countries especially Sub-Saharan Africa. The question of whether a broader security perspective such as an ecological approach is necessary for Sub-

Saharan Africa in order to ensure the security of its people and state is highly supported by the various empirical analyses found in this study.

As shown in chapter 2, in order to preserve ecological security there are key balances that need to be maintained. These relationships however are greatly disrupted in the Sub-Saharan African region. Rapid population growth is pushing on the physical environment. This leads to less land for agriculture, decreasing forests as population's further settle into new areas, contact with previously unknown species, and in turn emergence of new infectious disease. Environmental changes such as land degradation and resource scarcity are forcing millions of Sub-Saharan Africans to move from their countries and places of origin to new territories. This further creates pressure on new environments and can also become possible causes of conflicts. Resource scarcity is one of the contributors to conflict in much of the region. This further indicates that traditional security concerns such as conflicts are also related to ecological security concerns.

As mentioned in chapter 3, environmental changes are increasingly affecting the very livelihoods of many people in the Sub-Saharan African region. The interaction of population growth, global rise in living standards and pollution is reducing the availability of renewable resources such as forests, land, and water. Since Sub-Saharan Africa does not have the resources and infrastructure to deal with various challenges associated with environmental change, it has become a survival issue for the region. Environmental degradation in the region is one of the many causes of human suffering such as hunger, displacement, reduced agricultural outputs, and conflicts. Millions of Africans face famine regularly and millions more die of hunger. Unlike developed nations, the greatest share of Sub-Saharan African economy is highly dependent on the

environment therefore making the environment the very essence of life in general in the region (Oyebade and Alao 1998).

Although Sub-Saharan Africa contributes very little to global climate change, it is and will be the region most affected by it. The reason for climate change's greater effect on Sub-Saharan Africa is because the environment is much more critical for the people and their survival as they highly depend on the environment for their everyday life. Furthermore, Sub-Saharan Africa is not strong enough economically to prevent or restore damaged environments. As a result, the lives of the majority of Africans are further destroyed and impoverished (Africa Partnership Forum 2008; hereafter APF; Nyong 2009; Hope 2009). The slight economic increase in Sub-Saharan and its potential for a sustainable development are threatened and pulled back because of climate change. Lack of economic wellbeing, increased number of diseases and populations are further exacerbating the negative effects of climate change (Hope 2009). As the main driver of change, rapid population growth in Sub-Saharan Africa is one of the contributors to environmental ills. Rapid population growth places stress on natural systems, contributes to food insecurity, deforestation, land degradation and resource scarcity in the region (Pirages and Degeest 2004).

Furthermore, towards the end of this century, climatic changes are projected to greatly increase the number of hungry people worldwide. However, the African continent will be home to more than eighty percent of the added one hundred million people (Parry et al. 2004; Hope 2009). According to Hope, "for Sub-Saharan Africa, reduced agricultural productivity from climate change is estimated to amount to US\$26 billion (2003 prices) by 2060 - an amount that currently exceeds bilateral aid transfers to the

region” (UNDP 2007; Hope 2009, 455). Climate change not only contributes to loss in agricultural productivity but also affects the health of the people. Changes in temperature further allow diseases like malaria to breed and increase in number. This further results in increased infection rates and deaths in the region (Hope 2009).

Infectious diseases in Sub-Saharan Africa are killing millions each year. Few infectious diseases account for the deaths of millions and nearly half resulting from various environmental problems (WHO 2005a, Pimentel et al. 1998; Robbins 2000; Pimentel et al. 2007). Diseases such as malaria, HIV/AIDS, and tuberculosis have been on the rise in the last few decades. Sub-Saharan Africa accounts for most of the diseases’ infection rates. In the most affected regions of Sub-Saharan Africa, climate change will highly contribute to the increased incidence of malaria infections. It is estimated to add between twenty to seventy million in the next few decades (McMichael et al. 2008). Currently, the World Health Organization has estimated that nearly all malaria infections are found in Sub-Saharan Africa. As a result, it estimated that one child dies of malaria every thirty seconds (WHO 2010b). Waterborne diseases are contracted mainly from contaminated or dirty waters and lack of sanitation. This results in more than five million deaths, which the majority are likely to be in Sub-Saharan Africa (UN 2001; Pimentel et al. 2007). It is estimated that approximately one third of the world’s population carry the bacteria that can later transform into active Tuberculosis. Each year, this transformation from a dormant state to an active disease occurs in nearly nine million people resulting in close to two million deaths. Almost all infections are in developing countries (WHO 2002). Overcrowding is the biggest contributor to TB infections. As population are densely located in an area, the rate of infection increases (Dye 2006, 938). According to

the World Health Organization, each individual with active TB can infect between ten to fifteen people each year. Every second, one person is infected with TB Bacilli. The highest TB incidence and mortality rate per capita are found in the African region (WHO 2010e). Each year, tuberculosis claims the lives of nearly three million people. The last decade of the twentieth century has marked a significant increase in new TB cases (Pimentel et al. 2007). Furthermore, infection rates of Tuberculosis in HIV/AIDS patients are much greater than those free from the disease (WHO 2010e).

HIV/AIDS has become one of the major killers of all time. Every year, nearly two to three million people die from HIV/AIDS worldwide (WHO 2002). Approximately seventy percent of all HIV/AIDS infections are in Sub-Saharan Africa. Over ninety percent of all children infected with HIV are Africans (The World Bank 2009b). The AIDS epidemic does not only kill people but also affects the various aspects of the social and economic life of the Sub-Saharan African region further driving households into poverty (Barnett, Mwaniki and Serwada 2005).

