Uganda's Fading Luster: Environmental Security in the Pearl of Africa

A Pilot Case Study
Foundation for Environmental Security and Sustainability

June 2006

USAID FROM THE AMERICAN PEOPLE

FESS Foundation for Environmental Security & Sustainability

Partnership for African Environmental Sustainability PAES

"Yet it is not possible to descend the Nile continuously from its source at Ripon Falls without realizing that the best lies behind one. Uganda is the pearl."

- Winston Churchill, *My African Journey, 1908.*

The **Foundation for Environmental Security and Sustainability (FESS)** is a public policy foundation established to advance knowledge and provide practical solutions for key environmental security concerns around the world. FESS combines empirical analysis with in-country research to construct policy-relevant analyses and recommendations to address environmental conditions that pose risks to national, regional, and global security and stability.

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The **Partnership for African Environmental Sustainability (PAES)** is a non-governmental organization established to promote environmentally and socially sustainable development in Africa. PAES focuses on policy studies and assists countries to strengthen their capacities in four program areas: environmental security; sustainable development strategies; sustainable land management; and natural resource assessment. PAES is headquartered in Kampala, Uganda, with offices in Washington, D.C. and Lusaka, Zambia.

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Acknowledgement
FESS would like to thank staff at USAID/EGAT/ESP in Washington, DC as well the USAID Mission in Kampala for their encouragement and support.

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ACRONYMS

ADB	African Development Bank
ADF	Allied Democratic Forces
AI	Amnesty International
CCC	Critical Country Concerns
CCO	Certificates of Customary Ownership
COMPETE	Competitive Private Enterprise and Trade Expansion
CPPs	Crop Protection Products
DRC	Democratic Republic of the Congo
DWD	Directorate of Water Development
EACTI	East Africa Counterterrorism Initiative
ECI	Energy and Country Instability
EFA	Education for All
EIU	Economist Intelligence Unit
ESAF	Environmental Security Assessment Framework
ESF	Environmental Security Factors
EU	European Union
EUCOM	United States European Command
EUREP-GAP	Euro-Retailer Produce Working Group-Good Agricultural Practices (EUREP-GAP) Law
FAO	Food and Agriculture Organization
FESS	Foundation for Environmental Security and Sustainability
GDP	Gross Domestic Product
GOU	Government of Uganda
IDPs	Internally Displaced Persons
IFDC	International Center for Soil Fertility and Agricultural Development
IFPRI	International Food Policy Research Institute
KDA	Karamoja Development Agency
LRA	Lord's Resistance Army
LSSP	Land Sector Strategic Plan
MWLE	Ministry of Water, Lands, and Environment
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organization
NBI	Nile Basin Initiative
NEMA	National Environment Management Authority
NFA	National Forest Authority
NRA	National Resistance Army
NRM	National Resistance Movement
NTEs	Non-Traditional Exports
NWSC	National Water and Sewerage Corporation
OCHA	Office for the Coordination of Humanitarian Affairs

PAES	Partnership for African Environmental Sustainability
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernization of Agriculture
PEPAR	President's Emergency Plan for AIDS Relief
PPP	Purchasing Power Parity
SPLA	Sudan Peoples Liberation Army
TFP	Total Factor Productivity
TOE	Ton of Oil Equivalent
UBOS	Uganda Bureau of Statistics
UEDCL	Uganda Electricity Distribution Co. Ltd.
UEPB	Uganda Export Promotion Board
UK	United Kingdom
ULC	Uganda Land Commission
UNDP	United Nations Development Program
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNHS	Uganda National Household Survey
UNLA	Ugandan National Liberation Army
UPDF	Uganda People's Defence Force
UPE	Universal Primary Education
USAID	United States Agency for International Development
VSTM	Vulnerabilities, Stressors, Threats, and Mitigators
UWA	Uganda Wildlife Authority
WCS	Wildlife Conservation Society
WFP	World Food Program
WHO	World Health Organization
WRI	World Resources Institute
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

I. Background and Approach to Environmental Security

The Foundation for Environmental Security and Sustainability (FESS) is a public policy foundation established to advance knowledge and provide effective solutions for key environmental concerns that pose risks to national, regional, and global security. With Congressional support, and through a grant from the U.S. Agency for International Development (USAID), FESS has developed the Environmental Security Assessment Framework (ESAF), a research methodology that uses a consistent, formalized analysis to construct policy-relevant recommendations that address potentially destabilizing environmental conditions.

At USAID's request, FESS has undertaken a series of three country-level environmental security assessment pilot case studies. The first pilot study focused on Nepal and was completed in the spring of 2004. The second case study dealt with environmental security in the Dominican Republic and was completed in the spring of 2005. Undertaken in collaboration with the Partnership for African Environmental Sustainability (PAES), the findings of the third case study, on Uganda, are the subject of the present report. In each case, the environmental security assessment has proceeded on two levels: as a field test of the ESAF methodology and as a focused country study aimed at producing specific policy recommendations for decision-makers.

Study Methodology and Process
An environmental security assessment examines environmental and natural resource issues as central questions and core analytic variables. However, the conceptual touchstone and key dependent variable is *security*, whether that of the individual (human security), community, nation, or region.

The ESAF is a tool for informed policy decision-making that seeks: a) to identify risks that arise as a result of the confluence of environmental variables and political, economic, and societal factors; and b) to evaluate the implications of these risks. It facilitates the setting of clear priorities, promotes the development of effective and sustainable programs, and provides consistency for comparisons across countries and regions.

The field study for this report was preceded by the international workshop, "Assessing Environmental Security in Eastern Africa: Achieving Sustainable Development and Peace," which took place at the Nile International Conference Center, Kampala, Uganda, on October 14–15, 2004. Convened jointly by PAES and FESS, the workshop brought together 38 participants from diverse disciplines, countries, institutions of higher learning, and international development agencies.

The field research was conducted in Kampala, in the Gulu district of northern Uganda, and in the southwestern area of the country. Particular emphasis and focus was given to northern Uganda in light of the conflict in that region. In addition to interviews, data was collected through the assistance of numerous contacts, both in and out of government, who shared a variety of documents, reports, and studies that touched upon important aspects of the investigation.

II. Patterns of Change in Uganda

Changes in the Environmental Landscape
Despite its abundant endowment of natural resources, Uganda's environmental security has been eroded significantly during the past several decades. Uganda has experienced severe land degradation, massive deforestation, wetland loss, and population displacement. Soil nutrient depletion is among the highest in sub-Saharan Africa. The country's forest cover stands at only 24 percent, compared to 52 percent about a century ago (NEMA 2002). The estimated deforestation rate is 2.2 percent per year (Butler n.d.). In the last

decade (1990 to 2005), Uganda's forest cover decreased by 26 percent (Butler n.d.). Wetlands are also a vital resource, accounting for 10 percent of Uganda's total land surface area. Wetland losses have been significant; in Jinja district, for example, 80 percent of the wetlands have been converted to agricultural use (NEMA 2002).

As in many African countries, these changes in Uganda's environmental landscape are primarily due to anthropogenic factors involving population growth and the consequent expansion of agricultural land and urban settlements. Unsustainable agricultural and rangeland practices as well as policy and institutional weaknesses have compounded the problem. To the more than 80 percent of Ugandans who derive their livelihoods from land, land degradation means low and declining agricultural productivity, worsening poverty, and growing food insecurity.

Changes in the Socioeconomic Landscape

Uganda's GDP grew an average of 6.2 percent per year between 1987 and 2004 (IMF 2005a). However, when the country's high annual population growth rate of 3.3 percent is taken into account (Baguma 2005), the per capita growth rate has been relatively modest (2.9 percent) (IMF 2005a). The Ugandan economy continues to face a variety of constraints that may negatively affect the socioeconomic landscape in coming years. These include:

- *High debt.* Uganda is heavily dependent on donor assistance to finance government operations. In 2004, donor inflows net of debt-service payments reached about 12 percent of GDP, of which about half (6 percent of GDP) is provided as direct budget support (IMF 2005a).

- *Narrow production and export base.* Despite efforts at export diversification**,** coffee, tea, and tobacco still hold a central place in Uganda's economy (19 percent, 8 percent, and 8 percent, respectively, of total exports, according to 2003 figures). Non-traditional exports such as fish and fish products (17 percent), cut flowers (4 percent), maize (3 percent), and electricity (3 percent) have been gaining importance as foreign currency earners in recent years (UBOS 2004). Generally, however, Uganda's economy remains vulnerable to international commodity price fluctuations, trade barriers, drought, poor road system, and lack of direct access to the sea.

- *Pervasive poverty and income inequality.* Despite progress made in poverty reduction in the mid-1990s, many Ugandans find themselves in conditions of abject poverty. The proportion of people below the poverty line increased from 34 percent in 2000 to 38 percent in 2003 (IMF 2005b). The fall in agricultural prices (coffee and vanilla) and the protracted conflict in northern Uganda contributed to the reversal.

Uganda has made significant progress in education and health in recent years. Primary education enrollment increased by more than threefold during the period 1986–2003. Specifically, enrollment figures stood at 2.2 million in 1986 (Kirungi n.d.) and had increased to 7.6 million by 2003 (UBOS 2004). The introduction of universal primary education (UPE) spurred this rise in enrollment but also caused the pupil-to-teacher ratio to jump dramatically, from 38:1 to 60:1 (Kirungi n.d.). This evidently makes it more difficult for teachers to provide attention to individual students. Another problem is that the secondary education system consists of too few schools to serve the rapidly increasing number of primary school graduates. Moreover, the few secondary schools that exist are concentrated in the urban areas making them inaccessible to most rural students.

In public health, Uganda is renowned for its success in combating HIV/AIDS during the 1990s. In the early 1990s, Uganda suffered from alarmingly high rates of infection, reaching as high as 30 percent in some especially hard-hit areas (Uganda AIDS Commission 2001). Yet, according to estimates by the U.S. Census

Bureau/Joint United Nations Program on HIV/AIDS (UNAIDS), Uganda reduced the prevalence of HIV by two thirds in a decade, going from an overall peak prevalence rate of 15 percent in 1991 down to 5 percent in 2001 (USAID 2002).

Despite its acclaimed success in controlling HIV/AIDS, the HIV/AIDS rate in Uganda remains high by world standards, and there also is a high rate of tuberculosis infection. Much of the HIV/AIDS infection in Uganda is believed to occur in poor peri-urban areas with high population density, poor hygiene, inadequate sanitation, and overall poor housing and living conditions. Thus, a further reduction in the rate of HIV infection may require an improvement in overall living conditions.

Malaria, which has received less attention than HIV, is perhaps Uganda's greatest health care challenge, costing the country more than $347 million a year (Associated Press 2002), with up to 40 percent of its outpatient care going to the infected population (UMOH n.d.a). In 2004, 80,000 people died of malaria in Uganda, half of them children under the age of five (UMOH n.d.b).

Changes in the Political and Cultural Landscape

Questions about the stability and security of Uganda at the national level must be framed within the context of unresolved political and cultural tensions. Under the leadership of Yoweri Museveni and the National Resistance Movement (NRM), Uganda has made strides in moving toward democracy and development, including political stability, brisk economic growth, and a relatively free press and judiciary. Progress in governance has included the establishment of new policies and institutions and of effective working relationships with many international financial institutions and donors. Out of a turbulent past, the NRM has managed to maintain a relatively stable government that has held together for more than twice as long as any other government since independence from Britain in 1962.

Yet, the move toward a multiparty system of government is filled with uncertainties. As Uganda grapples with the contentious nature of the issues surrounding the role of political parties and President Museveni's re-election, pressure may build along existing ethnic and regional fault lines within the country. The persistence of political practices that have run through recent Ugandan history may also contribute to tensions or instability. Such longstanding patterns include the use of the military to advance political objectives, the politicization of ethnicity for mobilization on behalf of state activities, and the use of corruption to build and sustain political alliances.

One notable characteristic of government structures in Uganda is an inadequate capacity to implement policies and enforce legislation which, in combination with corruption, adds to the prevailing mistrust of government. Additionally, the 1995 Constitution and the 1998 Land Act have contributed to tensions between modern and traditional law, which may complicate the resettlement of displaced persons in the north when the conflict there comes to an end.

Growing environmental awareness and conditionalities imposed by development partners in dispensing aid have resulted in increased environmental legislation. However, this otherwise impressive array of laws has not been adequately matched by the institutional capacity to implement them. Some of the adverse consequences of the weak enforcement of laws on environmental management are becoming evident. The stiff resistance of the local population to eviction from wetlands is one example of the consequences of lax enforcement. The wetlands law had been on the books for a long time but was not enforced. As a result, people encroaching on wetlands came to expect that they had a right to be on the land. When the law was finally enforced, they resisted fiercely. This is an example of how weak implementation of the laws can have tangible repercussions on security and stability.

III. Findings

After exploring the linkages and interactions of a broad array of economic, social, political, and environmental trends, this study finds four principal areas of security concern—land, food, energy, and water. It should be noted that all of these issue-areas are interrelated in a variety of ways, and their separate treatment is for analytical purposes only.

Land Security: Seeds of Conflict
For Ugandans and a majority of Africans, land remains a fundamental resource and the primary source of livelihood and well-being. Indeed, land continues to occupy an important place in the social organization and economic development of Africans.

The 1995 Constitution and the 1998 Land Act of Uganda recognized four land tenure systems: customary tenure, freehold, leasehold, and *mailo*. Leasehold and freehold are the least common. Under customary land tenure, land belongs to the clans within a tribe, and the clan leaders are responsible for allocating it within individual families of the clan. Freehold tenure is a system whereby landowners hold registered land indefinitely, and the landowner enjoys full rights to use, sell, lease, transfer, subdivide, mortgage, or bequeath the land. The leasehold tenure is a system in which the owner grants the tenant exclusive possession of the land, usually for a specific period and, in return, the tenant pays rent or service. The *mailo* tenure system was established by the British colonial rulers in 1900, when they gave legal land titles to the royal family (*kabaka*). The tracts of land allocated were so large that they had to be measured in square miles (or *mailo*, hence the name of this tenure system) (Nkonya et al. 2004). The landlords in the *kabaka* then divided their land into smaller parcels (*kibanja*), which were rented out to tenants (*bakopi*).

The inclusion in the 1995 Constitution and the 1998 Land Act of four types of land ownership has meant at times an acknowledgment of overlapping rights to the same piece of land, and granting occupancy rights to land in perpetuity to both registered landowners and tenants. Today, there are a variety of environmental security concerns arising from land tenure, management, and policy:

- *Land titles.* Under the customary land tenure system, occupants do not have title deeds. Without documentary proof of ownership, customary land occupants are not secure from possible eviction, provided the evicting party tenders satisfactory proof that he or she is the rightful owner of the parcel of land. This entails involvement of local leaders (Local Council executives) alongside the clan elders in mediating the possession and exchange of customary land. The 1998 Land Act provides for the issuance of a certificate of occupancy "to the occupant on application of the registered owner...." (Tukahirwa 2002). With this certificate, the occupant is able to demonstrate legal habitation and becomes a "statutory tenant of the registered owner" (Tukahirwa 2002).

- *Conflict over the degazetting of government land*. The Government of Uganda has adopted a policy of converting gazetted (public) land to private use in order to encourage investment and economic growth. However, this process, known as degazetting, in some cases has become a source of conflict between the government and local communities. The attitudes of communities in relation to the policy vary widely. For example, while the Government degazetted the Namanve Forest Reserve in 1997 without strife, its decision to degazette the Butamira Forest Reserve in 2002 brought it into conflict with local communities. The case ended with the Government issuing a land use permit—over community objections—to Kakira Sugar Works Ltd. to turn the forest reserve into a sugarcane plantation (Tumushabe and Bainomugisha 2004).

  On the other hand, residents of Kasese district have been demanding degazetting of most of their land or compensation from government on grounds that half of their territory is gazetted as game

parks, forest reserves, prisons, or other government institutions. Similarly, the Karamojong have been angered by the gazetting of most of their fertile land, leaving unproductive land for human beings. This situation spurs them to go to neighboring areas, especially Teso and Lango, in search of pasture and water, setting the stage for conflict.

- *Tenure insecurity and unequal land distribution.* In Uganda, there is great inequality in access to and ownership of land among households and across districts (MWLE 2004). Tenure insecurity is widely felt, particularly among women landowners, tenant farmers, and households in densely settled areas. This tenure insecurity curtails land users from investing in land improvement, putting up permanent structures, and undertaking soil and water conservation programs.

- *Weakness in land governance.* This is a problem that the government's own Ministry of Water, Lands, and Environment (MWLE) has recognized. In a 2004 paper on national land policy, the MWLE recognizes that, until recently, land sector institutions were designed to serve the interests of a narrow minority of relatively wealthy registered landowners (MWLE 2004). The paper further states that decision-making processes have lacked transparency, and local institutions have not been empowered as foreseen in the decentralization policy. In urban areas, the existence of multiple large-scale landowners has made enforcement of regulations complex and difficult.

This study considered three regions in particular (northern Uganda, Karamoja, and the Albertine Rift area) where land tenure, use, and management may be a special source of security concerns.

- In northern Uganda, much of the land falls under the customary tenure system. Although the 1998 Land Act recognizes customary tenure and the fact that it is governed by traditional laws, the Act gave administrative power to modern institutions. This undermines traditional institutions and triggers land disputes. Further, the 1998 Land Act stipulates issuance of Certificates of Customary Ownership (CCOs) as proof of ownership, yet CCOs have not been issued, depriving landowners of a sense of security.

  Contradictions in environmental legislation, particularly land and water resource laws, have the potential to be (and in some cases have already been) root causes of environmental insecurity in Uganda. Of more concern, however, is that although these anomalies have been identified, no steps are being taken to rectify them. As the war in the north slowly winds down, the need to streamline land laws becomes more urgent lest land tenure issues end up ultimately undermining the hard-earned stability in the region.

  The 1998 Land Act stipulates that any tiller who has lived or used land for 12 years has a claim to it. Unfortunately, the Act does not make a distinction between landowners displaced by war and other absentee landowners. Because most Internally Displaced Persons (IDPs) have been away from their farms for more than 12 years, some fear that they might have lost the right to their land. This fear was compounded by widespread allegations that officers of the Uganda People's Defense Force (UPDF) have taken possession of privately owned land and used it for their personal benefit. In addition, there are reports of illegal logging by the military in areas where the local people were relocated in order to isolate the Lord's Resistance Army (LRA).

- Karamoja has been a scene of environmental scarcity, poverty, and protracted political instability. Data from the Uganda Bureau of Statistics show that the districts of Karamoja posted the highest Human Poverty Index (HPI) in the country. This, combined with environmental changes in Karamoja, has resulted in diminished crop cultivation and increased competition over shrinking pastoral resources. The outbreak of cattle diseases is common, and the Karamojong cope with these

changes through moving to places where pasture and water can be obtained and through cattle raids against agriculturalists to re-stock lost cattle. The conflict has been fueled by the proliferation of small arms and ammunition.

- Rich in biodiversity, the Albertine Rift also has a high population density, with up to 600 people to 700 people per square kilometer in some areas (Plumptre et al. 2004). People living in the region have among the lowest incomes in the country, with over 95 percent relying on subsistence farming. Traditions of dividing the land among all children have placed huge pressures on the land. Heavy farming has destroyed and fragmented many habitats of the region. Firewood collection is also a serious problem that at times contributes to conflict. Further, recent wars in Rwanda, Burundi, and the Democratic Republic of Congo, have spilled over into western Uganda with adverse consequences for both the population and the ecosystem.

Food Security: From Seeming Plenty to Apparent Scarcity?
Benefiting from fertile soil and adequate rainfall, Uganda has escaped famine and extreme food insecurity common to many other sub-Saharan nations. Agriculture is one of the most important elements of the country's economy and employs between 78 percent and 90 percent of the population (FAO 2005 and AFDB 2005).

Yet food insecurity is growing, and today one out of every four children in the country is underweight (WRI 2003). Reflecting the decline in food security, there is a general trend toward increasing cereal commercial imports and food aid shipments.

Nearly two-thirds of the 3.5 million rural households are mired in unproductive, low-input/low-output farming producing food largely for their own consumption (USAID n.d.). On average, 40 percent of the country's households are food insecure throughout the year (Bahiigwa 1999). Leading problems contributing to this growing trend include:

- *Declining per capita land availability*. According to the National Environment Management Authority (NEMA) projections, between 1991 and 2015 the per capita cultivated land in Uganda is expected to shrink from 1.1 hectares to 0.6 hectares. The projections further estimate that by 2032, nearly all of the available arable land will be under cultivation.

- *Massive nutrient mining and consequent decline of soil quality*. One of the key threats to the country's capacity to feed its population is land degradation, particularly nutrient mining, in which nutrients are leached out of the soil as a result of frequent cropping without organic or inorganic replenishment. High population growth rates, extensive agricultural practices, and low rates of technological adoption and inorganic fertilizer use (compared to other African countries) have wreaked havoc on Uganda's soils. Today, farmers can no longer afford to leave areas fallow. No natural nutrient recycling occurs, and almost all crops are showing a decrease in output. The areas most affected by soil degradation include the highly populated areas of southwest, northeast, and northwest regions of Uganda.

- *Declining crop yields.* The continuous cultivation and cropping system practiced by farmers contributes to lower yields with each harvest. Declines in soil fertility have resulted in reductions in yields of both cash and food crops across Uganda. Between 1970 and 1997, per capita food production dropped by 44 percent (Bahiigwa 1999). The growth rate of food production, estimated at 1.5 percent a year, is less than half of what is needed to keep up with a population growing at more than 3 percent per year (FAO 2005).

- *Prevalence of pests and diseases.* Because of overuse and degradation of the land, almost all crops are affected by pests and diseases. Banana (*matooke)* production, the most important domestic food crop,

already threatened by declining yields and by bacterial wilt existing in half of the districts in the country, is the biggest concern.

- *Lack of access to finance and extension*. Studies have found that "limited access to credit, agricultural extension and market information were associated with less use of fertilizer and, in the case of credit, lower productivity" (Nkonya et al. 2005). While increased access to finance and extension could help reverse problems of food insecurity, this would require significant resource allocations.

- *Deficient infrastructure*. Uganda's physical infrastructure is extremely inadequate and serves as a significant constraint to crop transportation. In the countryside, it is common to see bags of food sitting on the road waiting to be picked up and shipped to a larger community. Furthermore, an inadequate food distribution system prevents the balancing of surpluses and deficits across various areas of the country.

Energy Security: Approaching a Limit?
Uganda is endowed with significant energy resource potential. Hydropower is estimated at 2,000MW (NEMA 2002), the largest in the region (NEMA 1996). Hydrocarbon exploration has been undertaken in the Albertine Rift, and solar energy shows promise. Yet, 93 percent of the country's energy is derived from biomass, particularly wood and charcoal, and only 5 percent of the country is connected to the electrical grid. While the demand for energy is increasing yearly due to rapid population growth, only very limited progress has been made in developing hydro, solar, geothermal, and bioenergy resources.

Access to electricity exists primarily in the urban setting, yet urban dwellers face increasing prices and inconsistent supply. Urban residents and NGOs have voiced anger against the electricity provider. The lack of a comprehensive energy policy based on modern and sustainable energy is hampering the country's development.

Uganda's energy insecurity arises from a host of factors, including:

- *Heavy dependence on biomass*. Fuel wood accounts for nearly 83 percent of overall energy use. In urban households, biomass is used for 78 percent of energy needs, and the figure rises to a staggering 99 percent in rural homes (Pedersen et al. 2003). In rural areas, only about two percent of households have access to electrical power. Industrial use of wood and charcoal is also on the rise, with high rates of consumption in the brick and lime sectors as well as in the tea industry.

- *Limited access to electricity*. Per capita consumption of electricity is only 44 kwh/year (GOU 1999), one of the lowest rates in the world (NEMA 1996). The power sector suffers from regular supply deficits, frequent load shedding, illegal hook-ups, corruption, and challenges related to Uganda's topography. Twenty years of political turmoil, civil war, and economic instability incapacitated the energy sector by curtailing efficiency in energy consumption and production, reducing commercial energy supplies, and limiting energy options. Furthermore, where electricity does exist, most Ugandans cannot afford it.

- *Insufficient capacity and frequent power shortages.* This is one of the greatest threats to the sector's viability. Planned outages and system breakdowns are a daily occurrence and place significant strain on domestic consumers and businesses. The national grid loses as much as 28 percent of transmission due to theft (Luggya 2005). Collusion to avoid charges among personnel, paying customers, and non-paying customers is rampant.

- *The hydropower question*. Hydropower potential in Uganda is significant and is a viable renewable energy option. However, controversy and criticism over efforts to construct dam projects along the Nile have beset both large and small projects. President Museveni's recent pronouncements regarding a quick

completion of Bujagali and Karuma dams notwithstanding, financial and other difficulties make that unlikely. Therefore, hydropower does not offer a short-term panacea from electricity shortages.

- *The uncertainty of oil.* Renewed interest in the search for oil in the Albertine Graben area may help alleviate the high petroleum costs the country faces. Surveys from one site estimated the area may contain as much as 1.2 billion barrels of oil (U.S. Department of Energy 2004). However, the use and sale of oil will enhance energy security only if the country avoids pitfalls common to resource-rich countries.

Water Security: An Emerging Destabilizing Factor?

Historically, Uganda's water resources have been sufficient to sustain the population as a whole, but this situation may not hold in the longer term. Since the late 1990s, Uganda has transformed its water sector and increased availability of water sources around the country. Despite its short-term success, in the medium term Uganda faces a significant challenge in meeting the steadily increasing demand for accessible, adequate, and clean water resources. Water requirements are rising at an alarming rate as a result of recurrent droughts, high population growth, and increased per capita demand. If current trends continue, demand may outpace supply of accessible water by the year 2025 (NEMA 2002).

While generous in quantity, Uganda's water resources are unevenly distributed across the country. Many subregions, notably those in the northern half of the country, have only sparse resources, such as groundwater and springs, available to the rural population. This situation is exacerbated by sporadic, drought-induced water scarcities that give rise to conflicts within and between communities. At the same time, prolonged drought conditions have contributed to a ten-year low in the water levels of Lake Victoria and to lower groundwater and spring levels in other areas.

Water policies and regulations are in place in Uganda, and the government has been working closely with the donor community and private sector to develop the water sector. Nevertheless, the current situation is one of uneven development resulting from neglect of certain areas, weak management at the district and local levels, and low institutional capacity for regulation and enforcement. Rural areas, in particular, are disproportionately underserved for both water and sanitation. The disparity between rural and urban areas may become a trigger for conflict as increasing population densities put more stress on limited rural water supplies.

Prominently located in two major basins, Uganda shares Lake Victoria with the two other border states of Tanzania and Kenya, and it shares the Nile River waters with nine other riparian states. Because of this, the utilization and management of Uganda's water supply must be viewed in light of transboundary concerns. Expanding populations within the riparian states and increasing population densities around Lake Victoria will continue to stimulate competition for water and other natural resources associated with Lake Victoria and the Nile, potentially generating community and transboundary conflicts.

I. BACKGROUND AND APPROACH TO ENVIRONMENTAL SECURITY ASSESSMENT

The Foundation for Environmental Security and Sustainability (FESS) is a public policy foundation established to advance knowledge and provide practical solutions for key environmental concerns that pose risks to national, regional, and global security. With Congressional support, and through a grant from the U.S. Agency for International Development (USAID), FESS developed the Environmental Security Assessment Framework (ESAF), a research methodology that uses a consistent, formalized analysis to construct policy-relevant recommendations that address potentially destabilizing environmental conditions.

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In each of the three case studies, the purpose of the research project was twofold. The first objective was to conduct a field test of the Environmental Security Assessment Framework methodology. The second objective was to complete a comprehensive study of environmental security in a specific country of concern to policymakers in order to develop a set of strategic recommendations.

The concepts of "environmental security" and "environmental insecurity" are relatively new, and there are a number of competing definitions and varying interpretations of the terms. In its work, FESS employs the following working definitions of environmental security and environmental insecurity:

- *Environmental security* is a condition in which a nation or region, through sound governance, capable management, and sustainable utilization of its natural resources and environment, takes effective steps toward creating social, economic, and political stability and ensuring the welfare of its population.

- *Environmental insecurity* is a condition in which a nation or region fails to effectively govern, manage, and utilize its natural resources and environment, resulting in social, economic, or political instability that over time may lead to heightened tensions, social turmoil, or conflict.

An environmental security assessment incorporates environmental and natural resource factors as key independent or intervening variables and *security as the ultimate dependent variable in the analysis.* The concept of security encompasses the individual (human security), community, nation, and region. Thus, this report is not intended as a comprehensive study of one nation's environmental challenges but instead focuses mainly on the analysis of pathways by which *environmental problems and the use or abuse of natural resources may threaten Uganda's stability and security*. Insecurity and instability in Uganda has potential ramifications for U.S. interests and security in light of the country's strategic location and the strong bilateral relations between Uganda and the United States.

Links among development, the environment, and security are complex but explicitly acknowledged by U.S. and African policymakers. As former USAID Administrator Andrew Natsios has pointed out, the *National Security Strategy of the United States of America* placed development "on a par with defense and diplomacy" as a "central component of national security strategy" (USAID 2005b). Similarly, African governments have recognized the contribution of environmental factors to security and stability. In February 2004, the African Union's *Solemn Declaration on a Common African Defence and Security Policy* stated that the "newer, multi-dimensional notion of security embraces such issues as … protection against natural disasters as well as ecological and environmental degradation." Thus, better monitoring, analysis, and early warning of these emerging risks to security have become policy imperatives.

The linkages between environment and security are seldom linear or simple. Only in rare instances can environmental degradation be identified as the sole or principal cause of endemic insecurity and instability (Homer-Dixon 1999; Dabelko et al. 2000; Najam 2003). More frequently, environmental factors act upon—and are acted upon by—other variables related to security, such as governance, economic performance, and social relations. The interaction of such key environmental and non-environmental variables can have a powerful cumulative effect on security. Such reciprocal relationships are difficult to identify and measure and are thus frequently missed in multicausal analysis, especially since environmental security is a comparatively new paradigm.

An important asset of the environmental security paradigm is that it explicitly posits and analyzes such relationships. While purely environmental analyses often do not make linkages to livelihoods, social tensions, and insecurity, traditional security analyses can focus too exclusively on political and economic aspects of a conflict without exploring environmental factors that may contribute to instability or insecurity. By addressing the origins and implications of environmental stresses that place essential resources at risk—including deforestation, soil degradation, loss of wetlands, and climate variability—environmental security studies can provide policymakers with important insights into broader issues of stability and security.

In order to fulfill its promise, the field of environmental security, which to date has been marked by an abundance of conceptual discussions, must expand its empirical knowledge base through case studies in diverse locales. There is also a need for environmental security analysis to sharpen its ability to distinguish between those environmental issues that *do* reach the threshold of having the potential to impact environmental security and those that *do not* meet that threshold. Most importantly, insights from environmental security assessments need to be expressed in a form that policymakers can readily understand and take into account when making decisions.

This pilot study assessing environmental security in Uganda is intended as a contribution toward meeting the considerable challenge posed by the need to complement the theoretical foundations of environmental security with sound empirical data and clear policy relevance.

II. THE ESAF METHODOLOGY

The Environmental Security Assessment Framework (ESAF) is structured to identify risks to nations and regions that arise as a result of the confluence of environmental and political, economic, and societal factors, and to evaluate the implications of these risks.

The ESAF seeks to answer questions concerning the implications of environmental variables for development, stability and, ultimately, security. The ESAF is also intended to provide consistency for comparisons across countries and regions, while being sufficiently adaptive to account for the nuances of local economic, political, social, cultural, and environmental conditions. The goal of the ESAF is to inform policymakers, facilitate the establishment of clear priorities, and contribute to the development of effective and sustainable programs. (A detailed outline of the ESAF appears in Appendix III at the end of this report.)

The ESAF incorporates a diverse set of variables relevant to environmental security. These are examined in their interactions and analyzed in a series of successive phases leading to the formulation of scenarios and policy recommendations.

The ESAF makes use of various dimensions of stability and instability (e.g., social cohesion, livelihood security, political participation) as initial barometers of security conditions in a given country or region. Stability/instability is not conceived as a dichotomy but as a continuum, with instability becoming more acute and relevant to security as it moves through stages of heightened tensions, turmoil, and conflict. These

stages may be nonlinear, temporary, or reversible; the diverse variables generated by the ESAF help to provide the context necessary to make such judgments. In certain situations (e.g., countries marked by authoritarian rule and poor environmental governance), *stability* itself might be associated with environmental security problems. The ESAF thus provides a thick description of the status and trends of environmental security through the use of layers of interrelated information to refine and contextualize understandings and distill hypotheses that lead to credible scenarios and actionable recommendations.

The ESAF proceeds in seven phases. *Phase I* of the ESAF sets out the initial profile of the country or region under study. The country profile includes baseline information about the politics, economics, social structure, history, and foreign relations of the country. The country profile is also the first stage in determining fault lines or cleavages that may be relevant to stability and security in a given nation or region. Specifically, the political analysis examines power distribution and key points of contention, the economic analysis looks into patterns of employment and the distribution of benefits from the current structure of production, and the social analysis looks at tensions associated with class, ethnicity, race, and religion.

Phase I also identifies U.S. interests in the country or region, including strategic, political, commercial, and cultural. Also in this first phase, complete data on U.S. and international aid by organization and agency are collected. These data are essential in the final stages of the ESAF, when recommendations regarding assistance are considered in light of efforts already undertaken by the relevant governments and organizations.

Phases II and *III* situate environmental security within the context of natural resource-based economic activities, social conditions, and the physical environment. The two phases examine economic and social data linked to the environment in order to identify issues, sectors, and resources important to stability. *Critical Country Concerns* (CCCs) is the term used to refer to the sum total of those factors identified as relevant to security.

Phase II proceeds from the premise that environmental security is grounded in tangible linkages between social and economic conditions and the environment. This phase, therefore: a) examines a country's critical natural resources using two select sets of economic and social data linked to the environment; and b) utilizes a third set of indicators to frame the foregoing analysis within the overall concept of environmental sustainability.

The information collected on environmental sustainability provides a profile of the natural setting and environmental trends within which socioeconomic activities take place. It includes measures of land under cultivation, rates of deforestation, and available water resources. Phase II's econo-environmental analysis determines significant sectoral contributors (e.g., agriculture, timber, mining) to GDP, the relationship between employment and the environment, and the structure of trade derived from environmentally based goods. The socio-environmental analysis centers on livelihoods, food security, and health, bringing into focus such relationships as those between population density and migration, staple crops and nutrition, and sanitation and disease.

Through these analyses, a clearer view emerges of key socioeconomic sectors (i.e., those important for stability) and their linkages to the environment in the form of underlying Critical Country Concerns. CCCs are defined as underlying issues, sectors, or resources that are directly or indirectly related to stability as a result of their importance for economic, political, and social well-being.

Phase III begins by identifying these CCCs from the previous analysis and explaining their links to the environment. Through further analysis, the relative condition and vulnerability of each CCC is investigated, thereby identifying a set of key environmental problems for the specific country or region under study. To understand the scope and underlying factors associated with these key problems, each is then disaggregated

and studied more closely by examining the impact of *environmental governance* on the CCCs. *Environmental governance* is defined as the traditions and institutions by which power, responsibility, and authority are exercised over a nation's natural resources.

The environmental governance analysis considers how relevant populations and communities behave in response to traditions and institutions of power. Here are considered questions about the structure and adequacy of legal and regulatory frameworks and the political will and capacity to enforce them. This phase also recognizes the increasing significance of civil society participation within a democratic context, and therefore questions are asked about citizen access to public institutions where they can air grievances about the responsiveness and integrity of the institutions and officials responsible for environmental governance, including mitigation/response to natural hazards.

Phase IV takes as its point of departure the preceding assessment of the relative condition and vulnerability of the CCCs and goes on to develop a more finely tuned basis for assessing their implications and for distinguishing between environmental problems and problems of environmental security (as not all environmental problems are problems of environmental security). At this point, a preliminary judgment is rendered about which problems are to be identified as *Environmental Security Factors* (ESF).

ESFs are defined as those problems that have significant implications for political, economic, and social stability and welfare *and* may pose a security concern. This judgment is based upon the various sources and layers of information and analysis collected to this point in the ESAF, and the results are presented schematically in the ESF Profile, which makes this judgment apparent by laying out the entire list of key environmental problems under consideration. At this point, after first expanding the scope and complexity of the analysis in order to encompass all potential issues and then distilling the results through a process of differentiation that identifies those factors that are in fact relevant to security (the ESFs), the ESAF has significantly sharpened the power and focus of the overall environmental security analysis. Based on these steps, the understanding of the relative significance of the ESFs is further refined.

Phase V is the stage at which the ESAF is ready to generate and field test preliminary hypotheses. At this point, through both the collected data and the multifaceted contexts and assessments generated by the prior phases, three types of potential crisis scenarios are developed in relation to the ESFs. One scenario projects likely outcomes if current trends continue in a linear fashion; the second posits shocks to the system and projects likely outcomes given the present capacity to respond; the third describes potential outcomes if the country were to take most of the steps necessary to address identified environmental security threats. Each scenario is evaluated in terms of its probability and potential impact.

Phase VI sets out the relevance of specific ESAF findings to U.S. interests and the implications for assistance activities in the country or region examined. During this phase, field interviews with U.S. government officials are carried out to supplement baseline data collected in Phase I as well as other information gathered in the previous stages of the research. The results are then compared and contrasted to the potential scenarios generated by the ESAF to identify gaps and target areas for improved U.S. coordination and assistance. This phase concludes with a set of preliminary recommendations.

Phase VII is the culmination of the ESAF bringing together all of the previous findings and providing a comprehensive assessment of the principal environmental security threats and possible remedial actions. The ultimate product is a comprehensive final report detailing the findings and recommendations of the study. The recommendations put forth in the final report are comprehensive insofar as they address a wide range of possible actions available not only to U.S. and foreign policymakers but also to stakeholders in civil society and the private sector.

In sum, the ESAF is an analytic tool to advance environmental security studies along several different fronts. First, it moves the environmental security field beyond largely deductive assessments of the relationship between the environment and security. Second, it provides a common analytic vocabulary usable by practitioners in both the development and security communities. Most importantly, it generates practical policy recommendations for the use of government officials and other stakeholders, with a view toward promoting economic well-being, social peace, political stability, and environmental sustainability in the countries and regions it examines.

Advanced Preparations for the Uganda Field Study

The field study for this report was preceded, five months earlier, by the international workshop, "Assessing Environmental Security in Eastern Africa: Achieving Sustainable Development and Peace," which took place at the Nile International Conference Center, Kampala, Uganda, October 14–15, 2004. Convened jointly by the Partnership for African Environmental Sustainability (PAES) and the Foundation for Environmental Security and Sustainability (FESS), the workshop brought together 38 participants from diverse countries, disciplines, institutions of higher learning, and international development agencies.

The immediate objectives of the workshop were to:

- Raise awareness of the role environmental security plays in local, national, and regional stability.
- Identify environmental risks to security and stability in eastern Africa.
- Review the Environmental Security Assessment Framework (ESAF) developed by FESS.
- Discuss practical policy options to mitigate potentially destabilizing environmental conditions before they reach a stage of crisis.

Organized in plenary and working group sessions, the workshop first discussed the concept and evolution of environmental security. Ugandan scholars and practitioners presented papers reviewing the status of environmental security in the country, with a focus on governance, economic and social development, sustainable energy and climate change, poverty, and conflict. Environmental security issues related to the Nile and Lake Victoria basins, Africa's largest fresh water resources, were also analyzed. The workshop came to a close with a set of preliminary conclusions and recommendations.

The workshop was followed by the initial phases of the ESAF, which consist of extensive data collection and a detailed literature review. After a preliminary list of CCCs was developed, planning began for the field study phase. For the Uganda pilot case study, a team of seven researchers from FESS, PAES, and Tulane University conducted a field study in March 2005, with stays varying in length from two to four weeks. Over the course of the field study, more than 60 interviews were conducted with high-ranking government officials, elected representatives, civil servants, military personnel, policy experts, academics, civil society professionals, and private sector representatives. A list of persons interviewed appears in Appendix II.

The field research was conducted mainly in three areas: Kampala, the Gulu district in northern Uganda, and the southwestern region of the country. This was supplemented by visits to government offices in Entebbe to interview government officials and gather information from institutions located in that city. Particular attention was given to Northern Uganda in light of the conflict in that region. Interviews were semi-structured. While an interview schedule was developed using the ESAF methodology, the questions asked in the course of the interviews also covered other issues that arose during the field work or in the course of the interviews themselves.

The FESS-PAES-Tulane research team made daily assessments of interview results, and preliminary write-ups of key issues were prepared during breaks in the schedule. In addition to interviews, many contacts, both in and out of government, provided the team a wealth of documents, reports, and studies touching upon

important aspects of the study. With only a few exceptions, FESS-PAES-Tulane team members made all of the contacts with persons and organizations and arranged the interviews, while the USAID mission in Kampala provided valuable suggestions and contact information that facilitated the work. For this assistance, we are extremely grateful.

III. U.S. FOREIGN POLICY AND SECURITY INTERESTS IN RELATION TO UGANDA

Uganda is viewed by the United States as a generally reliable and relatively stable ally in a region marked by considerable instability. While neighbors Kenya and Tanzania are considered peaceful, Uganda borders on such troubled states as Sudan, the Democratic Republic of the Congo (DRC), and Rwanda. President Museveni has generally supported the United States in its actions in Afghanistan and Iraq, making him a strong ally of the United States and supporter of its foreign policy.

The main U.S. security interest in Uganda is its strategic position in relation to the war on terrorism and the potential spread of Islamic fundamentalism. This interest not only pre-dates the attacks of 9/11 but even the 1998 bombing of the U.S. embassies in neighboring Kenya and Tanzania. Ugandan officials claimed at the time that plans had been under way to bomb the U.S. embassy in Kampala at the same time as the attack in the other two countries. As a reflection of the importance of the region to counterterrorism, a major conference for the East Africa Counterterrorism Initiative (EACTI) was held in Kampala in April 2004.

The actions the United States and its allies have taken against Al-Qaeda and other extreme Islamic groups in the Near East and Southwest Asia have created pressures that may send violent extremists in search of safe havens elsewhere, including East Africa. While Uganda is not prominently mentioned among possible terrorist sites and Ugandan authorities have put in place a variety of anti-terror measures, the limited capacity of Ugandan security forces, customs, and immigration—plus their susceptibility to corruption—make the country potentially permeable to infiltration by radical groups.

In recent years, the U.S. Department of State (DOS), in its annual Country Reports on Terrorism, included two insurgent groups operating in the country on their list of Foreign Terrorist Organizations. The Allied Democratic Forces (ADF), an insurgent group most active in the late 1990s and since largely defeated, was last placed on DOS's list of "other terrorist groups" in 2002. The Lord's Resistance Army (LRA), an insurgency movement active in the north for the past 19 years, still remains on the list of "other terrorists groups" as of the 2005 report.

Uganda is also of value to U.S. security interests in relation to other issues. The country is designated as the African Fuels Initiative hub; Entebbe is a major depot for UN transport and supplies headed for the DRC; and the United States European Command (EUCOM) has used Uganda as a staging ground for operations in Rwanda.

Over the past decade, Uganda has served as a possible model for the gradual transition from authoritarianism to democracy in Africa. Observers have seen the enactment of a new constitution, relatively free presidential elections, and a degree of tolerance for dissenting points of view as evidence of political progress. Liberal economic reforms have received a favorable reception as well, although economic growth, which took place at a brisk pace in the 1990s, has slowed over the past few years. Most notably, the international community has held up the Ugandan government's open and vigorous battle against HIV/AIDS as an example worthy of emulation by other African countries.

The donor community has been generous in its aid to and praise of Uganda in reaction to the country's economic recovery and political stability. Massive development assistance and budgetary support from donors have helped keep Uganda's economy growing. However, the tense presidential contest of 2005–2006

gave indication that Uganda's political transition may be faltering, calling into question its credibility as an example of the success of liberalized politics and economics. International supporters are beginning to voice misgivings. Since November 2005, several donors, including the World Bank and the governments of the Netherlands and the United Kingdom (UK), have reduced budgetary support to the country because of concerns over financial indiscipline, the lifting of the constitutional term limit, and alleged political intimidation of rivals. According to UK Secretary of State for International Development Hilary Benn, Museveni's "efforts to change the constitution so that he can remain in power are steadily eroding his legitimacy and that of his government" (Benn 2006).

Despite claims of victory over rebels in the north, the war continues to slow the country's progress and to produce major casualties as well as the displacement of 1.4 million citizens. Although LRA strength is thought by knowledgeable observers to have diminished considerably, and the peace agreement in southern Sudan reduces the likelihood of outside assistance for the LRA, several times in the last year a real end to the conflict has eluded the warring parties. Compounding the seemingly endless struggle, tensions from the historical north-south political divide in Uganda are sufficient to raise the possibility of some form of post-LRA conflict emerging anew in that part of the country. Whatever their basis in fact, rumors concerning GOU/Ugandan military schemes to seize land from the Acholi in the transition from war to peace (in Gulu and elsewhere in the north) are contributing to the already insecure situation.

Over the medium to long term, security analysts have an eye on Uganda's emerging and growing water needs from the Nile basin, which Uganda's State Minister for Water has declared a matter of national security. In Kampala, Egyptian officials also appear wary of Ugandan intentions. Multinational institutions established to use Nile River resources equitably and sustainably are still nascent and will require support and the active participation of member countries before enduring regional security can be achieved.

The United States is also concerned about the sporadic involvement of the Ugandan military in the DRC and Rwanda, fearing that such actions could reignite or further spread violence in the region. In an Amnesty International (AI) study on the flow of weapons and ammunition from Eastern Europe to the Democratic Republic of Congo, Uganda was implicated in funneling materials and support to rebel groups, particularly those controlling gold mining areas (Amnesty International 2005). Prior to the AI report, the Ugandan military conducted its own investigation into such abuses as the trafficking of arms and contraband. This report, mentioned by several interviewees, remains confidential. Some of these problems seem less a result of official military (or national) policy than of corruption among individuals in the Ugandan military.

A June 2005 Human Rights Watch (HRW) report also charged the Ugandan military with plundering DRC gold mines and blamed it for contributing to the intensity of the conflict in the neighboring country (2005b). While Ugandan soldiers left the DRC in 2003, some in Uganda are still profiting from an illegal trade in a conflict zone where human rights are regularly abused. Between 1998 and 2002, when the Ugandan military occupied areas rich in gold, an estimated one ton of gold was extracted worth $9 million (HRW 2005a). Today, the value of the trade is estimated at $1 million to $2 million per month (HRW 2005a). This trade, however, does not appear to be properly documented. Government statistics do not record the entry of most of the gold eventually exported (Uganda does little gold mining internally), so HRW concludes that the trade must be illegal. In 2004, the discrepancy between gold produced in the country and what Uganda exported was just over $45 million per year (HRW 2005a).

On the domestic front, Ugandan security organizations face additional criticisms. According to Human Rights Watch, Ugandan military, security, and intelligence agencies routinely practice torture: "Members of the opposition Forum for Democratic Change (FDC) and civilians in northern Uganda in particular are victims of torture and ill-treatment" (HRW 2005b).

Still looming as a threat to security is the specter of past transfers of power that have entailed violence by the military and corruption of the electoral process. Despite recent progress toward multiparty democracy, Uganda remains politically divided and democracy is still fragile. President Museveni's successful effort to change the constitution to allow a third term of presidential office has heightened political tensions that are rooted in the nation's colonial legacy and successive cycles of post-colonial conflict.

Political and social fragmentation constitute a serious threat to security during this time of transition, as cleavages across geographical, ethnic, political, and sociocultural lines reinforce unequal power relations of longstanding. Pressure increased along these existing fault lines as Uganda grappled with the contentious nature of issues surrounding the role of political parties and presidential term limits. The goal of increased political participation and the inclusion of citizens from all areas of the country in the political process, particularly those marginalized by conflict in the north, will be tested in the aftermath of the Museveni election victory. The future stability of the country will depend to a significant degree on the extent to which President Museveni finds effective means for ending the conflict in the north and restores public trust in government. Addressing the environmental security challenges discussed in this report is a potentially powerful contribution toward achieving that desired stability.