The countries selected in Chapter 5 are examples of how ecological insecurities in Sub-Saharan Africa are affecting the people and the state. Most of the countries selected have gone through wars in which the thesis was able to compare the mortality rate from wars and injuries with the mortality rate from ecological insecurities such as hunger, infectious diseases. In all four countries the mortality rates from ecological insecurities highly surpass those from war, self-inflicted injuries, and violence combined.

The premature death of millions of people in Sub-Saharan Africa from non-traditional challenges hopefully forces states in the region to rethink their security policies. The issues of environmental change, infectious disease, and poverty are not issues to be

discussed separately. The interconnectedness of these issues makes it even harder to deal with one and leave the other. The environment is a very critical asset to the Sub-Saharan region and damages to it cause severe suffering of people and threats to states.

There are several factors contributing to the mismanagement and disregard of Sub-Saharan Africa's environmental affairs. The undemocratic forms of government in most of the region have had significant influence on the current state of the environment and further dragged their feet in achieving policies suited for a sustainable environment (Oyebade and Alao 1998). Furthermore, the Structural Adjustment Programmes of the IMF and World Bank have further impacted the capacity of the region to survive environmental and social problems, where the policies encouraged cutting state expenditures on social services, opening markets and reducing state involvement in markets (UNECA 2001). According to UNECA, these policies did not achieve the aimed goals in most Sub-Saharan countries. The few that have slightly increased their economies were mainly gained at the expense of highly degraded environments and overexploitation of resources. The debt burden of the region is also key contributor to the overexploitation of natural resources. More than half of Sub-Saharan African countries are deeply in debt. In order to repay these debts, countries are obligated to exhaust their natural resources which results in further degradation of the environment (UNECA 2001). The interactions of all these internal and external factors are adding to the neglect of ecological insecurities that are robbing people from their livelihoods.

Currently, the ecological insecurities Sub-Saharan Africa is facing are worsening economic problems as well as overexploitation of natural resources (UNEP 2009). Despite the various efforts made by African leaders in signing and ratifying Multilateral

Environmental Agreements, there are severe implementation problems (UNECA 2001). In the current situation, the issues of environmental degradation, infectious diseases, and the like are not put in the forefront of development policies in many countries. These issues can fundamentally drag a country's economy down. As developing countries lack negotiating power in Environmental Agreements, it is highly unlikely that current policies are created to benefit the third world. Therefore, their voices in these agreements need to be taken into consideration (UNEP 2009).

There are a number of reasons why states have not yet adopted the ecological security perspective. First and foremost, some scholars argue that traditional military threats are still presently eminent and require military response. Therefore broadening its definition to include other non-traditional issues will weaken the military and the state in its ability to protect its territory (Huntington 1957; Dunlap 1992-1993; G. Dabelko and D. Dabelko 1995). The following argument is simply that the concept is just too broad (Finger 1991; Le Prestre 1993; G Dabelko and D. Dabelko 1995). The other argument is that it's a bureaucratic tactic by environmentalist and others to extort budget from the military (Le Prestre 1993; G Dabelko and D. Dabelko 1995). Finally, there is no conclusive evidence that wars or civil unrests are directly caused by creating stress on the environment (Lipschutz and Holdren 1990; Brock 1992; G Dabelko and D. Dabelko 1995).

It seems very logical for Sub-Saharan Africa to hold its current traditional position on security considering the many disputes and conflicts the region encounters. However, neglecting the various insecurities that come from other threats such as diseases, environmental degradation, and others can have a devastating effect. The states in Sub-Saharan Africa can no longer afford to neglect the threats from non-traditional issues. As

shown in this thesis, various insecurities to people and the states arise from non-traditional issues, which unless addressed as security threats can further endanger the survival of both. This can only be addressed when Sub-Saharan African leaders understand the magnitude of the threats and redefine or adjust to a new approach of thinking about security. The ecological security approach proposed in this thesis will benefit the region by creating a comprehensive understanding of the various threats and their relation to traditional security threats. It will enable states expenditures to be effectively distributed, which in turn lessens the premature deaths and suffering of millions in the region. In order for Sub-Saharan Africa to develop sustainably, changes to its security perspective are necessary. The ecological security approach will enhance the security of the region.

APPENDIX A

APF	Africa Partnership Forum
AGDP	Agricultural Gross Domestic Product
AIDS	Autoimmune Deficiency Syndrome
AU	African Union
CC	Climate Change
CDC	Center for Disease Control
CO ₂	Carbon Dioxide
DRC	Democratic Republic of the Congo
ENSO	El Nino Southern Oscillation
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
HPI	Human Poverty Index
ID	Infectious Disease
IFPRI	International Food Policy Research Institute
IFRC	International Federation of Red Cross
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IUSSP	International Union for the Scientific Study of Population
MEA	Millennium Ecosystem Assessment
MEAs	Multilateral Environmental Agreements
MHF	Marburg Haemorrhagic Fever
OAU	Organization of African Unity
RCS	Red Crescent Societies
SAP	Structural Adjustment Program
SARS	Severe Acute Respiratory syndrome
SIPRI	Stockholm International Peace Research Institute
SSA	Sub-Saharan Africa
TB	Tuberculosis
TLU	Tropical Livestock Unit
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFAO	United Nations Food and Agriculture Organization
UNMDGs	Millennium Development Goals
WB	World Bank
WCFSD	World Commission on Forest and Sustainable Development
WFS	World Food Summit

WHO	World Health Organization
WMO	World Meteorological Organization
YPLL	Years of Potential Life Lost

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