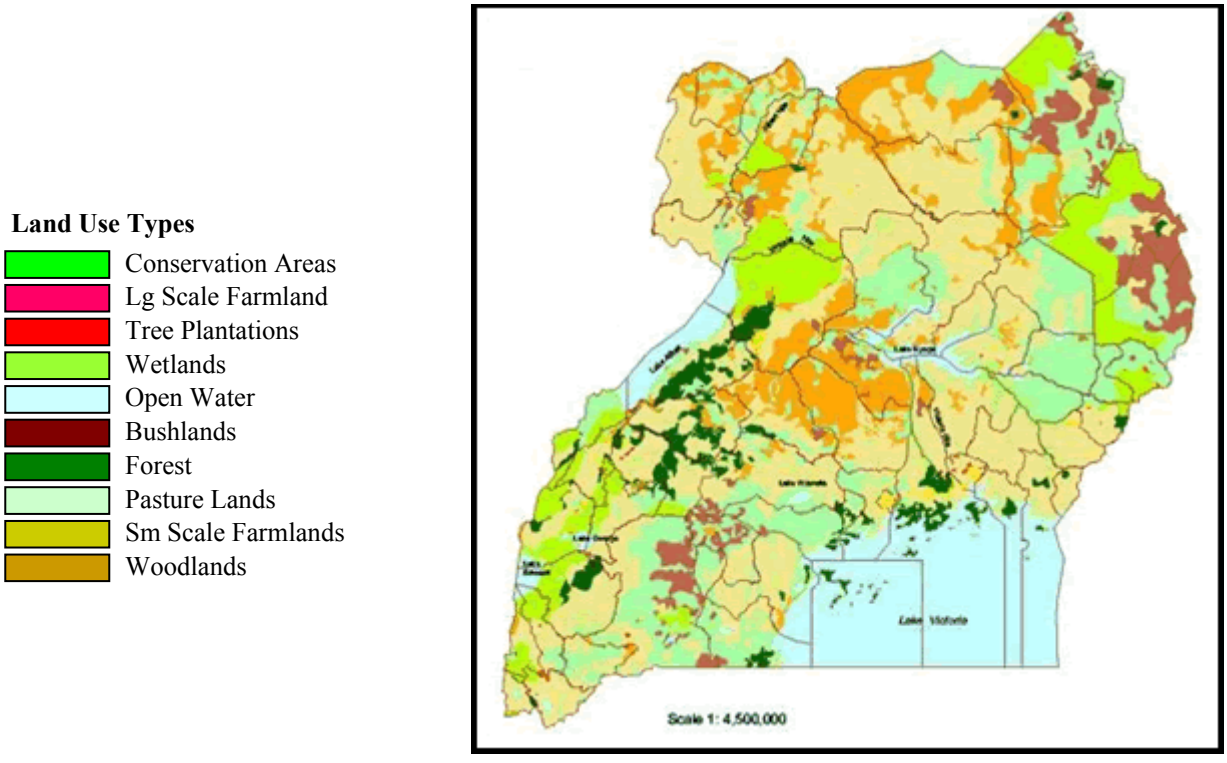
IV. PATTERNS OF CHANGE IN UGANDA

Changes in the Environmental Landscape

Land Cover and Use

Uganda has experienced major changes in its environmental landscape over the past 100 years, most notably during the post-colonial period. Land cover loss and land use change have been significant. Severe land degradation, massive deforestation, wetland loss, and heavy internal migration characterize these changes.

Figure 1: Land Use



Source: Uganda Land and Survey Department.

As in many other countries in Africa, these changes are primarily due to anthropogenic factors involving population growth and the consequent expansion of agricultural land and urban settlements. Unsustainable agricultural and rangeland practices and policy and institutional failures have compounded the problem.

The loss of vegetation cover adversely affects both ecological and economic functions. The ecological functions include maintenance of water balance, catchments, and filtration. Without these natural processes, the formation of ground and surface water is obstructed. Since a large segment of the Ugandan population lives in areas where water sources are already lacking, human settlement patterns contribute further to water depletion. The economic functions of vegetation cover include its use as a source of fuel wood, medicinal plants, and timber. It also provides habitats for a variety of small and big game that provide meat products for domestic consumption or sale. Uganda has experienced significant disruptions of these two functions, which have become a source of serious concern. Subsequent sections discuss first the defining features of the changing environmental landscape, followed by analysis of the drivers of these changes.

Land Degradation[1]

Land degradation in Uganda is characterized by escalating soil erosion, soil nutrient mining, declining soil fertility, agrochemical pollution and an increasing tendency towards desertification (NEMA 2002). Soil erosion is responsible "for over 80 percent of the annual cost of environmental degradation in Uganda" (NEMA 2002). Uganda's topography (mountains and hills) combined with the high temperatures and rainstorms are believed to have made soils susceptible to erosion.

Uganda's soils suffered nutrient depletion at an annual rate of 70 kilograms of nitrogen (N), phosphorus (P), potassium (K), per hectare in the 1980s (Stoorvogel and Smaling 1990). This high rate of soil nutrient depletion is attributed to the low use of inorganic and organic soil nutrients and poor soil fertility management practices (Nkonya et al. 2004). For example, fewer than 10 percent of smallholder farmers in Uganda use inorganic fertilizer (Pender et al. 2001) with an application level of 1 kilogram of soil nutrient per hectare (NARO and FAO 1999)—the lowest fertilizer application rate in Sub Saharan Africa (Nkonya et al. 2004). Crop yields are typically less than one-third of potential yields found on research stations, and yields of most major crops have been stagnant or declining since the early 1990s (Sserunkuuma et al. 2001). To the more than 80 percent of Ugandans who derive their livelihoods from land, land degradation means low and declining agricultural productivity, worsening poverty, and growing food insecurity.

Deforestation

About a century ago, 52 percent (10.8 million hectares) of Uganda's land area was covered by forest. In 2000, the forest and woodland cover was estimated at only 24 percent (NEMA 2002). Forests and trees hold special significance in the economic, social, ecological, cultural, and spiritual life of many Ugandans. For lower income groups in particular, forests and trees are a source of livelihood (e.g., energy, food, income, and employment). Forest coverage also helps protect watershed and soil quality, and contributes to local climate stability. "With increasing deforestation, these benefits are rapidly being lost, which is sustaining poverty" (MWLE 2002).

Of the total forest and woodland cover, 30 percent is under government ownership (15 percent under Central Forest Reserves managed by the National Forest Authority (NFA) and another 15 percent is encompassed by national parks and wildlife reserves managed by the Uganda Wildlife Authority), while the remaining 70 percent of the forest is on private land (see table 1 below).

Table 1: Forest Cover
(in hectares)

Forest Type	Government Lands		Private Land	Total*(ha)
	Central and Local Forest Reserves	**National Parks and Wildlife Reserves**	**Private and Customary Land**	
Tropical high forest	320,354	267,000	351,000	924,000
Woodlands	411,578	462,000	3,102,000	3,975,000
Plantations	20,041	2,000	11,000	33,000
Total forest	**737,000**	**731,000**	**3,484,000**	**4,932,000**
Percent of land area	**15**	**15**	**70**	**100**
Other cover	414,000	1,167,000	13,901,000	15,482,000
Total land covered	1,151,000	1,898,000	17,385,000	20,414,000

*Total land area excludes areas covered by water, thus it totals less than the sum of government and private lands.
Source: NEMA 2002.

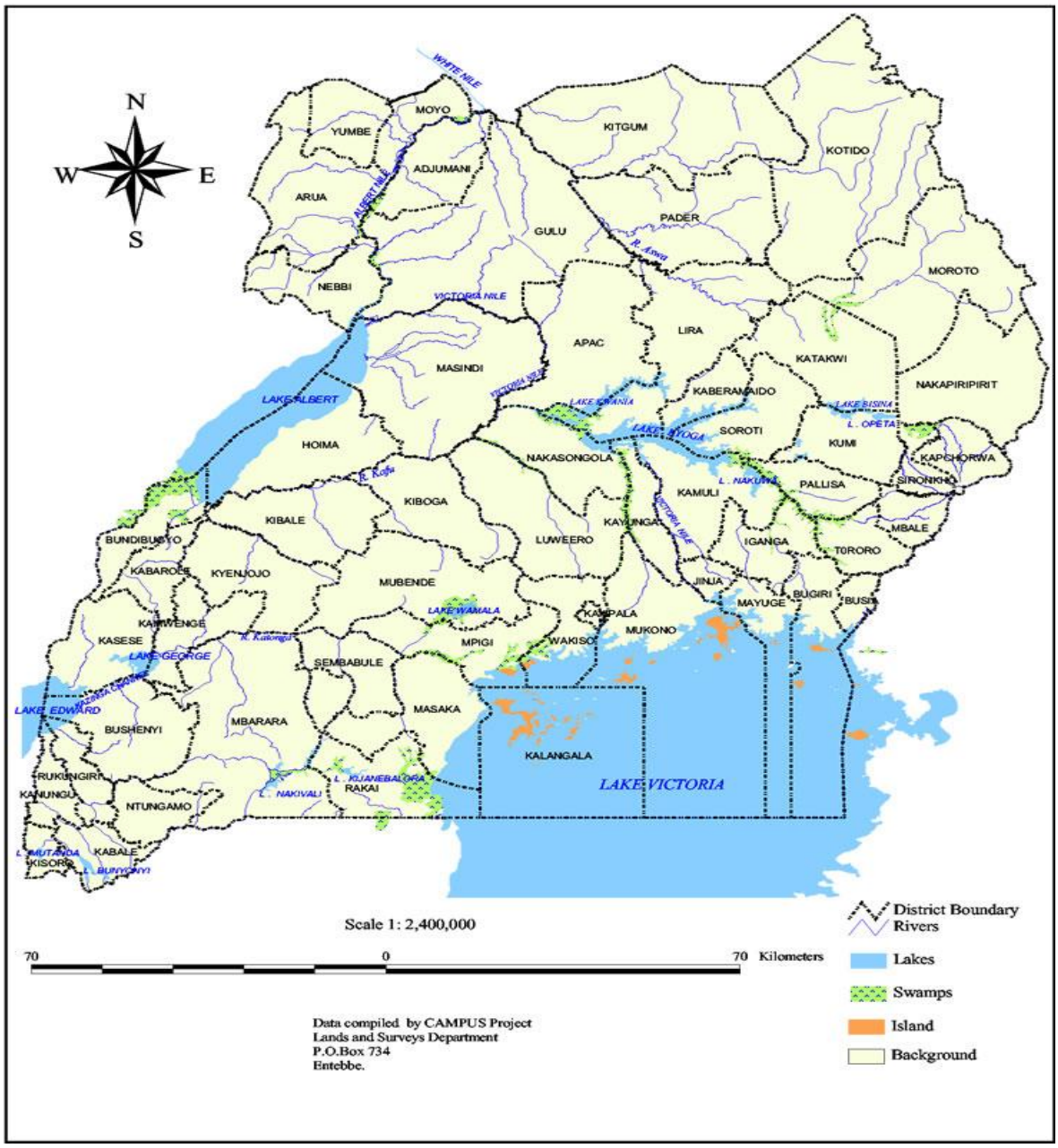
The estimated contribution of the forest sector to the economy varies widely, probably reflecting both data deficiencies and methodological differences in valuation. The Uganda Bureau of Statistics (UBOS) puts the contribution of the forest sector at 2 percent of GDP, while FAO estimates are much higher. The annual rate of deforestation[2] is estimated between 2 and 3 percent (NEMA 2002), while the annual biomass loss is estimated at 14 million tons, equivalent to 200,000 hectares (Uganda Forest Department 2003). Uganda's Biomass Study mentions the Mount Elgon area as experiencing the highest rate of deforestation, which is attributed to the degazetting of 7,200 hectares of the original Mount Elgon Forest Reserve (Uganda Forest Department 2003). Most of the country's deforestation occurs outside gazetted areas due to encroachment, land conversion to agriculture, unsustainable harvesting, urbanization, industrialization, and institutional failures (NEMA 2002).

With a view to halting deforestation and promoting sustainable forest management, the Government of Uganda (GOU), in 2001, issued the Uganda Forestry Policy, which offered guidance on three critical issues: conservation and sustainable development, livelihood enhancement, and institutional reform. A year later, the National Forest Plan was issued. The Plan covers a ten-year period (2002-2012). It aims to raise incomes and quality of life of poor people through forest development and targeted sustainable livelihoods, increased economic productivity and employment in forest industries, and the achievement of sustainable forest management. While the Forest Policy and the National Forest Plan are laudable initiatives, both lack guidelines for rehabilitating and recovering deforested land. The National Forest Plan, in particular, lacks an implementation strategy that carries the political and resource commitment needed to reverse alarming deforestation trends.

Wetland Depletion

Wetlands are among the vital resources of Uganda, and account for about 10 percent of total land surface area. They serve a wide variety of socioeconomic and biophysical functions by providing water table maintenance, erosion prevention, sediment traps, wildlife habitats, fishing, cattle grazing, and income. Wetlands also help filter out pollutants, silt, and sediments that could otherwise flow into rivers and waterways and choke aquatic life (EPA n.d.).

Figure 2: Wetlands, Lakes, and Rivers



Source: Uganda Land and Survey Department 2005.

In 1995, the Government of Uganda issued the National Policy for the Conservation and Management of Wetland Resources. The policy aims to:

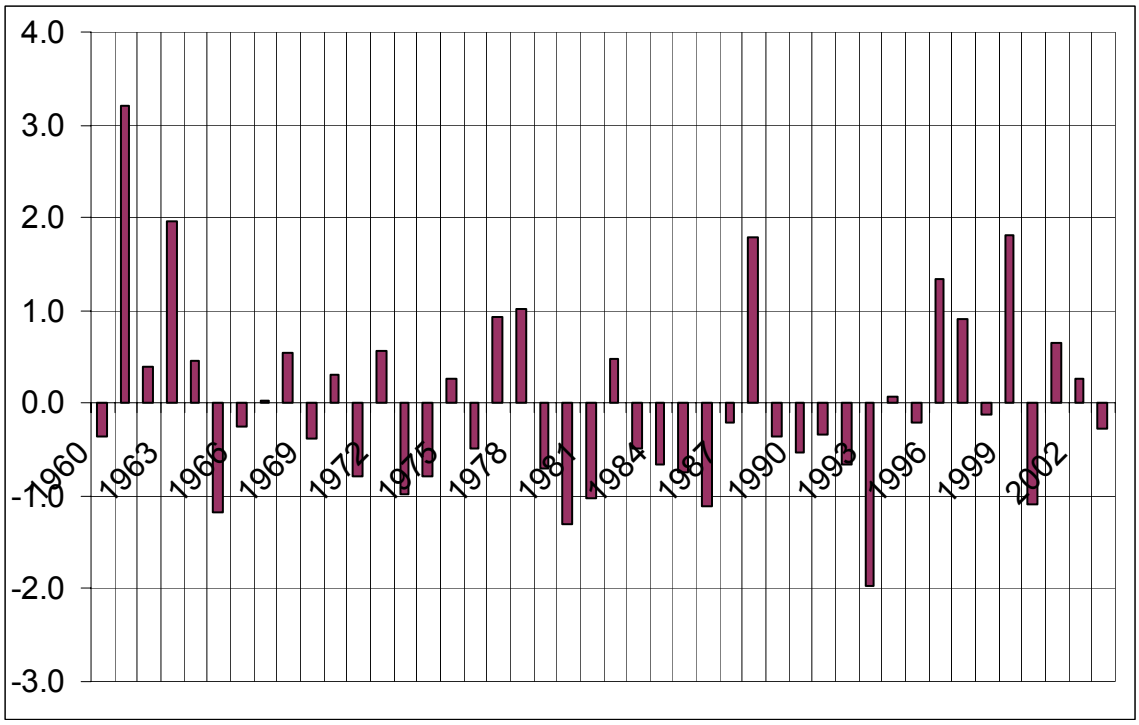
- Ensure that no drainage occurs unless it serves critical environmental management objectives;
- Ensure that activities carried out in and around wetlands are not destructive of the wetland environment;
- Ensure that development in wetlands is subject to environmental impact assessments and audits; and
- Maintain an optimum diversity of uses and users and ensure that users consider the implications of their activities for other stakeholders.

According to the Assistant Commissioner for Wetlands, Uganda has an adequate legal framework to conserve and sustainably manage wetlands (Mafabi 2005). In addition, the wetlands commission is working on comprehensive legislation to address weaknesses in the National Wetlands Policy, and it has attained remarkable successes in awareness-raising initiatives, and legislative and institutional development. Nevertheless, evidence from the past decade suggests that policy implementation and enforcement are lax and require further attention.

Drought: Rainfall and Climatic Variability

Uganda is increasingly facing drought and climatic variability. The graph below shows an annual time series of normalized rainfall deviations from the mean. The larger the deviation from the mean, the larger is the impact of floods or droughts—"0" depicts the mean rainfall value. According to the Meteorology Commission a drought year is when the value of the normalized deviation is -0.75 or more. From the graph, it can be seen that there were seven droughts between 1970 and 2000, i.e. in 1972, 1974, 1975, 1982, 1983, 1988, and 1994. According to the Meteorology Commissioner, over the 50 year period between 1920 and 1970, Uganda experienced three droughts. It experienced double that number just over the 30 year period between 1970 and 2000. This is one of several indicators suggesting that both the frequency and severity of droughts in Uganda are increasing.

Table 2: Rainfall Averaged Per Year in Uganda



Source: Uganda Meteorology Commission 2005.

Drivers of the Changing Environmental Landscape

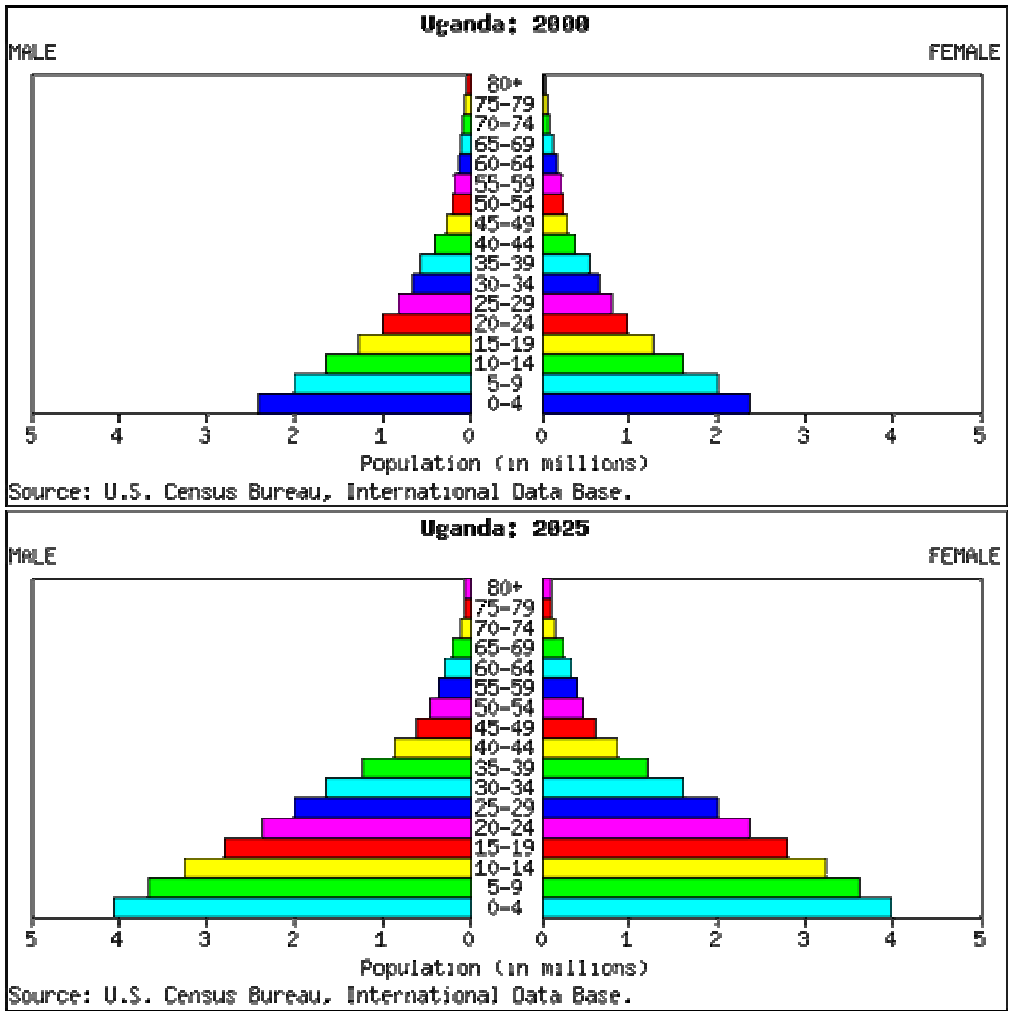
Changes in the environmental landscape are attributable largely to: 1) high population growth rates and changes in human settlement; 2) unsustainable agricultural practices, and 3) policy and institutional weaknesses and failures.

Population Growth and Changes in Human Settlements

Uganda's population is estimated to have reached 26.3 million in June 2004, an increase of about 2 million from the 2002 Population and Housing Census results of 24.4 million (UBOS 2004). With an average annual rate of growth estimated at 3.3 percent, the population is expected to double in slightly over two decades. In the eleven year period between 1991 and 2002, UBOS reports that Uganda added 8.2 million people to its population. As a result, the population density rose to 126 persons per square kilometer in 2002. Uganda's population density is much higher than that of its neighbors Tanzania (39), Kenya (54), and Sudan (66), although it is considerably lower than that of Rwanda (281) and Burundi (243).

As Figure 3 (below) indicates, the population composition of the country is changing. By 2025 the Ugandan population will be much younger that what it is now. The majority of the population will be below 30 years of age, which will put a heavy strain on educational and social services. Furthermore, the population between the ages of 30 to 60, from which much of the labor force for industry and agriculture is drawn, will be disproportionately small, impairing the capacity of the production sector to support the services sector.

Figure 3: Age Pyramid, 2000 and 2025



Note: Data updated 4-30-2004.

A rapid rise in population increases the demand for food, thus, placing pressure on farmers to produce more with existing technology. This could mean shorter fallow periods in favor of continuous cultivation of the

land, leading to greater soil nutrient depletion and an acceleration of land degradation. A high rate of rural population growth, in addition, means less and less land for each farmer to cultivate. Land fragmentation and smaller farm plots combined with high population pressure could accentuate the unequal resource distribution as some groups try to get disproportionately larger slices at the expense of the majority (Ohlsson 1999). Large families encourage land fragmentation by increasing demand for land, often resulting in family conflicts. As in many other developing countries, the Ugandan experience suggests that population growth, together with unequal access to land, contributes significantly to resource competition, scarcity, and soil fertility depletion.

The distribution of the population among the various regions shows that, in 2004, the central region had a population of 7.1 million, followed by the western and eastern regions with 6.8 million each and the northern region with 6.1 million (UBOS 2004). Compared to 1991, the latest figures show that the share of eastern and northern regions has increased, while that of the central and western regions has declined. The eastern region had the highest population density with 226 persons per square kilometer, while the northern region had the lowest population density at 65 persons per square kilometer. The population densities for the central and western regions were 176 persons and 126 persons per square kilometer respectively. Regions that have high population densities generally experience an overuse of land and the cultivation of marginal areas. High population density might in some cases encourage the development of innovative farming practices as the experience of other developing countries, in particular India, shows. In Uganda, however, Nkonya et al. report that there is no evidence to suggest that an increase in population density has promoted the adoption of improved land management practices that could offset worsening erosion and nutrient depletion (2004).

Uganda has one of the lowest urbanization rates in Africa. Kampala remained the prime urban center throughout the period 1969-2002, although the proportion of the population of Kampala to the total urban population declined from 54 percent in 1969 to 40 percent in 2002. This is because of the fixed geographical boundaries of Kampala as well as the growth of many other urban centers, mostly associated with the creation of new districts. However, more than half of the urban population (54 percent) lives in the central region of the country.

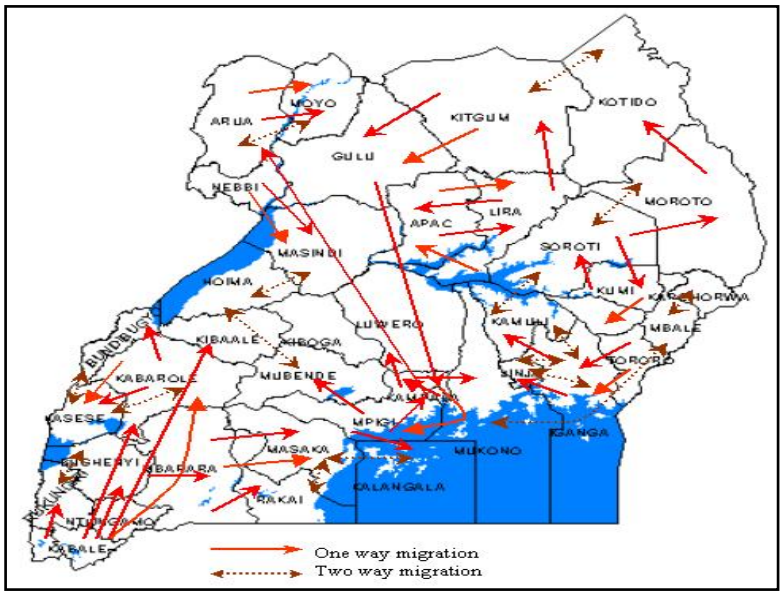
Table 3: Urbanization in Uganda, 1969-2002

	1969	1980	1991	2002
Urban population	634,952	938,287	1,889,622	2,999,387
Urbanization level (%)	6.6	7.4	11.3	12.3
Percent of urban population in Kampala	53.9	47.9	41.0	39.6

Source: UBOS 2004. NB: The 1969, 1980, and 1991 data are as per the 1991 Uganda Statistical Abstract definition of urbanization, while the 2002 figures are as per a later definition, thus may not be comparable.

Uganda has experienced massive internal migration throughout the post-independence period, with much of the movement involving rural-to-rural migration. This migration has mostly originated or ended in areas of the country that are densely populated. The map below, adapted from an earlier PAES study on environmental security and conflict in Uganda 2003, shows the major national migration streams that occurred in Uganda according to the 1991 national population census.

Figure 4: Major Migration Streams in Uganda (based on the 1991 Census)



Source: PAES 2004.

Policy and Institutional Weaknesses

The Government of Uganda at different times has introduced several policy and institutional measures designed to improve land management, which have contributed to changes in the environmental landscape. Most significant is the 1975 Land Reform Decree issued by the Government of Idi Amin. This Decree proclaimed all land in Uganda to be public land and vested its ownership in the state to be administered by the Uganda Land Commission (ULC). The Decree abolished all freehold interests in land except where such land is owned by the state, in which case interests were vested in the ULC. The *mailo* system of land tenure was also abolished and converted into leasehold. Indeed, the Land Reform Decree abolished any law related to land in Buganda, Ankole, and Toro. "Elsewhere customary land users became tenants at the sufferance of the state" (Rugadya 2003), in which case their use of land could be terminated at any time.

The Decree was in force for two decades, "though not implemented on the ground," (Rugadya 2003), and repealed by the 1995 Constitution. It was during this period that Uganda experienced the most severe land degradation and deforestation. As in many other countries, state ownership of land and insecurity of tenure both stripped land users of a sense of possession and of incentives for sustainable land and forest management. In the Ugandan case, the impact of the 1975 Land Reform Decree is well explained by Tukahirwa: "Under the *double production* slogan, people accessed almost any piece of public land they would lay their hands upon.… The poaching trade reached an all-time high…. Uganda lost more trees (mahogany and other hardwood) in less than a decade than it had ever lost" (Tukahirwa 2002).

The 1995 Constitution abolished the 1975 Land Reform Decree and vested ownership of all land in the people of Uganda rather than the state. Further, the Constitution reinstated the four types of land ownership that prevailed upon independence: customary land tenure, freehold tenure, leasehold tenure, and *mailo* tenure (Rugadya 2003 and Tukahirwa 2002). To administer land, the Constitution also introduced District Land Boards. A Land Sector Strategic Plan (LSSP) has been prepared as part of the medium and long-term policy strategies for productive and sustainable management and use of land resources. Although fraught with difficulties, the implementation of the LSSP remains a key to moving toward sustainable land management.

Poor Farming Methods

Poor farming methods and agricultural practices have had their share in changing the environment landscape. Most notably, these include:

- Unsustainable agricultural practices, including mono-cropping, late and untimely planting, over-cropping, and uncontrolled bush burning. Limited knowledge about proper farming methods and

lack of knowledge about soil status and the use of pesticides also have contributed to a decrease in soil productivity.

- The burning of bushes for cultivation by both cultivators and pastoralists (for the Karamojong, it is also a strategy to control ticks), leads to conflicts between pastoralists and cultivators competing for the same land. Sometimes, the fire burns houses and crops, which leads to a violent response by fire victims.

- Increasing land fragmentation as a result of population increase and the lack of alternative livelihoods outside traditional agriculture have contributed to over-cultivation of the land.

Changes in the Socioeconomic Situation

The post-colonial period has seen profound changes in the country's socioeconomic structure, which have had some positive as well as some negative effects on environmental security. The following sections provide analysis of these changes based on social and economic indicators.

Economic Trends: Recovery, Growth, and Sustainability

Changes in Aggregate Output and Demand

Since the attainment of independence in 1962, Uganda's economy has changed significantly. The period 1962−1970 saw a rapid growth rate in GDP of about 6.7 percent per annum. Starting in the 1970s and through the mid-1980s, however, the country's productive capacity and social infrastructure was severely damaged, first, by Idi Amin's decision to expropriate business assets of Asians in Uganda, then by the civil war, and finally by political instability. GDP growth rate was negative throughout the 1970s with the exception of 1977, when a small rate of positive growth was registered resulting from an increase in the international price of coffee. In 1979, when Idi Amin was forced to relinquish power, GDP stood at only 80 percent of the 1970 level (Library of Congress 1990). Although the agriculture sector showed some signs of recovery in the early 1980s, industrial output declined sharply. The war and political crisis of the mid-1980s exacerbated the problem, resulting again in negative growth rates of 4.2 percent in 1984, 1.5 percent in 1985, and 2.3 percent in 1986.

Museveni's accession to the presidency appeared to halt the economic decline. In 1987, GDP rose 4.5 percent, followed by 7.2 percent in 1988, 6.6 percent in 1989, and 3.4 percent in 1990. The rather small growth in 1990 was the result of drought, the fall in international coffee prices, and a decline in manufacturing output.

Table 4: Structural Changes in GDP
(Share of GDP in Percent)

Sector	1980	1990	2000	2004
Agriculture	70	57	37.2	33.1
Industry (total)	4.4	11	10.1	9.8
(*percent of which is manufacturing*)	*4*	*6*	*9.4*	*9.0*
Construction			8.4	10.0
Services	22	32	42.9	45.8
Public utilities (electricity, water, others)	N/A	N/A	1.4	1.3
Total GDP	100	100	100	100
Total GDP value in US$	1,245	4,304	5,800	N/A

Source: UBOS 2004. The data for 2000 and 2004 was obtained from IMF, Uganda: Selected Issues and Statistical Appendix, IMF Country Report No. 05/172, May 2005.

Indeed, for the past decade and a half, Uganda has enjoyed sustained economic recovery reflected in an impressive average annual GDP growth of 6.2 percent during the period between 1987 and 2004 (IMF 2005a). However, when the country's high annual population growth rate of 3.3 percent is taken into account (Baguma 2005) the per capita growth rates have been relatively modest (2.9 percent) (IMF 2005a).

IMF reports show that capital accumulation (an increase in the capital stock, including machinery, equipment, buildings, roads, and transport facilities) explains about 85 percent of GDP growth. In contrast, the contribution of increases in total factor productivity (TFP) (output per unit of input)—to growth has been extremely low. As the table below shows, labor productivity grew by only one percent during 1986–2003. This shows that Uganda faces a Herculean challenge in sustaining the impressive economic growth of the past years unless massive investment is made in developing the country's human capital. Despite the expansion of secondary and tertiary education, training, and health services, key components of human and social capital, much work remains to be done in these areas.

Table 5: Sources of Economic Growth (1961-2003)
Annual Percentage Growth

	Total GDP	Sources			
		Capital	Labor	Total Factor Productivity (TFP)	Short-Term Factors
1961-2003	3.9	2.5	1.0	0.3	0.1
1961-71	5.2	2.7	1.3	0.1	1.1
1972-85	-0.4	-1.4	0.8	0.5	-0.4
1986-2003	6.4	5.5	1.0	0.1	-0.4

Source: IMF 2005a.

The Government of Uganda has put in place a number of far-reaching policy initiatives aimed at reducing poverty and guiding the economy toward a sustained development path. Some of the key policy measures

include: fiscal decentralization, the 1997 Local Government Act, the Plan for Modernization of Agriculture (PMA), and the creation of the National Agricultural Advisory Services (NAADS).

Despite these commendable efforts, the Ugandan economy faces several challenges: a high debt burden, huge balance of payments deficits, a narrow export and production base, lack of access to the sea, pervasive poverty, high levels of illiteracy, and high malaria and HIV/AIDS prevalence rates. All of these conditions could impact the attainment of environmental security and sustainable peace in a profound way.

High Debt and Trade Deficits

Table 6 shows that Uganda's trade deficit grew by over 50 percent during the three year period, 2000–2003. To finance this trade deficit and government operations, Uganda relies heavily on donor assistance, and that reliance is increasing. Net donor support to Uganda, which averaged 8 percent of GDP during the latter half of the 1990s, had risen to 11.1 percent of GDP by 2000–2001 and rose yet again to 11.7 percent by 2001–2002 (IMF 2002).

Table 6: Value of Imports and Exports (000 US$)

Year	Total Imports	Exports	Re-exports	Total Exports	Trade Balance
2000	958,464	370,142	31,503	401,645	-556,819
2001	1,006,557	414,490	37,275	451,765	-554,792
2002	1,073,732	431,839	35,766	467,605	-606,127
2003	1,375,106	467,170	66,936	534,106	-841,001

Source: UBOS 2004.

While covering trade deficits through the use of external aid is a normal practice in many developing countries, what is worrisome in Uganda's case is the large amount of aid dedicated to support the fiscal deficit. Uganda's fiscal deficit for 2001–2002 (11.5 percent of GDP) was almost identical to the percentage of the GDP represented by donor assistance (11.7 percent of GPP). Uganda's government spending for 2001–2002, at 23.3 percent of GDP, significantly exceeded government revenues, which were 11.8 percent of GDP. Although the Ministry of Finance officials interviewed by the study team are fully aware of the implications of this heavy dependence on donor support, they argue that it would be foolish for the government to refuse development funding agencies willing to cover recurrent costs through grants.

Production and Export Diversification

Uganda remains an agrarian economy with a narrow production and export base. The agriculture sector contributes about 40 percent to GDP, provides employment to 82 percent of the labor force, and generates almost all export earnings. Traditional commodities (coffee, cotton, tea, and tobacco) dominate exports. As a result, the economy is vulnerable to international commodity price fluctuations and trade barriers, as well as to drought.

Coffee accounted for 19 percent of total exports in 2003, down from 60 percent in 1999. The decline in the share of coffee is attributed to the fall in its international price. As Table 7 shows, during 2003–2004, export earnings from cotton went down, earnings from tea remained the same, and tobacco earnings increased, although they failed to offset the loss from coffee. It is, however, worth noting that non-traditional exports (fish products, flowers, petroleum products, electricity, maize, and vanilla) have been gaining importance as foreign currency earners in recent years (see data below). The Uganda Export Promotion Board (UEPB) reported that the share of export earnings from non-traditional exports almost doubled from 34 percent in 1998 to over 60 percent in 2003. Non-traditional exports accounted for 60.9 percent and 62.7 percent of total export earnings in 2002 and 2003 respectively (UBOS 2004). These high shares are likely to decrease when coffee prices recover.

Uganda's agriculture-based exports are also faced with internal challenges that include the lack of modern storage facilities, limited export handling capacity, and lack of adequate investment capital to meet supply commitments. Further, many agricultural commodity exports will have to be adjusted to meet new technical standards set by the European Union, an important destination for Ugandan exports. EU requires compliance with the Euro-Retailer Produce Working Group-Good Agricultural Practices (EUREP-GAP) Law of January 2005. There are concerns that this law may restrict the entry of Uganda's exports into Europe, particularly horticultural products.

Table 7: Value of Exports of Selected Commodities (000 US$)

Year	Coffee	Cotton	Tea	Tobacco	Fish	Flowers	Vanilla
2000	125,316	22,088	37,050	26,889	30,818	9,912	1,048
2001	97,652	13,434	30,031	32,096	78,150	14,750	2,417
2002	96,626	9,519	31,293	45,262	87,945	17,828	6,898
2003	100,233	17,755	38,314	43,042	88,113	22,080	11,948

Source: UBOS 2004.

As regards policy and institutional measures, in addition to efforts to diversify exports, the government has emphasized what it calls "export deepening," which means moving up the value-added ladder and exporting more processed commodities. In 2001, the Competitive Private Enterprise and Trade Expansion (COMPETE) program selected three of the top exports—coffee, fish, and cotton—to further their international market competitiveness. With respect to non-agricultural exports, horticulture and floriculture have received increased investment largely as a result of newly viable means of air cargo (New Vision 2004c).

Pervasive Poverty and Income Inequality

With the remarkable and sustained economic growth of the 1990s, Uganda succeeded in reducing poverty from 56 percent in 1992 to 44 percent in 1998 and 34 percent in 2000 (IMF 2005b). During the period 2000-2003, however, there has been a reversal of this trend. Poverty increased from 34 percent in 2000 to 38 percent in 2003 primarily as a result of a slowdown in the rate of economic growth, the fall in agricultural prices (coffee and vanilla), and the protracted conflict in northern Uganda, including in the Karamoja area (IMF 2005b).

The worsening of poverty in recent years has been felt by all regions of the country, especially in the east. This is in part a result of the movement of displaced persons to the east because of the conflict in other areas (IMF 2005b). It is worth noting that northern Uganda continues to experience the highest incidence of poverty in the country at 63 percent. Indeed, the protracted conflicts in northern Uganda and Karamoja have disrupted agricultural production and increased livelihood insecurity and the incidence of poverty. Thus, despite the economic progress achieved over the past two decades, close to 10 million Ugandans find themselves under conditions of abject poverty.

Income inequality in Uganda has increased during the past decade and a half as indicated by a rise in the Gini coefficient, a measurement of the degree of income inequality in a society. The Gini coefficient rose from approximately 0.36 in 1992 to 0.43 in 2003 (IMF 2005b). Indeed, since 2000, trends in income inequality and poverty have been less than encouraging. Income poverty increased from 34 percent to 38 percent between 2000 and 2003 (IMF 2005b).

Human Capacity Enhancement

Uganda has made significant progress in improving access to education and health services. Despite this achievement, Uganda ranked 144 out of the 177 countries of the world in the 2003 UN Human Development

Index (HDI) (UNDP 2005). The same report ranks Uganda 66 among 103 countries in the Human Poverty Index (HPI) and 109 among 140 countries in the Gender-Related Development Index (UNDP 2005).

Access to Education and the Challenges Ahead

In 1997, the Government of Uganda introduced the Universal Primary Education (UPE) program, which was aimed at broadening access to primary schooling, largely through cost reduction. While primary education enrollment rates grew from 2.2 million in 1986 to 3.1 million in 1996, it was only after the introduction of UPE that rates climbed substantially, with a 70 percent increase to 5.3 million in 1997 alone (Kirungi n.d.) and a further increase to 7.6 million by 2003 (UBOS 2004).

The capacity of Uganda's primary schools to cope with the large volume of students now enrolled has become a source of concern. The introduction of UPE caused the pupil-to-teacher ratio to jump drastically, from 38:1 to 60:1 in a single year (Kirungi n.d.), creating a situation that makes it difficult to provide specialized attention to individual students. This has caused concern that growth in enrollment has resulted in a lowering of educational standards in the country's primary schools, causing many parents who can afford it to send their children to private schools.

Notwithstanding the sharp rise in enrollment, dropouts are still a problem. And, despite the emphasis on reducing the cost of education, money is still the main barrier to schooling in Uganda. According to the Planning Unit of the Uganda Ministry of Education and Sports, in 2002, 62.3 percent of students who dropped out of primary school did so because of the inability to pay school fees (UBOS 2004).

Another concern is the limited capacity of the secondary education system. There are not enough schools providing secondary education to ensure space for the flood of new primary school graduates. In fact, many of the existing schools need to be rehabilitated or expanded to meet the growing demand. According to Yusuf K. Nsubuga, the Commissioner for Secondary Education, the "failure to absorb the growing number of primary school leavers will undermine Universal Primary Education and broader national goals like the elimination of poverty" (myUganda n.d.).

Currently, approximately 40 percent of the primary school graduates are absorbed into the secondary schools, implying the possibility that there may be fewer schools than necessary to meet student demand, presenting an opportunity for private investors (myUganda n.d.). As the number of students completing secondary education increases in the country, there is a need to create more opportunities for these students to attend tertiary education institutions. However, of the roughly 9,000 to 12,000 students who qualify for admission into tertiary education institutions annually, only about 25 percent go on to post-secondary institutions in part because of lack of slots available in tertiary institutions (myUganda n.d.).

Access to secondary education varies greatly throughout the country, with people living in and around Kampala and other urban areas having much greater access to schools than those living in rural areas. A similar gap exists between the country's rich and poor, with the former having much higher secondary enrollment rates than the latter. The rural-urban gap is evidenced by the fact that 87 percent of the urban population aged 10 years and above are considered literate compared to only 67 percent of the rural population (UBOS 2004). Gender also influences educational attainment. According to the 2002–2003 Uganda National Household Survey, men had a higher literacy rate than women (UBOS 2004). Ahikire argues that this disparity (approximately 40 percent of women as opposed to 26 percent of men are illiterate) is in part due to the relative isolation of women's lives in rural areas; the result is very little knowledge of health, nutrition, and hygiene among females (Ahikire n.d.).

The "Education for All (EFA) by 2015" initiative calls for everyone to have access to education in whatever way possible and at whatever stage of life. One of the major programs under this initiative is the Functional Adult Literacy Program under the Ministry of Gender, Labor, and Social Development. As a result, there has

been an increase in the Adult Literacy Program enrollment. More women than men are taking advantage of this program (UBOS 2004). More widespread educational opportunities for the country's population, particularly in northern Uganda, where an entire generation of IDP children have been deprived of schooling, could improve prospects for sustained economic growth, political stability, and an enduring peace.

Table 8: Trends of Secondary School Education, 1999–2003

Area	1999	2000	2001	2002	2003
Enrollment	258,263	518,931	539,786	655,951	683,609
Number of schools	1,633	1,892	2,400	2,142	2,055
Number of teachers	22,599	30,408	30,425	37,227	38,549

Source: UBOS 2004.

Employment and Job Creation

Raising incomes of the poor is the third pillar of Uganda's Poverty Eradication Action Plan (PEAP). One way of achieving this is by expanding employment opportunities. Historically, data on the status of employment in Uganda has been scant. The last labor force survey was conducted in 1987. The 1991 Population and Housing census provided some labor force indicators. The household surveys conducted by the Uganda Bureau of Statistics since 1988 have addressed some of the data gaps. Data sources include the Household Survey (1992–1993) and the Monitoring Surveys (1993–1994; 1994–1995; and 1995–1996). In 1999–2000, a second household survey was undertaken covering a much larger sample than the previous monitoring surveys, with a focus on socioeconomic characteristics.

The Uganda National Household Survey 2002–2003 (UNHS 2002–2003) is the latest in the series of household surveys undertaken by the Uganda Bureau of Statistics with a focus on the labor force.[3] The survey gathered data on the employment situation in Uganda and correlated employment figures with a number of factors, including gender, education, age, working experience, and methods used in searching for work. According to the data, the labor force participation rate was approximately 67 percent. Of economically active persons, 3 percent were unemployed, and the youth unemployment rate (5.3 percent) was higher than the national rate (3.2 percent). Sixty-five percent of the unemployed had attempted to look for work, while the underemployment rate was highest among youth and in the agricultural sector.

Overall Unemployment, Gender, and Urban vs. Rural Differences

Table 9: Unemployed Persons Aged 10 and Above by Gender and Location

	Number of Unemployed (000s)			Unemployment rate (%)		
	Male	*Female*	Total	*Male*	*Female*	Total
Urban	56	130	180	7.5	16.3	12.0
Rural	72	88	160	1.6	1.8	1.7
Total	128	218	346	2.5	3.9	3.2

Source: UBOS 2004.

The table above shows a national unemployment rate of around 3.2 percent. This can be compared with the 1997 ILO estimate of 7.4 percent (6.7 percent for males and 8 percent for females), but neither estimate addresses the question of under-employment. The total number of people employed in Uganda is around 57 percent of the total population aged 10 and above (the very fact that unemployment is calculated down to age 10 is a reflection of how important household production is to the country's largely subsistence agriculture-

based economy). From the table, we also see that the overall rate of unemployment is much higher in urban than in rural areas, as is the case in many developing countries. The gender-specific rates show that female unemployment rates are higher than those of males in both urban and rural areas, although the gender difference in unemployment is much greater in urban areas.

Table 10: Unemployment Rate by Region and Gender

Region	Male	Female	Total
Kampala	10.0	22.5	**16.5**
Central	2.5	5.2	**3.9**
Eastern	2.1	2.4	**2.3**
Northern	0.9	1.1	**1.0**
Western	2.2	1.9	**2.1**
Total	**2.5**	**3.9**	**3.2**

Source: UBOS 2003.

Table 10 presents Uganda's unemployment data by region and gender, with Kampala standing as a separate region. More than half of the country's unemployed are in the central region. However, Kampala has the highest unemployment rate at approximately 17 percent, higher than any other region. When gender is considered, the unemployment rates are similar across gender for all regions other than Kampala, where females are more than twice as likely as males to be unemployed. While women may face constraints to employment in the formal sector, a 1993 World Bank report finds that Ugandan women involved in agricultural production bear a majority of the responsibility, producing 80 percent of the food crops and providing 70 percent of total agricultural labor as well as 60 percent of the labor in the cash crop production of coffee and cotton (Ahikire n.d.). Women also have the primary responsibility for all of the chores that ensure social existence, such as taking care of the children, running the household, and collecting water and firewood. Over time, this has enabled men to withdraw from agriculture and enter into other sectors such as trade (or even in some cases to engage in full-time leisure) (Ahikire n.d.).

A study by the International Food Policy Research Institute (Nkonya et al. 2004) suggests that the most important determinants of household income among those surveyed are education and livestock production. Livestock production, non-farm activities, and greater specialization in higher value crops such as bananas are associated with higher value of crop production; non-farm production contributes to higher value crop production since earnings from non-farm activities are typically used to buy agricultural inputs. When the households are disaggregated into female- and male-headed, female-headed households appear to have higher incomes than male-headed households, and female-headed households depend more on non-farm activities. It can be discerned from this that women are more likely to be employed off the farm in Uganda and that their labor productivity is higher than that of men. This supports a common view that men are underemployed relative to women in rural Uganda (Nkonya et al. 2004). The results of the study suggest that the most promising strategies for reducing rural poverty in Uganda are improvement in farmers' education and development of high-value crops and livestock.

Table 11: Employment by Sector (%)

Employment by Sector:	Males	Females	Total
Agriculture, hunting, and forestry	60.1	75.4	67.8
Fishing	1.7	0.1	0.9
Mining and quarrying	0.4	0.2	0.3
Manufacturing	7.3	4.9	6.1
Electricity, gas and water	0.1	0.0	0.1
Construction	2.5	0.0	1.3
Sale, maintenance, repair of motor vehicles and personal household goods	13.8	9.4	11.6
Hotels and restaurants	1.4	3.8	2.6
Transport, storage and communications	3.8	0.1	1.9
Real estate, renting and business activities	0.5	0.2	0.4
Public administration and defense	1.4	0.2	0.8
Education	3.3	1.8	2.6
Health and social work	0.7	0.8	0.8
Other community, social and personal service activities	2.1	1.2	1.6
Private households with employed persons	0.6	1.7	1.2
Total (%):	**100**	**100**	**100**
Total (Numbers '000):	**4,618**	**4,642**	**9,260**

Source: UBOS 2003 and UBOS 2004.

Health Care and Health Issues

Prior to independence in 1962, the colonial health care system was extensive and regarded as one of the best in Africa. Hospitals existed in nearly every district, a network of health workers conducted home-hygiene and prevention education, and Ugandans had relatively easy access to free care. However, the system relied on heavy government support and with the political and economic strife that begin in the 1970s and lasted through the mid-1980s, the health care system deteriorated dramatically.

Key health indicators reveal the decline in the health care system. Estimated figures for the infant mortality rate in 1972 were 78 per 1,000 live births and the maternal mortality rate was 380 per 100,000 live births (Corkery 2000). Thirty years later, these figures have not improved; if anything the trend has been in the opposite direction, especially with regard to maternal mortality. According to 2003 UNDP data, the infant mortality rate was 81 per 1,000 live births and the maternal mortality rate increased to 510 per 100,000 live births (UNDP 2005).

Most of the damage to the health care system was perpetrated by the government of Idi Amin, a period during which "most public health programs collapsed and health facilities faced staff and drug shortages" and the use of traditional medicine increased (Tashobya and Ogwal n.d.). Many development partners left the country and without support from NGOs or the government, most of the health system collapsed. According to the World Health Organization, by 1986, the country's health workforce was decimated

through death or flight to other countries, the public health budget was less than seven percent of its 1970 level, and the remaining hospitals and health centers were run by underskilled staff (WHO n.d.).

The end of Amin's rule brought some improvements. By 1987, the Museveni administration, with the support of international donors, began implementing a series of reforms to reverse the negative trends that had nearly destroyed the health sector during the previous decade. However, even by the standards of the region, Uganda's health system remains a poor one. Despite the last ten years of policy reforms, including decentralization, an increase in government expenditures, and significant donor activity, the country still battles poor health care provision and access.

The United Kingdom's Department for International Development (DFID), a significant funder of the health sector, perceives major obstacles to health services for the country's poor. About half the population lives more than five kilometers from the nearest health facility (Pearson 2000). In 2001, the UNDP estimated that less than half of the population had access to health care facilities.

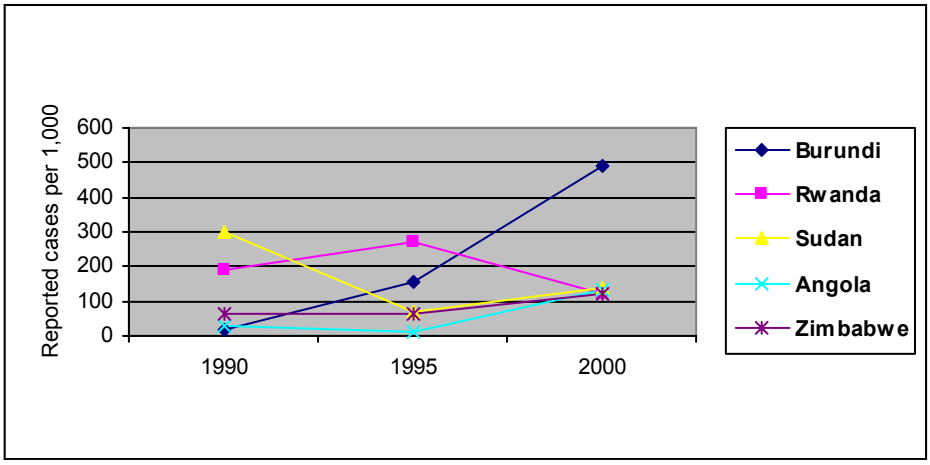
In line with poverty, an inadequate public health system, and lack of access to health facilities, most deaths are caused by diseases that are preventable and/or curable. In the 1980s, malaria, measles, respiratory tract infections, and gastroenteritis (often the cause of diarrheal diseases that result in severe dehydration, particularly among children) caused one-half of all deaths attributed to illness and were the main childhood diseases. During the same period, other fatal illnesses, particularly among children, included anemia, tetanus, whooping cough, and malnutrition.

Rates of infectious and parasitic disease transmission within Uganda are still high today for such diseases as Guinea worm, meningitis, schistosomiasis, trypanosomiasis, leishmaniasis, onchocerciasis, amoebiasis, yellow fever, and various acute respiratory infections. As less than half (47 percent) of the country's rural population has access to an improved water source, the incidence of waterborne illnesses such as cholera (24.5 cases per 100,000 people), dysentery (268 cases per 100,000 people), and typhoid (28 cases per 100,000 people) is particularly high (UNDP 2003). According to the World Health Organization, the mortality rate from intestinal infectious diseases in Uganda is 34 per 100,000 people.

a. The Malaria Burden

Malaria is Uganda's greatest health care challenge, with malaria rates having exploded from 132.1 cases per 1,000 persons in 1992 to 477.9 cases per 1,000 persons in 2003 (World Health Organization 2005). Because of its devastating effects on both school attendance and labor productivity, malaria is increasingly a socioeconomic threat as well as a public health problem. Malaria is the leading cause of mortality, especially among children. Malaria, which is a viral disease transmitted through the bite of infective female *Anopheles* mosquitoes, occurs in endemic form throughout Uganda. In Uganda, there is year-round transmission of falciparum malaria, a serious malarial infection that can lead to coma and

Figure 5: Malaria Rates, Selected African Countries: 1990, 1995, 2000

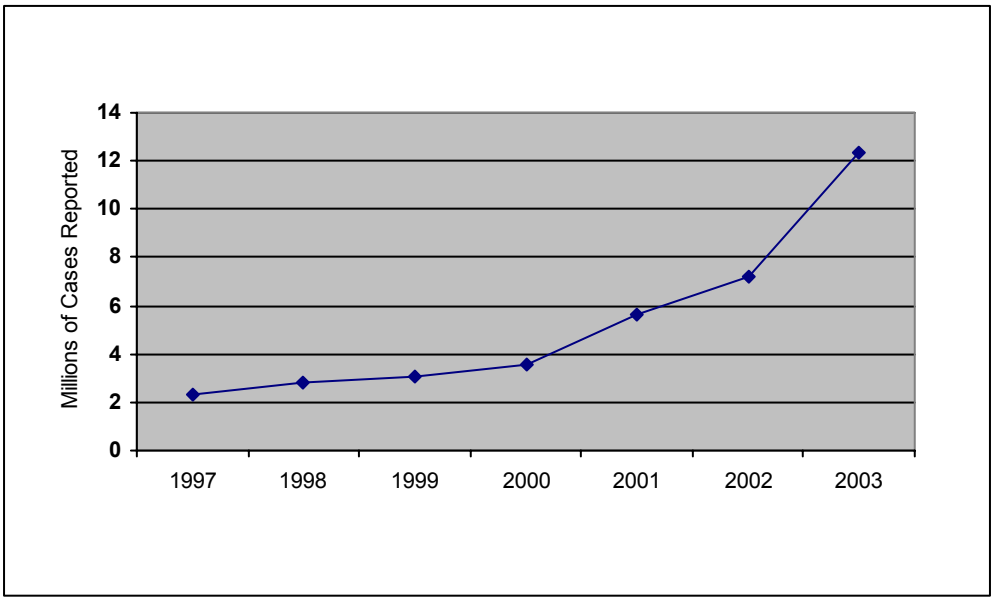


Source: World Malaria Report 2005.

death. Malaria parasites are increasingly becoming resistant to the drug chloroquine, particularly in eastern Uganda. According to the UNDP, in the year 2000, there were no children under the age of five years with insecticide-treated bed nets. The risk of malaria infection exists in most of the 45 districts in Uganda, with over 90 percent of the population living in highly endemic areas with year-round transmission and about 10 percent of the population living in low transmission areas that are prone to malaria epidemics.

Malaria is a major killer of refugees and internally displaced persons (IDPs) in Uganda. Children under the age of five years are the most common victims of malaria, which often kills children in combination with other diseases, such as childhood anemia and malnutrition. In Uganda, there are approximately 70,000-110,000 deaths annually due to malaria. In 2004, 80,000 people died of malaria, half of them children under the age of five. It is estimated that, in endemic areas like Uganda, malaria may impair as much as 60 percent of school children's learning ability. Pregnant women are a vulnerable group, as malaria can cause severe maternal anemia and is a major contributing factor to maternal death and low birth weight babies. In Uganda, malaria is responsible for approximately 60 percent of miscarriages (UMOH 2004).

Figure 6: Malaria Cases Reported, Uganda, 1997-2003



Source: World Malaria Report 2005.

It is estimated that 40 percent of Uganda's outpatient care budget is spent on malaria treatment (UMOH n.d.a). Treatment alone costs Uganda approximately $50 million each year, making the fight against malaria a top health priority (USAID 2003). In industry and agriculture, malaria is the cause of up to 50 percent of total lost working hours. In its cumulative effect, malaria is estimated to reduce GDP by nearly 30 percent over a period of 15 years (UMOH 2001–2002). Families are most affected by malaria during the rainy season when they can least afford to be sick, as they must perform farm activities. A family may spend up to 25 percent of its income on malaria treatment and prevention, not including funeral expenses (UMOH 2004). In this regard, malaria also contributes to poverty through loss of household incomes due to absenteeism from work. Controlling malaria would significantly improve human development and reduce poverty in Uganda.

b. HIV/AIDS

The Ugandan government has conducted a vigorous campaign to inform its citizens of the risk of HIV infection and to provide them with the health services needed to prevent or manage the illness. Uganda has been one of the most successful countries in the world in combating HIV/AIDS. According to estimates by the U.S. Census Bureau and UNAIDS, Uganda reduced the prevalence of HIV by two-thirds in a decade, going from an overall peak prevalence rate of 15 percent in 1991 down to 5 percent in 2001 (USAID 2002).

This is a significant improvement, but continued efforts are required in order to reduce the incidence of the disease. While comparatively low regionally, the infection rate is high by global standards. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), 4.1 percent of the adult population between the

ages of 15 and 49, and approximately 84,000 children up to 14 years old were living with HIV/AIDS in 2003 (UNAIDS 2004). Furthermore, the relatively low infection rate is most likely due to the fact that the number dying of the disease is nearly identical to the number who become infected (Knox 2005). According to the World Health Organization (WHO), in 2003 an estimated 78,000 Ugandans between the ages of 0 and 49 died of AIDS (WHO 2004).

Poverty and the AIDS epidemic are intertwined. Most of the infections are believed to occur in poor peri-urban areas with high population density, and inadequate hygiene, sanitation, and living conditions. At the same time, the disease inflicts a toll on the country's economy, ranging from losses in productivity to health care costs and investments foregone.

c. TB and Other Infectious Diseases

Those Ugandans already suffering from weakened immune systems as a result of HIV/AIDS are at a high risk of contracting tuberculosis. The tuberculosis case rate in 2001 was 187 cases per 100,000 persons in the population, which puts Uganda in the highest WHO risk category (UNDP 2001). According to the WHO, Uganda ranks 16th on a global scale in terms of the number of estimated cases of tuberculosis, with a TB mortality rate of 86 per 100,000 persons in the population and an increasing number of people co-infected with HIV/AIDS.

The high prevalence of preventable communicable diseases, the rising incidence of non-communicable diseases, the increasing demand for services due to population growth, and the burden created by the HIV/AIDS epidemic all pose critical problems to a health system characterized by inadequate resources (UMOH 2001-2002).

In addition, illnesses place a burden on the country's productive capacity because they leave so many people incapacitated. This is particularly problematic in an agrarian economy like Uganda's, which relies heavily upon physical labor. HIV/AIDS, in particular, has had a tremendous impact on agricultural production by changing the family structure. Specifically, the loss of able-bodied members has left many young people in single-parent households or orphaned. Furthermore, the lost productivity poses a serious threat in terms of increased poverty and food insecurity. According to WHO figures, HIV/AIDS is estimated to have reduced agricultural production by 37 percent to 61 percent and GDP by 2 percent (World Bank 2004). UNAIDS predicts it would cost the country a staggering 61 percent of its GDP to provide triple combination antiretroviral therapy to all infected persons (World Bank 2004).

d. The Health-Environment Nexus

The link between the environment and health is too great to ignore, but at present there is insufficient knowledge to understand precisely the nature of relationship. Many environmental factors, including fluctuations in temperature, precipitation, and humidity, and disruptions of the natural environment, such as deforestation and wetland cultivation, are linked with the spread of insect-borne diseases. Malaria cases have been known to increase following weather changes that favor the insect vector harboring the disease. Malaria has also been known to spread as a result of war and social upheaval as these events cause environmental change that may lead to increased mosquito activity. More research regarding the health-environment nexus is required, given such factors as persistent reports of climate variability by residents throughout the country, alarming rates of deforestation, and increasing land degradation.

Changes in the Political and Socio-Cultural Situation

Questions about the stability and security of Uganda at the national level must be framed within the context of unresolved political and cultural tensions. Under the leadership of Yoweri Museveni and the National Resistance Movement (NRM), Uganda has made strides in moving toward democracy and development,

including political stability, economic growth, and a relatively free press and judiciary. Progress in governance has included the establishment of new policies and institutions and effective working relationships with many international financial institutions and donors. Out of a turbulent past, the NRM has managed to maintain a relatively stable government that has held together for more than twice as long as any other government since independence from Britain in 1962.

Despite the successes, political stability and continued democratization in Uganda appear to hang in the balance. The outcome in large measure depends on the country's success in moving toward multi-party democracy and on the actions of Museveni, the February 2006 presidential election winner, and Kizza Besigye, his leading opposition rival. It is a commonly-held fear among Ugandans—one founded on a long history of violent transfers of power—that political transition could lead to conflict (CSOPNU 2004). The tensions surrounding the results of the 2006 election put the political system at risk of greater incidences of patronage, payoffs, and other forms of corruption that have tended to coincide with periods of political transition.

Furthermore, the move toward a multi-party system of government is fraught with uncertainties. Whereas Museveni was resistant at first to promoting pluralism in the next election, he later cited reduced sectarianism and increased literacy as the main reasons behind his change of heart. What he did not mention was the leverage of the international donor community that has brought pressure to bear on the side of greater democracy. In fact, international pressure to end the Movement system may well have been the deciding factor (Ford 2004). In any case, the views and attitudes of the international community are undeniably important to Uganda's future since more than half of Uganda's annual government budget comes from donor support.

As Uganda grapples with the contentious nature of the issues surrounding the role of political parties and presidential term limits, pressure appears to be building along existing fault lines within the country. The current political climate threatens to evolve according to certain recurring patterns:

1) Transfers of power effected through questionable election processes;
2) Boundaries between military and civil authority blurred;
3) Socio-cultural and geographical affiliations used to mobilize state activities;
4) Widespread perceptions of relative economic disadvantage and political marginalization; and
5) Corruption as a method to build and sustain political alliances.

Transfers of Power, Electoral Politics, and the Use or Threat of Military-Led Violence

Uganda has yet to solve the basic political succession question. Since the transition to independence in 1962, there has never been a peaceful transfer of power. Instead, state formation has been shaped by violent, illegitimate seizures of power. A consequence of the use of violence to claim power is that legitimacy is compromised and the development of trust between the state and society is undermined. Throughout Uganda's history, "militarism has been employed as a means of capturing and maintaining power, where violence has been part and parcel of the political game" (Löf 2004).

CHANGES IN GOVERNMENT LEADERSHIP

1962

- Uganda gains independence from Britain.
- A coalition installs Edward Mutesa, the king of Buganda, as President and Apollo Milton Obote as Prime Minister.

1966-1971

- Obote declares himself President in 1966 after directing Army Colonel Idi Amin to overthrow Mutesa.

- Obote imposes the 1967 Constitution, rescinds the federal status of Buganda and other kingdoms, and consolidates civil and military power into a de facto one-party state.
- Military force is employed to counter political opposition.

1971-1978
- Army General Idi Amin overthrows Obote and establishes a military dictatorship that systematically eliminates its supposed rivals, beginning with Obote's Acholi and Langi military recruits from the north.
- Amin expels "Asian" businessmen and distributes the spoils to his supporters, bringing the economy to a final stage of collapse.

1979-1980
- Amin is ousted through force by a diverse coalition including Yoweri Museveni and aided by the Tanzanian army.
- Successive interim governments of Yusuf Lule and Godfrey Binaisa are overthrown by military coups. A military commission exercises control for the last six months of 1980.

1981-1985
- After a highly contested election, the second Obote government takes over, facing opposition from the Museveni-led National Resistance Army (NRA), which escalates into civil war.
- Obote oversees military reprisals that center on the Luwero Triangle area associated with Bagandan supporters of Museveni and the West Nile area associated with Amin supporters.

1985
- Factionalism leads to an army coup led by military officers Bazilio Okello and Tito Okello Lutwa who depose Obote and encourage former Amin army recruits to engage in civil war.

1986-Present
- A cease-fire and disintegration of the Okello regime opens the way for Museveni to take over as President and leader of a National Resistance Movement (NRM) government and to begin the long process of reconstruction.

In 1996 Yoweri Museveni received over 78 percent of the vote in the first direct presidential election ever held in Uganda. However, results from the north reflected strong disenchantment with the National Resistance Movement (NRM). Museveni won another term of office in 2001 amid an elections process marred by claims of political violence that included intimidation, harassment, and vote-rigging. As one example, the President was quoted as threatening to reduce government services in areas that failed to support him (Vick 2001).

The high profile of the army raised concerns about its role in the electoral process. Museveni beat his rival NRM member, Colonel Kizza Besigye, by 69 percent to 28 percent. A referendum supported the Movement, not a multi-party system, but low voter turnout brought into question the ethical foundations of a system that bases its legitimacy on the ostensible commitment to inclusion and participation (Leggett 2001).

By pushing the term limit change, the President clearly has resisted a transfer of power, and there are signs that the NRM is leaning toward the use of force to protect its interests. Throughout 2004 and 2005, there have been instances of crackdowns on freedom of speech. For example, the authorities warned radio broadcasters against speaking against the office of the presidency. This was followed by a restructuring of the broadcasting industry and alleged police intimidation at political demonstrations.

The use of military force to effect and sustain transfers of power and to address political and social-cultural rivalries is an entrenched pattern in the political landscape of Uganda. The meshing of electoral politics and militarism undermines political legitimacy and perpetuates cycles of revenge. A longstanding consequence of the "shadow multiparty election" that brought Milton Obote to power is a lack of trust in the electoral system as free and fair (Löf 2004).

Museveni's attempt to stay in power after his current term ended in 2006 was opposed by all of Uganda's major opposition parties and even some key representatives in the NRM. More than half of all Ugandans surveyed in a recent public opinion poll conducted by one of the country's newspapers were opposed to Museveni's bid to remove term limits (Carson 2005). Museveni's resistance to giving up political power is a potentially destabilizing force, as it could unleash political unrest led by opposition groups, shake donor and business community confidence, and exacerbate the recent slowdown of the economy.

Perceptions of Political and Socioeconomic Inequities

Political and social fragmentation thwarts the development of viable and sustainable political institutions that can effectively manage the sustainable use of natural resources, resolve confrontations and conflict over limited resources, and ensure against the breakdown of law and order. The marginalization of groups within society along political, socio-cultural, geographic, and economic lines contributes to national disunity, undermines the process of democratization, and represents a potential threat to national security.

Group perceptions and social memory contribute significantly to disunity in Uganda. Overlapping cleavages across geographical, socio-cultural, and political lines are reinforced by disparities within and between regions, groups, and classes with regard to economic development, political participation, and natural resource allocation. These disparities foster instability and fuel periodic outbreaks of violence in the country and reinforce the persistent conflict in northern Uganda.

Structural inequalities in the distribution of the country's resources are manifest on the local level as perceptions and realities of inequities based, to a large extent, on overlapping regional, ethnic, religious, gender, and class distinctions. These tensions largely are latent, but they could become manifest if the political situation in the country were to worsen.

Regional Divisions

Uganda is cut in half horizontally by the Nile River, which is less a physical barrier than a geographical marker of a deep divide between regions that stems from a complex history of environmental, economic, social, and political differences. For the most part, in the northern region composed largely of semi-arid to arid plains, human communities have evolved as relatively small clusters of Nilotic- and Central Sudanic-speaking peoples who depend on a mix of agricultural and pastoral activities and whose political organization is based on clan leadership. The southern 'fertile crescent' fanning out from Lake Victoria has given rise to primarily Bantu-speaking communities supported by distinctive systems of agricultural production and centralized political organization.

The division between the northern and southern regions has many manifestations, one of which is language. The more than 50 (CSOPNU 2004) different languages in Uganda fall primarily into either Nilotic or Bantu language categories. The language gulf between speakers of Nilotic and Bantu languages is as wide as that between speakers of Slavic and Romance languages in Europe (Library of Congress 1990).

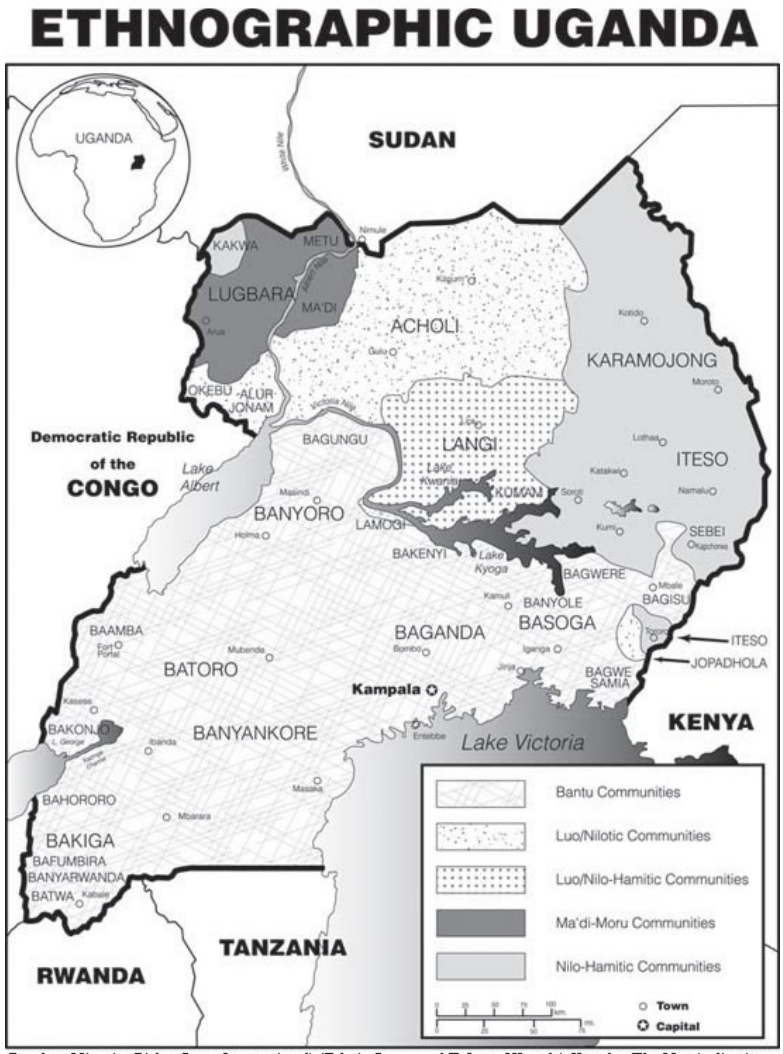
The region south of the Nile has been disproportionately advantaged for decades, having benefited from colonial investments in cash crop exports, infrastructure, industry, administration, and education. The region north of the Nile has served primarily as a labor reserve and recruitment area for armed forces personnel and has, by comparison, experienced minimal economic development. The division of labor approach to the two

regions was a conscious colonial strategy based on ethnicity. A second colonial strategy was racial rather than geographic and involved government regulations that encouraged laborers and artisans from the Indian sub-continent to dominate Uganda's trade sector while barring African farmers from becoming merchants (Leggett 2001).

Imbalances in the economy stemming from governmental policies and agricultural development that favors the southern region continue to generate tensions between the two regions today (Leggett 2001). Because of conflict and the displacement of the population, the economic disadvantage in the northern region is increasing, with poverty rates rising markedly, for example, in Gulu district (G. Ogwang 2005).

Figure 6 outlines the larger ethno-linguistic areas of Uganda and shows the horizontal division created by the Nile River:

Figure 7: Ethno-Linguistic Areas of Uganda



Based on Minority Rights Group International's 'Ethnic Groups and Tribes of Uganda', Uganda: The Marginalization of Minorities (2001). Boundaries are not definitive but are intended to show traditionally inhabited areas.

Source: ReliefWeb. Maps Division, African Centre for the Constructive Resolution of Disputes (ACCORD). December 31, 2001.
http://www.reliefweb.int/rw/RWB.NSF/db900LargeMaps/SKAR-64GDCA?OpenDocument.

Socio-Cultural Divisions

Group differences based on language and culture have become geographically based and have crystallized as ethnic identities. Most of the present-day district boundaries were established originally by the colonial government to demarcate ethnic territories for administrative purposes. The retention of this system has fostered a kind of parochialism (Anthony 2002). Fragmentation has developed along ethnic and class lines, and political parties have tended to reproduce ethnic and religious divisions.

Rivalry between the two large southern kingdoms of Buganda and Bunyoro, fueled by colonial favoritism shown toward Buganda in a land dispute, has been a source of conflict and a tool used by government to mobilize political support. The territorial and political autonomy of Buganda elites has been a key factor in the factionalism that shapes the Ugandan political and socio-cultural landscape. Other cohesive ethnic groups, such as the Toro and Busoga, have struggled to be considered equal in status to the Buganda (Kasozi 1994). This sub-state factionalism has not been offset by any unifying institutions of government.

Ethnic identities were reinforced and ethnic rivalries heightened by British policies that had the effect of "divide and conquer." Policy favoring Buganda had a catalytic effect on the process of ethnic consciousness that continues to affect the political, economic, and social balance (Anthony 2002). Differential access to resources across the regions has become entrenched by colonial policy and subsequent political processes. Inequalities linked to ethnicity and region related to natural resource use and security, with Buganda favored for a cash economy and the Acholi and Langi for a military role. Uneven economic and social development not only solidified a power base for Bagandans in government, but also represented a significant disparity between the south and the north that now plays into the ongoing civil war in northern Uganda.

The central point is not ethnicity per se, but how ethnicity has functioned historically as a driver for group mobilization in the political process. Ethnicity is intimately linked to political and economic conditions, especially unequal distribution of and competition for power and wealth (Anthony 2002). Demography, livelihoods, and historical circumstances have all played roles in the invisible, though potent, division of Uganda into north and south as well as into the demarcation of administrative districts that generally coincide with ethnic/cultural/language groupings.

Religious Divisions

Religion has been engaged to support political hegemonies throughout Ugandan history. In the mid-1800s, the Bugandan king, responding to expansionist pressures from Egypt and the rival Bunyoro kingdom, invited British Anglican Protestant missionaries to Buganda in the hopes of obtaining firearms. When violent conflicts erupted in the late 1880s among Catholic, Protestant, Muslim, and traditionalist groups, British intervention led to a sustained dominant position for Protestants. Political alignment came to be associated with religious persuasion, not only in Buganda but more generally. By independence in 1962, all of Uganda's principal political parties were based on religious allegiance (Leggett 2001).

The correlation between religious affiliation and political alignment has for generations played a significant role in national politics and driven some of the underlying tensions within the country. Sporadic outbreaks of religious violence have contributed to the latent tensions that still exist among religious groups. In recent years, however, there has been a noted decline in the influence of religion, and some Ugandans think that this is one of the biggest and most positive changes in politics (Leggett 2001). What direction the trend will take regarding the relationship between religious affiliation and political activity is an issue of some concern in this current climate of uncertainty regarding a multi-party system and a presidential third term. The specter of religion as a potential contributor to violence is real.

Ethnicity and Religion

Violence as a means of power transfer is intertwined with ethnic and sectarian conflict. The institutionalization of ethnicity and its role in regime change and political leadership has profound influence

on political, economic, and social development in Uganda. Indeed, ethnicity has been identified as one of the driving factors in post-independence conflicts that include the 1964–1966 overthrow of President Edward Mutesa by Milton Obote, the 1971 coup by Idi Amin, the civil war of 1981–1986, and the insurgency in the north that has been going on since 1987 (Anthony 2001).

Sectarianism, although significantly reduced, still troubles Uganda and has potential for rising to the surface as a source of conflict during a period of political transition. Conflicts that have erupted over time have been characterized as Catholics vs. Anglicans, Muslims vs. Christians, and Born Again Christians vs. Others (CSOPNU 2004). However, conflict identified as religious usually does not stem from theological disagreements. The impact of religion in conflict usually results from the association of religious identity with ethnic divisions and economic factors (Marty and Appleby 1997).

Ugandans interviewed in a recent study (CSOPNU 2004) cited the threat of tribal/ethnic and religious conflict as second only to LRA violence as a source of insecurity in the country. This suggests that the theme of ethnicity and sectarianism is a current security concern in Uganda.

One example of an undercurrent of fragmentation along ethnic and religious lines is the residual support within Muslim communities for followers of former president Idi Amin. Similarly, after Acholi and Karamoja, the West Nile area is characterized as of greatest concern in relation to conflict (Oloya 2005). West Nile was second to Karamoja as the least developed area in the 1960s–1970s. The bulk of the population is less than 25 years old. About 60 percent of the population is Muslim, education is limited and primarily Koranic, and unemployment is high. West Nile leaders believe that the lack of state support for modernization and employment is a consequence of the fact that theirs is an area of Muslim religion and culture.

The land of the West Nile area has potential for agricultural development, but the lack of access to markets is a major constraint. According to some researchers, these conditions leave people in the West Nile area especially vulnerable to manipulation by external forces inducing them to participate in illegal trade across the border with the DRC for the promise of easy money (Oloya 2005).

Many people in Uganda believe that individuals from the western area of the country increasingly dominate political, military, and commercial life, and that parochialism and improper use of office for personal gain are eroding the values of the NRM. In addition, within the relatively advantaged southern and western areas, there exists a dynamic of tension between the ethno-regional centers of Buganda and Bunyoro that since at least the colonial period has resulted in intermittent acts of political violence. The conflicting local nationalism between Buganda and Bunyoro leads some observers to be concerned about the prospect of political fragmentation along this line as the push intensifies to develop a multi-party system of government. The concentration of political, economic, and military power in southern and western areas of the country contributes to a sense of marginalization in other areas (Leggett 2001) and is a potential source of instability within the nation.

In Uganda, where the level of interaction among different ethnic groups is limited and mostly occurs as a result of school, business, or travel, group perceptions and social memory are shaped in large measure by the education system and the media. School curricula and the media are misused to influence public perceptions in a way that leads to fragmentation and the erosion of national unity (CSOPNU 2004). It is in this context that the recent strengthening of government control over the broadcasting industry, a primary instrument for shaping public perceptions, has particular significance as President Museveni consolidates his power to remain in office through a third term.

Perceptions of Relative Disadvantage in Economic Development and Political Inclusion

Perceptions of relative economic disadvantage and political marginalization are widespread in Uganda. In each and every focus group in a recent study (CSOPNU 2004), people expressed that they were politically excluded and did not receive a fair share of economic resources. Furthermore, all of the groups interviewed perceived their political exclusion and economic disadvantages to be the fault of another group. In other words, they perceived that another group was benefiting from political power and economic resources at their expense. This perception held in all 14 districts researched. Focus groups in northern Uganda blamed southerners; in central Uganda they blamed westerners; in Kibaale they blamed southerners close to the Rwandan border; in Bushenyi they blamed people in Mbarara; in Mbarara they blamed the Banyankole. Overall, the perception of injustice and exclusion existing throughout the country militates against the development of a sense of national identity.

National Unity or Disunity?

In many African countries, socio-cultural, ethnic, and religious diversity and political history make national unity a challenge in the best of times. In Uganda, the issue is especially salient in the context of the 2006 presidential election and associated political processes. National identity is in a state of transition.

Historically, ethnic groups in Uganda are linked to political and economic conditions, especially the unequal distribution of and competition for power and wealth, which has tended to hamper the foundation of national unity and democratic institutions. Although ethnicity is often cited as an immutable reality, ethnic identities and ethnic consciousness are historical constructions. An ethnic group is "an historically formed aggregate of people having a real or imaginary association, a specified territory, shared cluster of beliefs and values connoting its distinctiveness in relation to similar groups and recognized as such by others" (Markakis 1996). Depending on a number of variables including political will, ethnicity can be used as a political tool to divide and destabilize a society or to provide a foundation for the creation of political harmony within diversity.

Ethnicity is often looked at as detrimental to national unity, economic development, and democracy. The paradox is that the best way to reduce ethnic fragmentation is more, rather than less, democracy (Anthony 2002). Over time, one way to reduce ethnic tension is by deepening the democratic process, expanding economic opportunities, and implementing sound environmental management. The creation of a more united nation will mean promoting a civic identity that does not ignore or eliminate ethnic diversity but strives for collective economic prosperity and environmental security.

V. ENVIRONMENTAL SECURITY FACTORS

After exploring the linkages and interactions of a broad array of economic, social, political, and environmental trends, this study finds four principal areas of security concern—land, food, energy, and water. It should be noted that all of these issue-areas are interrelated in a variety of ways, and their separate treatment is only for analytical purposes.

Land Security: Seeds of Conflict[4]

Land Management—Past, Present, and Future

For Ugandans and a majority of Africans, land remains a fundamental resource and the primary source of livelihood and well-being. Indeed, land continues to occupy an important place in the social organization and political economy of the country.

The 1995 Constitution and the 1998 Land Act reaffirmed the rights of every Ugandan to own property and restored the four types of ownership (customary, *mailo,* leasehold, and freehold) that were in existence at the time of independence (October 9, 1962). The constitution and Land Act contained some significant

improvements. For example, discrimination against women's property ownership, which prevailed in the colonial and the immediate post-colonial times, was abolished.

Under the 1995 Constitution, the government retained the right to compulsory purchase of private land (owned by individuals, families, and communities) for public investment purposes. The government also retained the right to return property to reinstated kingdoms and to lawful and bonafide occupants. The latter is considered an important measure because, by recognizing lawful and bonafide occupants of land, the government has laid the basis for guaranteeing security of occupancy and tenure for Ugandans who do not own land.

Further, the Constitution and the Land Act allowed: 1) conversion of leases held on public land into freehold, i.e., tenants on public land can own the land on which they are settled; 2) registration of customary owners, thus converting customary tenure into freehold; and 3) acquisition of certificates by all users of land.

The Constitution mandated Parliament to establish land tribunals whose primary responsibility is to resolve land disputes related to all land transactions. These land tribunals are expected to be independent of the Uganda Land Commission—the national land authority.

The four land tenure systems recognized by the 1995 Constitution and the 1998 Land Act have enormous differences in coverage and impact. A significant majority of Ugandans hold land under the customary system. The leasehold and freehold systems are the least common (UBOS 2004).

Customary land tenure is the oldest and most common land tenure (Nkonya et al. 2004). Under the customary system, land belongs to the clans within a tribe and the clan leaders are responsible for allocating it among individual families of the clan. There are also communal lands where access is free to all members of the tribe for such activities as grazing. Households are granted indefinite occupancy of the land and are expected to bequeath it to their children. Holders of land under the customary system do not have a formal land title and the only proof of ownership is by birth into a given clan of the tribe.

Under the customary system, households generally have secure tenure. There are, however, two sets of problems associated with this tenure system: 1) growing land fragmentation, as land is subdivided among children from generation to generation; and 2) while land management is governed by the customs, rules and regulations of the community, the 1998 Land Act does not include adequate provisions for such a community-based system of land management.

Freehold tenure is a system whereby landowners hold registered land indefinitely. Under this system, the landowner enjoys full rights to use, sell, lease, transfer, subdivide, mortgage, or bequeath the land. The owner is free to use the land in any way desired within the legal, policy, and regulatory framework of the state.

Leasehold tenure is a system whereby the owner grants the tenant exclusive possession of the land, usually for a specific period. In return, the tenant pays rent or service, the amount and terms of which vary from one place to another. Leasehold contracts may entail formal land titles or may be informal. Long-term leases often require formal arrangements; short-term leases are usually informal. Long-term leases grant the tenant greater security of tenure and enable tenants to invest in land improvements in the form of such activities as tree planting and terracing. Tenants are also free to sublet, bequeath, mortgage, or use the land as collateral. In contrast, short-term leasees are not allowed to invest in land improvement and it is not in their interest to do so because they have no guarantee of permanent use of the land.

Mailo tenure is a system established by the British colonial rulers in 1900, when they divided the land into crown land and *mailo.* *Mailo* refers to the tract of land allocated and ownership titles given to the royal

family (*Kabaka*). These tracts of land allocated were so large that they had to be measured in square miles (*mailo*, hence the name of this tenure system) (Nkonya et al. 2004). The landlords in the *Kabaka* then divided their land into smaller parcels that were rented out to tenants. In addition to the annual rent, tenants were required to pay a tribute in the form of beer, crops, or money (NEMA 2001). This system allows tenants to cultivate crops, plant trees, reside on the *mailo* land, and bequeath it to their children. In cases where the landlord wishes to evict the tenant, the landlord is required to compensate the tenant for investments (NEMA 2001).

Following the 1995 Constitution and the 1998 Land Act, the Land Sector Strategic Plan (LSSP) was prepared. This plan provides a long-term implementation framework for the 1998 Land Act and aims to promote: 1) effective use and management of land resources; 2) more equitable distribution of land; 3) improved access to and ownership of land; and 4) greater tenure security for vulnerable groups, including pastoralists. One visible achievement of the LSSP is the establishment of land tribunals in about 56 districts with 18 circuit chairpersons.

Despite progress made to address land-related legislative issues, the land sector in Uganda faces several challenges that include insecurity of tenure, overlapping and conflicting land rights, and glaring inequity in access to and ownership of land. These problems have been compounded by high and ever increasing population densities, severe deforestation, land degradation, and declining soil quality, largely driven by the high population growth rate, unsustainable agricultural practices, and policy and institutional weaknesses.

Environmental Security Concerns Arising from Land Tenure, Management, and Policy

Notwithstanding localized land shortages in some districts, at present, land need not be regarded as an extremely scarce resource in Uganda. But the rate and extent of soil nutrient mining, deforestation, increasing environmentally-induced migration, the complexity of the land tenure regime, and the high number of displaced people as a result of the conflict in the north have given rise to serious policy and security concerns. Some of the key concerns are addressed below.

Land Titles

Under the customary land tenure system, occupants do not have title deeds. Without documentary proof of ownership, customary land occupants are not secure from possible eviction provided the evicting party tenders satisfactory proof that he or she is the rightful owner of the parcel of land. This entails the involvement of local leaders (Local Council executives) alongside the clan elders in mediating the possession and exchange of customary land.

While the 1998 Land Act provides for the issuance of a certificate of occupancy to the occupant on application of the registered owner, issuance of such a certificate would depend on mutual understanding between the two parties. The certificate is meant to enable the occupant to prove that he or she is a legal occupant if a problem arises. In effect, the bonafide occupants are made statutory tenants of the registered owner. Today, disputes over land ownership and/or access rights underlie many community clashes (see table below).

Table 12: Sources of Disputes among Land Users

Conflict Indicator	Sango Bay	Lake Mburo National Park area	Kabale / Ntungamo border	Kibale National Park area	Katakwi/ Kotido border
	(%)				
Land	80.0	91.3	100.0	91.7	77.0
Water	11.2	0.0	0.0	0.0	13.1
Others	8.8	8.7	0.00	8.3	9.9

Source: PAES 2004.

The table above shows the results of a 2003 PAES survey of 120 households in five study sites located in the north-eastern, western, and south-western parts of Uganda. In each site, land emerged as the primary source of disputes; in the case of the Kabale/Ntungamo border area, it is the sole source of dispute. In the Katakwi/Kotido area (Karamoja), water accounted for over 13 percent of disputes, prima facie evidence of the growing water scarcity in the region.

Conflicts Related to the Degazetting of Government Land

The Government of Uganda has adopted a policy of converting gazetted (public) land to private use in order to encourage investment and economic growth. However, this process, known as degazetting, in some cases has become a source of conflict between the government and local communities. For example, while the government degazetted the Namanve Forest Reserve in 1997 without strife, its decision to degazette the Butamira Forest Reserve in 2002 brought it into conflict with local communities. The case ended with the government issuing a land use permit—over community objections—to Kakira Sugar Works Ltd. to turn the Forest Reserve into a sugarcane plantation (Tumushabe and Bainomugisha 2004).

On the other hand, residents of Kasese district have been demanding degazetting of most of their land or compensation from government on grounds that half of their territory is gazetted as game parks, forest reserves, prisons, or other government institutions. Similarly, the Karamojong have been angered by the gazetting of most of their fertile land, leaving unproductive land for human beings. This situation spurs them to go to neighboring areas, especially Teso and Lango, in search of pasture and water, setting the stage for conflict.

Tenure Insecurity and Unequal Land Distribution

Average landholding in Uganda is estimated at 2.2 hectares per household, although there is great inequality in access to and ownership of land among households and within districts (MWLE 2004a). Tenure insecurity is widely felt, and it is particularly acute among female landowners, tenant farmers (*kibanja* holders), and households living in densely settled areas.

Such tenure insecurity curtails land users from investing in land improvement, putting up permanent structures, and undertaking soil and water conservation programs. For example, under customary tenure, owners enjoy an indefinite tenancy, which provides them a sense of security and continuity. Land owners, therefore, have incentives to invest in the land and manage it sustainably, although investment decisions are expected to be made in consultation with family and/or clan members. A more serious problem is that as population from generation to generation increases, the same tract of land is passed on to more and more users as parents bequeath their land to children.

Under freehold tenure, landholders are granted complete rights of use, including the right to transfer, sell, lease, subdivide, and mortgage their property. While landholders under this system have full tenure security, very few farmers are able to take advantage of this system of land tenure. The 1998 Land Act requires farmers to pay for cadastral surveys and title fees in order to obtain legal titles. Most farmers in Uganda

cannot afford these costs (Nkonya et al. 2004) and thus remain without title to the land. Until more landholders are able to acquire titles, most farmers will remain insecure under the freehold system.

Tenure security under the leasehold system varies with the duration of the lease. Land users with long-term leases have better security and greater incentives to invest in sustainable land management while those with short term leases may not be able to do the same. Under the *mailo* system, tenants are allowed to bequeath land to their children and they cannot be evicted by the landlord without a court order. However, there are several restrictions in tree and land use that make tenure security a source of concern. For example, a tenant is not allowed to put more than 0.4 hectares under perennial crops or sell trees for profit.

Overlapping and Conflicting Rights on a Piece of Land
The 1995 Constitution and the 1998 Land Act, in recognizing the four types of land ownership (customary, *mailo*, leasehold, and freehold tenure) potentially allow overlapping rights to the same piece of land. For example, under the *mailo* tenure system, tenants have the right not only to cultivate crops, to plant trees, and to reside on the *mailo* land, but also to bequeath it to their children. The landlord cannot evict a tenant without full compensation for investments made by the tenant. Thus, both registered landowners and tenants have rights to land in perpetuity, which could be a source of tension and conflict. Further, a majority of the customary land owners do not have proof of ownership despite a legal provision for issuance of certificates of customary ownership. At a time when the traditional system of dispute resolution is weakened because of modern laws that failed to recognize it, the situation can easily be exploited by unscrupulous individuals and groups by placing multiple claims on a piece of land. The problem is further compounded by the legal provision that permits a tiller to claim ownership of land that he or she has cultivated for 12 years. Such anomalies in the legal system create undue pressure on the land dispute resolution mechanisms, such as the Land Tribunals, which are already stressed by the huge number of land dispute cases.

Individualization of the Commons
Rapid population growth and extensive agricultural practices are leading to an increasing conversion of land from communal to individual property. This individualization of land ownership threatens the right of access to common grazing land and water and the livelihoods of agro-pastoral communities, a significant segment of Ugandan society. Although the 1998 Land Act has provisions for setting aside land for common use, national regulations and standards are lacking. As a result, both disputes among agro-pastoral communities within Uganda and conflicts with Kenya are on the rise.

Weakness in Land Governance
A report by the Ministry of Water, Land and Environment (MWLE), "Issues Paper for the National Land Policy," argues that, until recently, land sector institutions were designed to serve the interests of a narrow minority of relatively wealthy registered landowners (2004a). The paper also states that decision-making processes lacked transparency and local institutions have not been empowered as foreseen in the decentralization policy. In urban areas, the existence of multiple large-scale landowners has made enforcement of regulations complex and difficult.

Land Security Challenges in Three Critical Regions of the Country
Land ownership, tenure, and management continue to play a central role in Uganda's development and economic policies, sustainable peace building, and attainment of political stability. Three critical regions of the country illustrate land security challenges, including:

- Northern Uganda—where land is an environmental security issue in a post-conflict setting;
- Karamoja—where land scarcity in the form of scarcity of pasture and water has been a source of political instability and conflict;

- The Albertine Rift—where rich biodiversity against the backdrop of an extremely high population density, soil nutrient mining, and militarization have made the region an environmental security hot spot.

Northern Uganda—Post-Conflict Challenges and Opportunities

For two decades, northern Uganda has been a war zone. The Lord's Resistance Army (LRA) and its predecessors have waged a civil war against the Government of President Museveni (NRM). Gulu, Kitgum, and Pader districts are the most affected areas. Led by Joseph Kony, who claims to be a spiritual leader, LRA forces are estimated at less than 1,000, mostly child soldiers. The armed group has been effective in spreading fear and terrorizing the population. The LRA does not possess and administer a territory, although whatever land the military does not control is under the de facto control of the rebel organization.

All the people interviewed by the study group in Gulu and its environs, as well as in Kampala, explained that the LRA does not have the support of the local population. The LRA lacks popular support because it mostly attacks people belonging to its own ethnic group, in particular, the most defenseless and vulnerable among the population, especially women and children. About 93 percent of the population in Gulu, Kitgum, and Pader is displaced and resides in either IDP camps or nearby districts to which they have fled. The combination of LRA violence—which the highly mobile group has perpetrated over a large area—and damages and casualties resulting from the Ugandan army's military response to the LRA, have taken a tremendous toll on the local population.

The Government of Uganda and its Ugandan People's Defence Force (UPDF) have yet to defeat the LRA insurgency. Some of the reasons for this failure, according to interviewees, include: 1) poor military strategy and tactics; 2) unwillingness on the part of the military leadership to end the war for alleged self-serving economic reasons; 3) poor military discipline within the rank and file, who are often unwilling to fight and who commit rape and drink heavily; and 4) LRA mobility, which makes it difficult for the army to find the enemy.

> "The roots of the conflict go back at least as far as the war of liberation when the massacres in the Luwero triangle by the Ugandan National Liberation Army (UNLA), which included a high proportion of Acholis against the National Resistance Army (NRA). Following NRA's victory in 1986, elements of the UNLA regrouped in Sudan and began attacking the UPDA (predecessor of the UPDF) and against civilians in Acholiland. By 1987 Alice Lakwena's Holy Spirit Mobile Force began, succeeded in 1988 by her father's Holy Spirit Movement, which gave rise to Kony's Lord's Resistance Army (LRA). Only the first two of these insurgencies (UNLA and Alice Lakwena's Force) seemed to have much support within the Acholi community, which was alienated by the abuses committed by the UPDA. It seems likely that the atrocities committed by the LRA on the civilian population have cost it any support it might have garnered in the community. The LRA seems to have no coherent programme beyond the overthrow of the Museveni government and acted in an unpredictable and violent manner, which made realization of whatever objectives it may have had, beyond self-perpetuation, unachievable" (Dorsey and Opeitum 2002).

Despite its small size, unpopularity, and inherent organizational weaknesses, the LRA has managed to destabilize northern Uganda for almost two decades. The group has terrorized the population, played havoc with the economic and social well-being of northern Ugandans, and cost the country scarce financial, material, and human resources that could have been used for development.

During interviews with IDPs, it was apparent that they are haunted by the threat of potential attacks by LRA and were clear that returning to their respective villages is unthinkable until LRA leader Joseph Kony is captured. For many years, it was widely believed that the support of the Sudanese government facilitated the survival of the LRA and perpetuated it as a credible force. Yet, since the signing of the Comprehensive Peace Agreement between the Khartoum Government and the Sudan People's Liberation Army (January 9, 2005), the LRA has continued its periodic

abduction of children. This implies either that the importance of the support the LRA was receiving from the Khartoum Government was exaggerated or that Khartoum might still be helping the LRA. Whatever the truth, the fact that the LRA, a small, unpopular group, has been able to traumatize and kill innocent Ugandans shows the weakness of the Ugandan government and its armed forces.

The 20-year war has resulted in massive population displacement with rare historical parallel for the size of the population and geography of the area. The World Food Program reported that the number of IDPs reached 1,735,085 in 2004 (World Food Program 2004). According to the 2002 population census, about 22 percent of the population of Uganda (5.8 million people) lives in Northern Uganda, about two million of them in three districts of Acholiland, namely Gulu, Kitgum, and Pader. IDPs represent about 93 percent of the Acholi population; this figure includes people who migrated to other districts of the country as a result of the war.

At the time of the study team's visit, the overall security situation in Gulu and other parts of northern Uganda was declining. Gulu interviewees reported that the army has advised IDPs to stay within the camp area, an indication of the worsening security situation. Kitgum has been worse, with a significant number of civilians attacked, many children abducted and military barracks attacked. The LRA, they said, very rarely targeted military barracks in the past. The interviewees conjectured that the LRA might have scaled up its activities in response to the government's lukewarm support for a negotiated settlement of the conflict.

At the national level, the war remains Museveni's Achilles heel and a drain on the country's scarce financial and material resources. The war is also responsible for enormous displacement and growing poverty among the population of Acholiland. The direct and indirect costs of the war have been extremely significant. "The total cost of the conflict in Gulu district to the country has been estimated conservatively at about US$1.3 billion over the period of the conflict" (Dorsey and Opeitum 2002). The CSOPNU study suggests that the estimated cost of the war will rise when information from Kitgum and Pader as well as from the West Nile and Lango areas are made available (Dorsey and Opeitum 2002).

> "Uganda's military has often said that it is close to defeating the cultlike rebel group after 19 years of war, but attacks-mostly on civilians forced into refugee camps by the fighting-have continued." Reporting on the killing of eight people by LRA fighters in an attack on villagers near Kitgum (New York Times 2005).

Figure 8: Pabo Camp, Gulu District.

There were 52 camps in the Gulu area alone at the time of this study. The average size of camps is 20,000, with Pabo Camp being the largest (at 63,118 people) (Pabo Camp Leaders 2005). From the discussions the study team held with IDPs and others in the Gulu area, two land-related issues surfaced:

1) Growing mistrust of government. Many IDPs do not trust the government's motives in keeping them in the camps. Some believe that they are kept in camps because the government is positioning itself to take their land; and

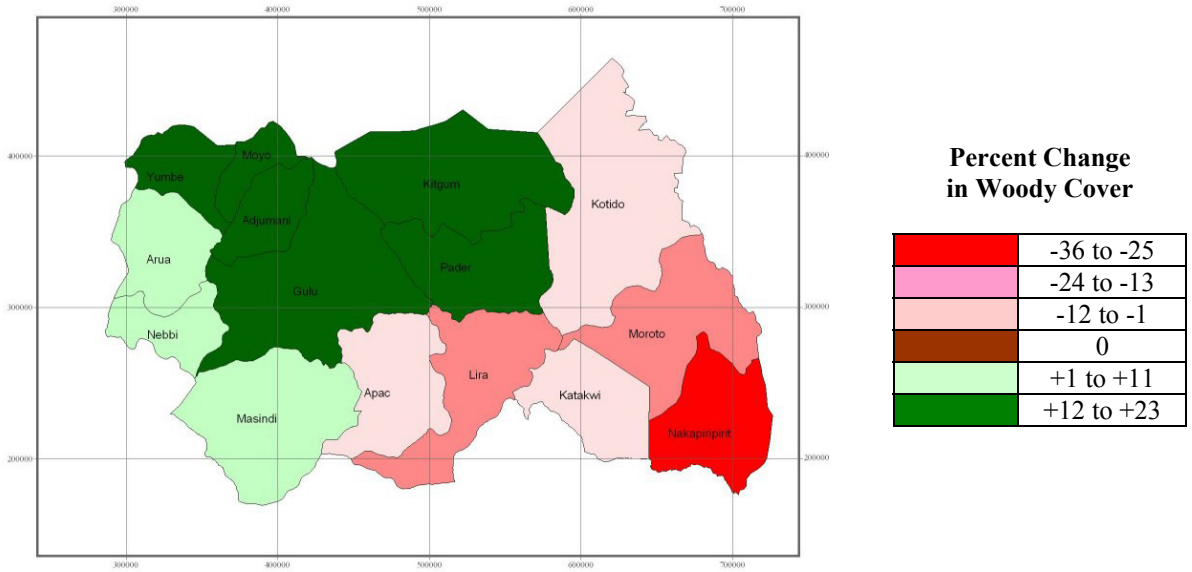
2) Many IDP camps are located on private land. Yet, the government has invested heavily in water supply, roads, education and health

> "In Gulu, I had to assure the people in public that the Government has no interest in their land, and will never take their land" (Rugunda 2005).

infrastructure, and bore holes. Such facilities would seem to reflect the intention to use the areas for an extended time as well the possibility of conversion of IDP camps into permanent structures (towns). However, not only are these camps often operating on private lands without owner compensation, many IDP campsites may not meet the minimum requirements for urban settlement, such as proximity to an adequate water supply.

Northern Uganda is endowed with highly fertile land, substantial forest cover, and adequate levels of rainfall (the second highest rainfall in the country). Only 10 percent of the arable land in Gulu district is under cultivation (Moro 2005). The protracted conflict has changed dramatically the vegetation cover of the

Figure 9: Change in Woody Cover



Source: Nampindo et al. 2005.

region, with both positive and negative effects being reported. A recent study by the Wildlife Conservation Society (WCS) in Uganda shows significant increase of vegetation in the districts of Gulu, Kitgum, and Pader, presumably because of non-use of the land by the population, most of which is in IDP camps (Nampindo et al. 2005). On the other hand, the adjacent districts, Lira and Moroto, experienced heavy loss of forest cover (Nampindo et al. 2005). The National Biomass Study of 1996 and 2003 corroborate these findings, reporting that "83 percent of Lira's local forest reserves had been either degraded or deforested." On the other hand, the same studies show that "Gulu, Pader, Kitgum and Apac lost almost 100 percent of their local forest reserves," (Uganda Forest Department and MWLE 1996 and 2003).

Post-Conflict Land Security Threats and Risks

Customary tenure is the dominant form of land tenure in Acholiland, although nearly all cultivated land falls under private ownership at the family or household levels. Traditions and rules that evolved over generations govern the use of the land, but there are several issues that will make land ownership an area of great concern:

> "The land issue is one of the biggest challenges facing post-conflict rehabilitation and reintegration" (G. Ogwang 2005).

1. *Land policy and legislation gaps*. Although the 1998 Land Act recognizes customary tenure and the fact that it is governed by traditional laws, the Act gave administrative

powers to modern institutions, not traditional ones. This undermines traditional institutions and triggers land disputes. Furthermore, the 1998 Land Act stipulates issuance of Certificates of Customary Ownership (CCOs) as proof of ownership, yet CCOs have not been issued, depriving landowners of a sense of security.

2. *Loss of rights to land through forced displacement.* The Land Act does not make a distinction between landowners displaced by war and other absentee landowners. The Act stipulates that any tiller who has lived or used a parcel of land for 12 years has a claim over that land. Because most IDPs have been away from their farms for more than 12 years, some fear that they might have lost the right to their land.

3. *Illegal occupation and logging by the military.* It is widely alleged that some army officers have taken possession of privately owned land and used it for their personal benefit. In the absence of a legal claim, such land use is illegitimate (and possibly impermanent) as no permission has been sought from legitimate landowners nor any compensation made. IDPs find it unacceptable that senior members of government are cultivating their land while the legal owners are confined to camps. During interviews, some IDPs remarked that the government deliberately created the camps so that the military and political leadership could take their land.

   In addition, there are reports of illegal logging by the military in areas where the local people were relocated in order to isolate the LRA. The CSOPNU report contains "widespread and detailed reports of logging undertaken by military personnel in both Gulu and Kitgum Districts (around Lukung and Agoro, near Opit and in Kaledima)" (CSOPNU 2004). Although the report notes that not all the allegations have been substantiated, the concern was reinforced by the interviews that the FESS research team conducted. Both the illegal cultivation of land and illegal logging intensify fears among IDPs that the government is there to take their land. Investigating these allegations and making compensatory payments where necessary would go a long way in allaying fears among the Acholi and may enable the government to regain the moral and political authority it has lost during the war.

4. *Absence of compensatory payments for both legal and illegal land users created by the conflict.* In addition to land illegally occupied and cultivated by the military leadership, there is no compensation for land used by the army as camps or for land used for IDP settlement. Both in the IDP and military camp areas, permanent structures have been set up without the permission of the original land owners or without any kind of compensation.

5. *Compulsory acquisition of land for private investment.* The 1995 Constitution allows compulsory acquisition of land by government for investment purposes. There has been widespread discussion of investment by the military leadership as well as by other private investors ready to invest in areas vacated by IDPs. Since there has not been an open discussion with the IDPs and tribal chiefs, these development initiatives, however beneficial, raise suspicions and have intensified the fear of land seizures by government authorities.

6. *Land grabbing from vulnerable groups.* IDPs fear that, upon return, there could be land grabbing from the most vulnerable groups, i.e., women and children, by neighbors and relatives, although it is hoped that community and family elders would be in a position to prevent such seizures and resolve any conflicts. Additionally, county officers may be encroaching on private land, often owned by vulnerable groups, because the land that "county officers originally occupied was often administratively acquired before independence but without title" (CSOPNU 2004).

7. *Overlapping claims on parental land.* The demographic impact of the war has been significant. The forced migration of people tends to erode family values and cultural ties among individuals and communities. These migrants once fully engaged in farming work have suddenly found themselves in a state of unemployment and frustration. Camp leaders reported to the study team that there are many children born in camps, some conceived outside of marriage. When these children grow up, they are likely to place claims on their parental land. Determining which children will be entitled to parental land and which ones may not, and then allocating land accordingly, is an arduous task and a potential source of conflict.

8. *Demarcation of land boundaries*. Rivers, hills, huge trees, or other familiar landmarks, often mark rural land boundaries. Over two decades of war, vegetation loss has destroyed many of these landmarks. Village elders who were familiar with the boundaries of landholdings may have died. These changes create uncertainty in relation to land ownership and create tensions at the family and community levels that might spill over into conflict at the district and national levels.

9. *Mechanisms for land dispute resolution.* Customary land ownership relies heavily on traditional systems and institutions for conflict management. However, the war weakened these institutions on several fronts: (a) Tribal chiefs who had commanded considerable respect, moral authority, and leadership are today among the IDPs. Like any IDP, these tribal chiefs live on food rations and under extremely poor conditions. "If he is one of us [living under marginal conditions], how can he be my chief" is the general feeling that prevails; (b) The 1998 Land Act and the Constitution do not recognize the role of traditional authorities in land conflict management; and (c) Land Tribunals and Parish Land Committees established by the Land Act may not include tribal chiefs. All these developments have weakened traditional institutions.

10. *Land mines*. While there has not been an extensive study documenting the use and location of land mines in Northern Uganda, they are known to be used frequently by the LRA. Their existence is a potential obstacle to the resettlement of IDPs and to building a sustainable peace in the region. According to news reports, "[d]ata collected from hospitals in the north show that 385 people suffered amputations as a result of mine accidents or unexploded ordinances between 1999 and 2003, making this the single largest recorded cause of disability in the region" (IRIN News 2004).

11. *Weak state capacity.* One of the characteristics of government structures in Uganda is the inadequate capacity to implement policies and enforce legislation. Government ineffectiveness—combined with the modern–traditional law dichotomy that the 1995 Constitution and the 1998 Land Act created, the prevailing mistrust of government, and the protracted war—has disillusioned many civil service personnel. Clearly, the capacity of the state to articulate programs and development policies is weak.

Karamoja—Environmental Scarcity, Poverty and Protracted Political Instability

The Karamoja area in northeast Uganda has a long history of civil strife characterized by cattle raids and intercommunity fights over scarce pasture and water. The problem dates back to colonial times and arises from the disruption of an integrated livestock and crops culture by a host of policy and institutional failures.

The Karamoja region is a vast nomadic pastoral area with a shallow natural resource base compared to other parts of Uganda. Rainfall is inadequate and too erratic for crop cultivation (averaging 350 to 750 mm per annum). Rainfall in this region is highly seasonal, coming mostly in torrential downpours that last for several hours. Prolonged drought conditions alternate with instances of heavy flooding.

Overgrazing in the rangelands and around watering points, severe soil erosion, and depletion of underground water aquifers and reservoirs characterize the Karamoja environment. Karamoja is also at the center of three major international illegal arms and ammunitions trafficking corridors involving Sudan, Ethiopia, and the

Kenya-Somali frontier. This illegal trade has compounded the region's complex political, economic, and social challenges.

Karamoja has experienced long-term environmental changes typified by severe land degradation, low, erratic and unreliable rainfall, and recurrent prolonged conditions of drought. The resulting diminished crop cultivation, increased competition over-shrinking pastoral resources, growing water scarcity, and pervasive poverty have made the region an area of severe environmental insecurity and protracted conflict.

According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), "Karamoja experienced massive crop failure, up to 90 percent, particularly in the region's dry belt. Those who have been in the region for more than two decades are quoted as saying that since the 1980s there has never been such a crop failure" (Timson 2005).

The current violent armed conflicts in Karamoja are caused by the cumulative effects of a combination of factors:

1. *Resource scarcity, particularly of pasture land and water*. The long-term environmental changes that Karamoja has undergone have resulted in diminished crop cultivation and increased competition over shrinking pastoral resources. Such environmental changes are often associated with the outbreak of cattle diseases, which at times claim large numbers of livestock. Like any pastoralist society, the Karimojong cope with these changes by moving to places where pasture and water can be obtained and by conducting cattle raids as a means of re-stocking lost cattle. A family's ability to protect its herd depends on its capacity to defend its property; hence the proliferation of small arms and ammunition, which both reflects and fuels the conflict.

2. *Economic and political marginalization of the Karimojong*. Since colonial times, the Karamoja region has not been blessed with strong local governance and a high development priority from the federal government. The colonial administration declared a huge part of Karamoja a protected area and thereby restricted pastoral mobility. International borders and tribal administrative boundaries were also created with entry allowed only by "special permit" (Owor 2005).

   Since Uganda's independence, however, the Karamoja region has been treated separately from the rest of the country. The 1964 Karamoja Act gave the region special status in the areas of administration and development. This status was short lived as Idi Amin repealed the act upon assuming power in 1971. The present NRM government reinstated the special status for Karamoja and established the Karamoja Development Agency (KDA), by Statute 4 of 1987. In addition, the Government established the office of Minister of State for Karamoja under the Office of the Prime Minister.

   Despite the treatment of Karamoja as a special region, development policies have generally undermined pastoralists in Karamoja. Uganda today lacks a national policy on pastoralism that clearly and specifically articulates the challenges of pastoral development in a dryland area like Karamoja. Interventions by the government to contain armed conflict have instead caused untold suffering to the people of Karamoja. For example, when the government launched a forced disarmament program, cattle raiding intensified as some criminals sought to acquire as much livestock as possible before the government took away their guns. Law abiding citizens who disarmed became targets and lost all their livestock and with it the basis of their livelihoods. Not surprisingly, a number of other planned development interventions have met with significant resistance.

3. *Creation of internal boundaries and international borders*. The drawing of Karamoja's border with Kenya between 1920 and 1940 led to a loss of between 1,500 to 2,000 square miles (about 15

percent) of Karimojong grazing lands, severely diminishing available grazing areas as well as dry season dispersal areas for various Karimojong groups. With livestock increasingly concentrated over smaller areas, early signs of natural resource degradation became evident. An additional estimated area of 108,443 hectares was lost by the Karimojong following the establishment of forest reserves in Moroto, Kadam, Napak, Morungole, and the Zulia Mountains, driving the mountain communities to more fragile areas. As early as 1940, environmental degradation had already become a serious problem in many parts of Karamoja.

4. *Management of gazetted areas*. In addition to the creation of boundaries and borders that resulted in diminished grazing lands, gazetted areas (such as national parks, game or forest reserves or wetlands) represent about 36 percent of the total land area of the three Karamoja districts of Moroto, Kotido, and Nakapiripirit. The relatively large gazetted area has contributed to the current situation of land scarcity in Karamoja.

5. *Weakening of traditional institutions*. For a long time, the traditional council of elders served both the political functions of public administration and the judicial functions of a court of law, adjudicating, sanctioning, and enforcing. Today, these institutions are still in operation. Yet, modern public administration does not recognize the customary traditional governance system. Judicial proceedings under the modern justice system take a long time before a sentence is passed because sufficient evidence has to be adduced to convict a suspect beyond a reasonable doubt. Outcomes of such proceedings are often not publicized. In Karamoja, aggrieved communities usually find it hard to appreciate these delays in the judicial process, to such an extent that the Karimojong often assume that the system does not work. The administration of justice is very weak at the district level in Karamoja as a result of the absence of courts and magistrates. This has undermined the confidence of the Karimojong in the modern system of justice.

6. *Proliferation of small arms*. The accessibility of arms in Karamoja has come at a price—frequent conflicts. The movement into dry season grazing areas outside Karamoja is usually associated with heavily armed warriors, sometimes wielding sophisticated weaponry for protection of the herds. Many times, these weapons have been turned on unarmed civilian populations in the host communities, where Karimojong warriors are accused of allegedly committing crimes ranging from stealing food and household property to rustling cattle from their hosts and committing highway robberies, rapes, and other atrocities, including murder and kidnapping.

7. *Pervasive poverty*. The Uganda Bureau of Statistics (UBOS) shows that the districts of Karamoja posted the highest Human Poverty Index (HPI) in the country. The HPI in Nakapiripirit and Moroto districts is 63.5; Kotido comes in at 53.8. These figures compare unfavorably with a HPI national average of 37.5 and a 46.1 average for the northern region. The western region had an average HPI of 39.0, with the eastern region at 37.1 and the central region at 31.5.

Albertine Rift —Environmental Security Hotspot

The Albertine Rift, located in southwestern and western Uganda, is regarded as one of the most beautiful and biodiverse places in the world. The Rift "harbors more endemic mammals, birds, and amphibians than any other region in Africa," and "is home to about 14 percent (about 5,800 species) of mainland Africa's plant species, with more than 550 endemic species" (Conservation International 2006). The forests of the Albertine are particularly rich in both endemic and threatened species (Plumptre 2002). Endowed with the world's last population of Mountain Gorillas, the Albertine Rift is part of Africa's montane rainforest circle, with links on the west and southwest with Cameroon and Angola, on the northeast with the Kenyan Highlands, on the southeast with the Eastern Arc Mountains, and via the Malawi Rift with southern Africa (WWF 2006). On the western side the Albertine Rift borders the Guinea-Congolian lowland rainforest.

In addition to species diversity, the Albertine Rift is also rich in ecosystem diversity. It enjoys diverse climatic regimes ranging from tropical in the lowlands to temperate in the highlands. Average rainfall throughout the mountain range varies between 1,200 and 2,200 mm per annum, although some localities exceed the upper limit of this range.

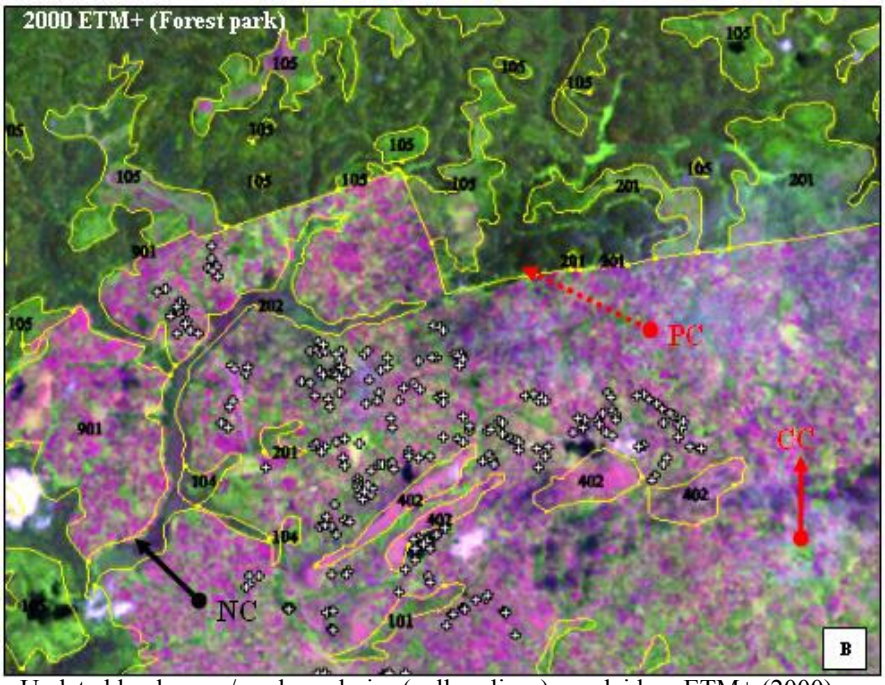
Today, the Albertine Rift stands as one of the most environmentally insecure places in Uganda. As one of the country's most fertile regions, the area suffers from high population density, extensive farming, and a large refugee population, all of which has wreaked havoc on the fragile ecosystem and is endangering the livelihoods of the people. Some key indicators of this process are described below.

High Population Density and the Destruction of Ecosystems
Despite its endowment with biodiversity of global significance, the Albertine Rift has one of the highest population densities in the country, with up to 600 to 700 people per square kilometer in the central part of the region and in southwest Uganda (Plumptre et al. 2004). People living in the region are among the poorest in Africa, with over 95 percent relying on subsistence farming. The polygamous practices of the Bakinga and Bafumbira, the traditional inhabitants of the region, and the custom of dividing land among children, have placed huge pressures on the land.

Heavy farming activities are destroying and fragmenting habitats in many areas of the region. Hunting and poaching, which are causing major problems in several protected areas and are even more intense outside these areas, aggravate the problems brought on by the high human population density and the destruction of habitats. Firewood collection is also a serious problem in several areas, contributing to deforestation.

For example, communities surrounding Kibale National Park (part of which is shown on the figure below) cultivate up to the last foot of the park's boundaries. This type of land use poses a threat to the national parks, and is always a source of tension and even conflict between park management and the surrounding communities.

Figure 10: Land Use Map



Updated land cover/use boundaries (yellow lines) overlaid on ETM+ (2000). Note that by 2000, cultivation had expanded to most of the non-protected natural vegetation. *Source*: PAES 2004.

Recent Regional Conflicts
Because of its location bordering the DRC, the Albertine region has suffered some of the most devastating impacts of recent conflicts, particularly the areas bordering DRC and Rwanda. Encroachment and illegal activities, such as the killing of mountain gorillas have increased. Populations of elephant as well as many other large mammal species have been decimated. Both of these activities harm tourism, which is a key income generator for surrounding Ugandan communities. Large numbers of refugees from the Rwanda/Burundi/DRC wars are known to be deforesting some areas, and bands of rebels hide in the forest between periods of raiding and fighting. Regional instability is spilling over Uganda's borders.

Growing Land Scarcity and Unsustainable Agricultural Practices
Kabale is a prime example of the serious problem of land fragmentation. The main land tenure regime in the district is the customary system (75 percent) with freehold and leasehold accounting for the remaining 25 percent. An estimated 90 percent of the population in the district is engaged in agriculture, despite the scarcity of land. Growing land scarcity has resulted in the reclamation of swamps, which started in the 1960s and peaked in the 1970s (PAES 2004). Kabale, with a population density of 290 persons/km^2 compared to the national average of 175 persons/km^2 (not including Kampala), is now one of the most densely populated districts in Uganda (UBOS 2004).

Food Security: From Seeming Plenty to Apparent Scarcity?

The State of Food Security and the Agriculture Sector
In Uganda, agriculture is the centerpiece of the economy, accounting for between 33 percent and 40 percent of the GDP and employing between 78 percent and 90 percent of the population (FAO 2005 and AFDB 2005). The backbone of the sector is small- and medium-scale farmers with average landholdings of 2.5 hectares. Historically, Uganda has been well-endowed with high quality agricultural land and dependable rainfall. In the 1960s, the country produced enough food for internal consumption and production was on the rise (averaging 10 percent annual growth according to MAAIF and MPFPED 2000 statistics in the *Plan for Modernization of Agriculture* or PMA). Since then, the sector has moved in a negative direction. Today Ugandan farmers are producing smaller yields despite a larger population.

Agricultural lands comprise 62 percent of the country's 199,710 sq km of land. The land area under cultivation (i.e., where permanent and temporary crops are cultivated) is about 4.6 million hectares, of which around 4.3 million hectares are devoted to food crops, while cash crops cover about 0.3 million hectares.[5]

Table 13: Land Use in Uganda

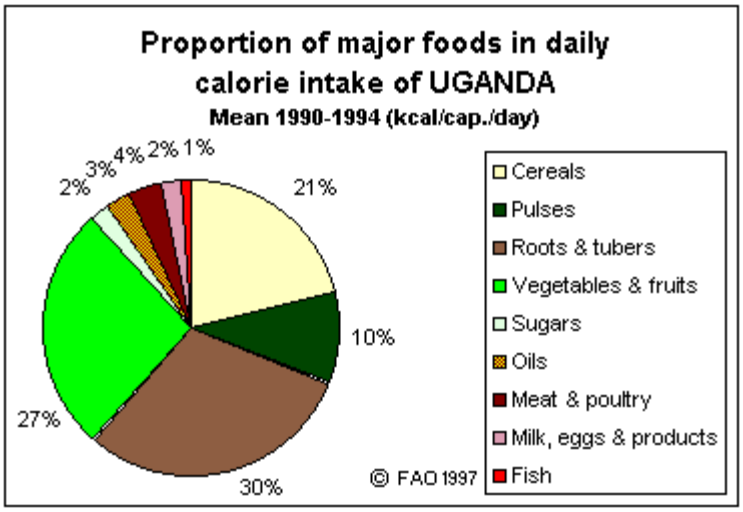
Item	***1,000 Ha***	***% of Total Land Area***	***% of Agriculture Area***
Total area	24,104		
Land area	19,710		
Agricultural area	12,312	**62%**	**100%**
Arable land	5,100	**26%**	**41%**
Permanent crops	2,100	**11%**	**17%**
Permanent pasture	5,112	**26%**	**42%**
Non-arable and non-permanent	12,510		

Source: FAOSTAT (2002 Data)

The three major sources of food in Uganda are cereal crops, root crops, and bananas (illustrated in the chart below). In terms of contribution to agricultural GDP, food crops (plantains, cassava, sweet potatoes, millet,

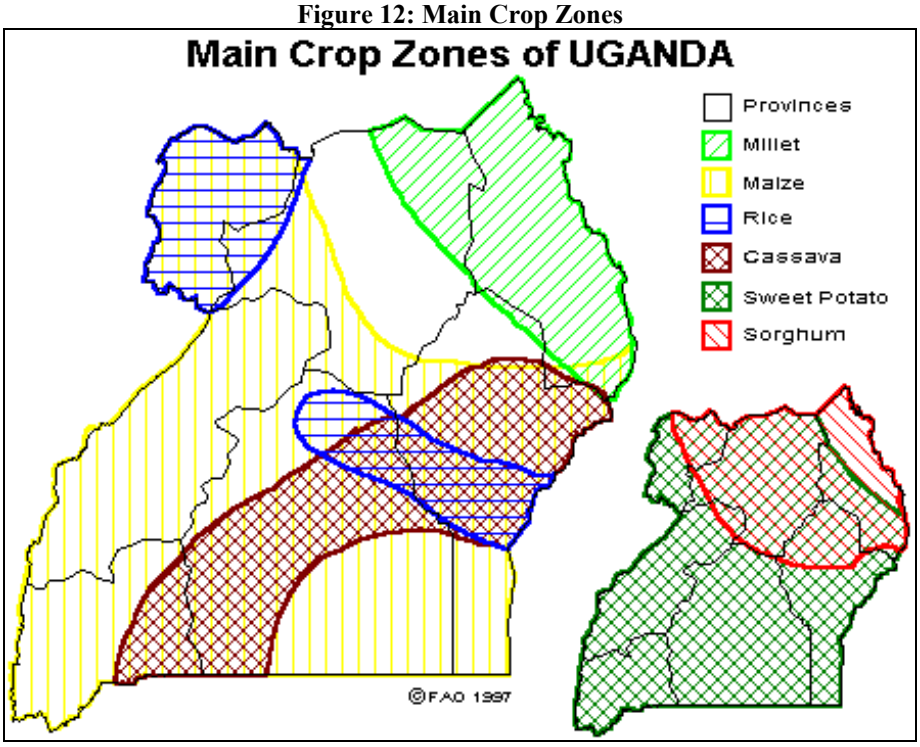
sorghum, maize, beans, groundnuts, and sesame) represent 60 percent, livestock 19 percent, and export crops (coffee, cotton, tea, and tobacco) 12 percent. The primary location of the country's major crops is shown on the map below. Some high-value, non-traditional crops, such as cut flowers and certain vegetables and fruits, are assuming an important role in the country's export commodities and are helping to diversify the basket of items Uganda markets. According to the January 2005 Uganda country report published by the Economic Intelligence Unit, private consumption contributes close to 80 percent of annual GDP, which is consistent with the fact that the bulk of agricultural GDP (60 percent) is generated for the private consumption of food crops (EIU 2005).

Figure 11: Food Consumption in Uganda



Source: FAO 1997.

Figure 12: Main Crop Zones



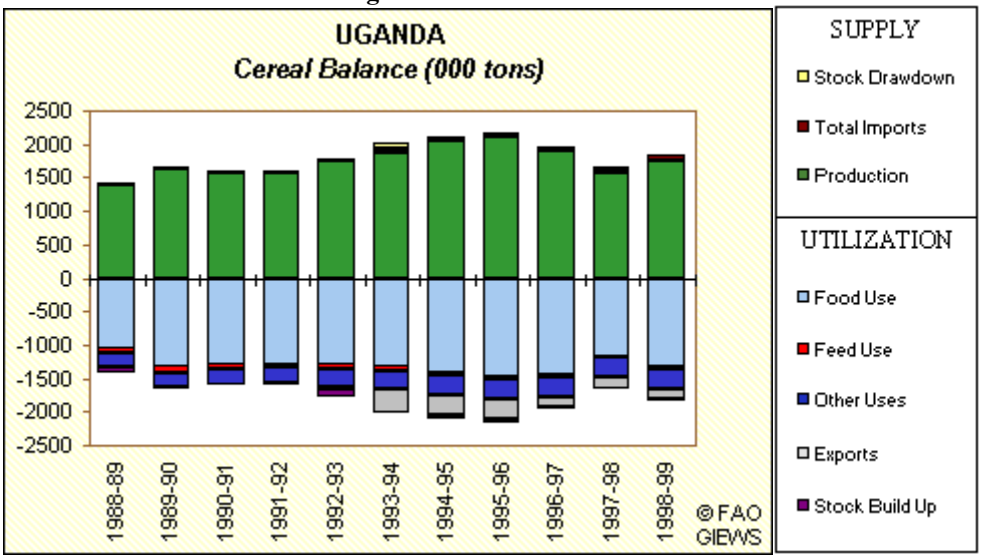
Source: FAO 1997.

About three million smallholders generate the vast majority of Uganda's agricultural output. Small farmers produce 94 percent of all agricultural production and 100 percent of the country's food production (UNFNC 1996). Only two cash crops, tea and sugar, are grown on large estates; together these estates comprise only 50,000 hectares.

Figure 13: Crop land in southwest Uganda.

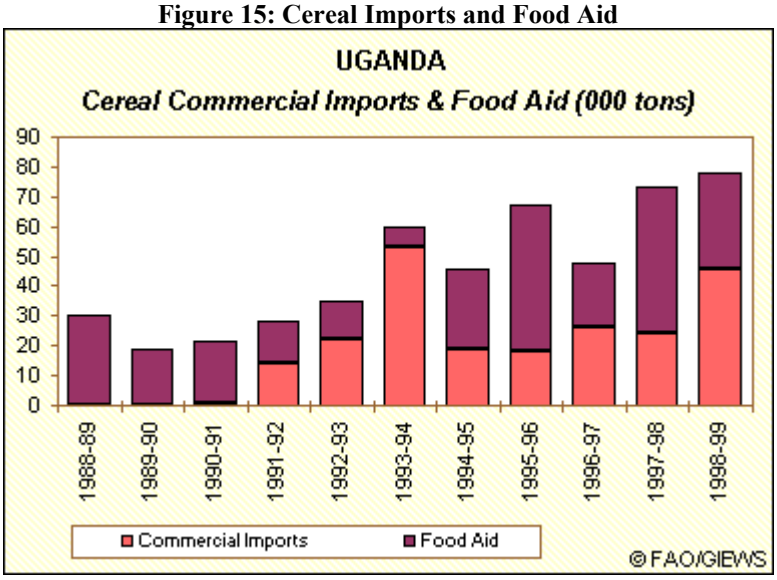
The overwhelming majority of Ugandans live in rural areas and in poverty. The poor are especially concentrated in rural areas. According to USAID, "85 percent of Ugandans and 96 percent of the poor live in rural areas. Nearly two-thirds of the 3.5 million rural households are mired in unproductive, low-input/low-output farming, and producing food largely for their own consumption" (USAID n.d.). Most of the population lives below the poverty level (WRI 2003b) and regularly confronts food insecurity. On average, 40 percent of the country's households are food insecure throughout the year. Few people stockpile food, and the government lacks an effective nationwide program to provide rations in times of need (Bahiigwa 1999). One out of every four children in Uganda is underweight (WRI 2003a). As figures 12 and 13 demonstrate, there is a trend toward increasing cereal imports and rising food aid shipments, which reflects the general decline in food security. Most experts agree that the connections between food insecurity, poverty, and environmental degradation are clear and negatively synergistic.

Figure 14: Cereal Balance



Source: FAO/GIEWS.

Figure 15: Cereal Imports and Food Aid



Source: FAO/GIEWS.

The agriculture sector should play a major role in combating social and economic insecurity, but it is undermined by decreasing productivity and vulnerability to international price fluctuations of agricultural exports. While Uganda had a positive food balance previously, more recently per capita food production has declined. Political and economic instability, including civil war, corruption, mismanagement, and the near destruction of commercial agriculture in the 1970s and 1980s dramatically impaired the productive capacity of the sector and decreased living standards. In addition, factors such as population growth, conflict in the north, a lack of economic diversification, land degradation resulting from a decrease in fallowing techniques, and minimal use of modern inputs are taking their toll. In the past 10 years, agricultural output and the sector's contribution to GDP have declined. As an example, the chart below illustrates the decline in production for the staple crop plantains that has taken place despite an increase in the area harvested. Between 1970 and 1997, per capita food production dropped by 44 percent (Bahiigwa 1999). The annual growth rate of food production, estimated at 1.5 percent, is not rapid enough to feed the population, which is growing at more than 3 percent per year (FAO 2005). These negative trends, if unchecked, will increase the gap between the output of the country's agricultural sector and the basic needs of the population. The result will be a higher level of food insecurity.

Table 14: Information on Plantain Production

Plantains Area Under Cultivation (Ha.)				
1961	**1990**	**2002**	**2003**	**2004**
616,000	1,388,000	1,648,000	1,700,000	1,700,000
Plantains Yield (Hg/Ha)				
1961	**1990**	**2002**	**2003**	**2004**
60,065	56,499	60,000	58,824	58,824

FAOSTAT Database Agricultural Data.

Adding to the typical farmer's daily struggle for survival is the decreasing per capita land availability. Between 1991 and 2015, the per capita cultivated land in Uganda is expected to shrink from 1.1 ha to 0.6 ha

(NEMA 2001). NEMA projections estimate that by 2032 nearly all of the available arable land will be under cultivation, placing the survival of rural families in subsequent years in a precarious position as they would no longer be able to increase productivity through extensive practices (NEMA 2002). For Uganda, a viable and sustainable agricultural sector is critical to food and economic security, development, the reduction of poverty, the minimization of environmental degradation, and the promotion of health. The ability of the agricultural sector to support and promote the country's stability, however, is threatened by factors straining the country's food security now and into the future.

Soil Quality in Uganda: The Problem of Nutrient Mining

One of the key threats to the country's ability to feed the population is land degradation, particularly nutrient mining.[6] This threat is increasing in the short to medium term with the demise of shifting cultivation. Decreasing land availability resulting from high population growth has led to continuous cultivation which, given low rates of technology adaptation and of fertilizer use in Uganda (even in comparison to other African countries), leads to land exhaustion and nutrient depletion. This process of accelerated land degradation places the country's farmers—and the population as a whole—in a precarious position.

Uganda suffers from one of the highest levels of nutrient depletion in sub-Saharan Africa (Woelcke 2002). Olson and Berry (2003) cite five key causes of land degradation and low productivity, including: "1) poverty and land fragmentation leading to over-exploitation of the land with inadequate soil and water conservation practices; 2) increasing rural population densities with few non-farm income opportunities; 3) low levels of commodity trade and the production of lower value commodities, reducing incentives to invest in the soil; 4) little farm knowledge of improved agricultural technologies, insufficient agricultural research that takes into account the needs and resource constraints of farmers, and a lack of effective agricultural extension; and 5) inappropriate farming practices/systems including deforestation, bush burning and overgrazing." A crucial issue facing Uganda is at what point the relation between an increasingly degraded land and a rapidly growing population produces such a disastrously low level of soil productivity and land availability per capita as to provoke conflict and instability.

According to agricultural expert Clive Drew, when the country had a smaller population, the practice of shifting cultivation helped ensure nutrient recycling (2005). Now, farmers can no longer afford to leave areas fallow. No natural nutrient recycling occurs and almost all crops are showing a decrease in output. As a result, much of the land being used in rural areas has been overused, leading to soil erosion. The continuous cultivation and cropping system practiced by Ugandan farmers, in the absence of soil fertility improvement measures, means that with each harvest nutrients are removed from the soil.

Across Uganda, declines in soil fertility have resulted in decreases in yields of both cash and food crops. For example, the average yield per hectare obtained under subsistence farming is estimated to be only 1 ton of maize, while the world average is close to 3.5 tons (FAO Land and Plant Nutrition Management Service n.d.). The shortfall, in economic terms, for a country struggling to reduce poverty is clear, and the monetary costs of environmental degradation are increasing over time. For 1991, experts estimated losses of $170 million to $460 million resulting from environmental degradation, of which 85 percent was due to soil erosion, 9 percent from water contamination, and the remaining 6 percent from biodiversity loss, water hyacinth growth, and deforestation (Kazoora 2002). By 2003, however, the cost of environmental degradation had increased to a range of between $230 million and $600 million (Olson and Berry 2003).

While the entire country is affected, some areas are experiencing especially acute levels of declines in soil quality. In these areas, threshold limits likely will be reached soon. The areas most affected by soil degradation include the highly populated areas of the southwest, northeast, and northwest regions. The highlands and drylands are the key areas suffering the most extensive decline in soil quality; these areas also have some of the highest population densities in the country. Population densities in the southwestern and eastern highlands reached as high as 282 per square kilometer by 2000 (Olson and Berry 2003) while the

country's overall density was 126 persons per square kilometer as of 2002 (UBOS 2004). Kabale, Kisoro, Mbale, and Rakai experience the worst levels of soil erosion, compounded by some of the highest population densities. In addition, Drew also includes the area east from Jinja to the border and the area surrounding Mt. Elgon and Kapchorwo as suffering from some of the worst levels of soil nutrient mining and overall degradation (2005). In the "Cattle Corridor," which comprises the range lands starting in the northeast districts of Moroto and Kotido down to Masaka and Mbarara, rain is insufficient and unreliable, and the ground is degraded, with desertification encountered in the Karamoja area. Drought and desertification drive the cattle herders into neighboring communities sparking small-scale conflicts over land and water usage.

Table 15: Soil Erosion

District	Total Land Area (ha)	Estimated Area Affected by Soil Erosion (in percent)	Population Density (people per sq km)
Kabale	165,300	90	250
Kisoro	66,200	85	279
Mbale	250,400	80	282
Rakai	388,900	80	98

Source: NEMA 2001, cited in Olson and Berry.

Drew cites declining banana (*matooke*) production—bananas account for 30 percent of caloric intake in Uganda—as a major consequence of land degradation and nutrient mining (2005). With more than 65 percent of the population of the country relying on banana as its staple food crop and more than 1.5 million hectares of land under *matooke* cultivation (Monsanto 2004), bananas are critical to food security in Uganda. Historically, eastern Uganda was known as the *matooke* belt. Now, one can hardly find it growing in many of its traditional areas of cultivation (in the east and central regions, in particular) (Drew 2005).

Some agricultural experts fear that *matooke* could be nearly wiped out within 25 years unless effective intervention helps stem the nutrient mining problem (Drew 2005). Other experts corroborate the decline of banana production. Uganda is still a leading world producer of bananas, but output and yields have decreased in the past few years, especially in the traditional banana zones of Mpigi and Mukono (Olson and Berry 2003). The farmers in the most degraded areas, who would have the most to gain from improving their land management practices, are not adopting the necessary technologies and inputs to reverse a trend that may destroy their livelihood.

There are several reasons for Ugandan farmers' low level of use of inputs. Misperceptions about current soil fertility are a barrier to the adoption of modern agricultural practices. Although beliefs are changing, too many Ugandan farmers still assume that inorganic fertilizer use is unnecessary because the country's soils are highly fertile (IFDC 2003). While this was historically true in many regions, soil degradation resulting in lower yields is a reality with which nearly all farmers now must contend.

Cost is probably an even bigger challenge. According to a 2002 study, farmers do not employ intensive agriculture techniques because "it is not profitable under current socioeconomic and agro-ecological conditions" (Woelcke 2002). The findings further suggest that the lack of incentive to adopt new practices is due to inadequate access to credit and insurmountable transaction and transportation expenses (Woelcke 2002). A 2004 IFPRI study confirms these results. According to that analysis, "[t]he high costs of inputs, particularly fertilizer, may be the most important reason for their limited use" (Nkonya et al. 2004). As one of the countries with the lowest rates of inorganic fertilizer use in Africa, Uganda has yet to undertake nutrient replenishment on a major scale. Currently, inorganic fertilizers are primarily used by the large estate farmers; these large holdings account for 80 to 90 percent of the total fertilizer applied in Uganda (IFDC 2003). Among smallholder farmers, the application of inorganic fertilizer averages less than one kilogram

per hectare while only 10 percent employ pesticides and fewer than 10 percent cultivate with improved seeds (Nkonya and Kato 2001).

Furthermore, most farmers have little contact with extension programs and receive little or no technical assistance. IFPRI data reveal that between 1990 and 2000, just half of the 451 households in 107 communities received training or extension services (Nkonya et al. 2004). Increasing access to government and nongovernmental agricultural programs, especially in remote and highly degraded areas, could play an important role in reversing the negative trends in the agriculture sector.

Despite the persistence of outdated perceptions concerning soil quality, there is also evidence that farmers are increasingly aware of land degradation. A 2001 IFPRI study conducted in 107 communities located in seven agricultural zones found that respondents recognize "significant deterioration and soil moisture-holding capacity and erosion problems" (Pender et al. 2001; Jagger and Pender 2003). In another IFPRI/Makerere University survey of 12 communities in the banana-coffee lakeshore system, all communities cited decreasing soil fertility (Sserunkumma et al. 2001). This awareness is an important precursor to changes in behavior, including the adoption of new agricultural practices. However, increased awareness will lead to larger crop yields only to the extent that farmers actually undertake conservation practices and are able to afford inputs.

In order to sustain the resources on which the country's survival and stability are based, farmers and policy makers must act quickly to stem nutrient loss. Experts estimate that Ugandan soils are experiencing depletion rates of around 88kg nutrients/ha per year (IFDC 2003). The transformation required to stop or reverse soil depletion would involve the appropriate and efficient use of technology, including improved seeds, mineral fertilizers, crop protection products (CPPs), water management, and sound agronomic practices (IFDC 2003).

Pests and Diseases

Plant pests and diseases are a second major threat to the country's food security and to the viability of the agricultural sector. Many experts state that crops in Uganda are heavily afflicted by pests and diseases because of overuse and degradation of the land (Drew 2005 and Sserunkumma et al. 2001). In the 12 communities surveyed by IFPRI and Makerere University, pests and diseases were ranked as the leading cause of food insecurity (Sserunkumma et al. 2001). According to the PMA, 35 to 40 percent of crops, including cassava, coffee, banana, tobacco, groundnuts, and cowpeas, are lost to diseases and pests (MAAIF and MPFED 2000).

From the standpoint of food security, the gravest disease threat comes from banana wilt, which affects the country's most important domestic food crop, already experiencing declining yields as a result of land degradation. This bacterial disease currently has no cure, and the banana plant carries no natural resistance to it. The disease is easy to transmit as it spreads through flying insects and farm tools (A. Tumushabe 2005b). It is also carried by dry and fresh banana leaves. While research to engineer a biotechnical solution is reportedly underway, presumably to develop a banana crop varietal resistant to the disease, no immediate resolution is on the horizon. Already existing in half of the country's 56 districts, banana wilt has the potential to destroy the country's entire crop (Drew 2005). Government officials and agricultural experts are aware of the peril and constantly express their concerns in the media, but the threat remains.

According to the head of the National Banana Research Program, there has been a 94 percent drop in food production in areas affected by banana wilt (A. Tumushabe 2005a). National Agricultural Research Organization (NARO) data released in August 2004 revealed that the disease had destroyed plantations in 21 out of 56 districts and was spreading fast (Monsanto 2004). Recent studies indicate that the crop is near extinction in 37 districts (Esiara 2006). The director general of NARO warned that the "wilt menace presents

a clear and present danger to the country's food security" (Monsanto 2004), and the agriculture minister called it a "threat to national food security" (G. Ogwang 2005).

The Ugandan saying, "you haven't eaten until you have had *matooke,*" reveals the importance of this food crop to the national diet. According to the agriculture minister, bananas contribute almost a fourth of the nation's GDP (24.5 percent) and nearly half of the economic output of southwest farming communities (J. Ogwang 2005). According to the Permanent Secretary in the Ministry of Agriculture Gabindadde Musoke, the disease has the potential to cause an annual loss of $4 billion (Esiara 2006). The end of banana cultivation as a result of disease would be devastating for the Ugandan population and could prove to be a destabilizing factor for the nation.

Farmers are beginning to rely on cassava and sweet potato in locations where bananas can no longer be grown. These root crops are becoming the poor man's food. Others are shifting to more commercially viable crops such as coffee. Rice cultivation is on the increase because it is convenient to store and prepare. Another factor that favors the adoption of rice is that it can be cooked more efficiently than other foods, which is important in light of increases in the cost of charcoal.

However, the problem of rice blast, a highly destructive fungal disease, needs to be addressed if rice is to function as a viable caloric alternative to bananas. Maize is another crop that Ugandan farmers increasingly rely upon as *matooke* crop yields continue to decline. However, maize may be a factor exacerbating land degradation in the Lake Victoria crescent region as its cultivation exposes land to erosion (Sserunkumma et al. 2001).

Thus, in relation to Uganda's food security, two key questions are whether banana wilt can be effectively controlled and, if not, whether other densely caloric crops can take its place in providing the nutrition necessary to feed a growing population.

Modernization and Commercialization: From Subsistence to Commercial Agriculture?

Most experts agree that modernizing agriculture by transforming the sector from one reliant on traditional practices to one characterized by improved seeds, fertilizers, irrigation, market access, and increased technical and market knowledge is necessary to meeting the country's economic, food, and security needs.

In the absence of such a transformation, the combined effects of increasing population, declining crop yields, and decreasing land per capita, carry with them the potential for an unstable future. The need for developing a more modern and productive agricultural sector in order to meet the demands of a growing labor force is made more acute by the fact that few job opportunities exist in the country's small industrial sector. But the task of increasing the value of agricultural production is made more difficult by market-related deficiencies, such as a poor transportation infrastructure, which reduce incentives to modernize agricultural practices.

Uganda's current government has given reform of the agricultural sector a high priority in its pursuit of the goals of decreasing poverty and improving food security. According to one source, Ugandan government efforts in this regard have included the macroeconomic reforms of the mid-1980s, the export diversification of the 1990s, the Poverty Eradication Plan (PEAP), and the Plan for Modernization of Agriculture (PMA) of 2000. Today, the "…PMA has become the blueprint to guide the GOU's efforts toward agricultural development and transformation" (IFDC 2003).

The PMA is structured on the basis of seven core areas of concentration. They include "national agricultural advisory services (NAADS), research and technology development, agricultural education, rural financial services, marketing and agro-processing, physical infrastructure, and natural resource management and utilization" (IFDC 2003). The ultimate goal is to make smallholder farmers more efficient and capable of participating in commercial agriculture.

The obstacles related to modernization and commercialization are significant and will require decades of financial and technical assistance. According to John Oloya of the World Bank, this transformation may take as long as 25 years to accomplish and will require agricultural extension, technology, micro-finance, feeder roads, rural energy, and environmental and gender education (Oloya 2005).

Furthermore, "…there are numerous market development-related challenges affecting private sector involvement in agri-input marketing. These include the lack of market information, inadequate access to finance, limited marketing and business skills, and poor enforcement of regulatory frameworks" (IFDC 2003). According to one government representative speaking about the efforts to modernize the country's agriculture, "not much transformation has occurred despite the good intentions of the government. High levels of poverty still exist."

These long-term and almost intractable obstacles suggest that modernization and commercialization will be a difficult feat unlikely to be accomplished in a short time. Therefore, increasing food insecurity as a result of land degradation, decreasing crop yields, pests, and diseases has the potential of overtaking mitigation efforts. This scenario portends the emergence of humanitarian crises with potential political and security implications.

Despite the obvious need for change in the agriculture sector, some observers raise concerns about potentially negative impacts of such changes on the environment and on food security. Studies have indicated that commercial crops could increase nutrient depletion insofar as nutrients lost are not likely to be replaced given the limited technological capacity existing in the Uganda agricultural sector (Woelcke 2002).

Expansion of agricultural land as a means of increasing production is also problematic and has important drawbacks. If forests and other areas are cleared for cropping, this will place additional burdens on already exhausted land resources (Kanabahita 2001). In fact, it is misleading to say that Uganda has 16.7 million hectares of arable land, as some analysts claim, since most of this is comprised of forests, swamps, and woodlands that fulfill other economic and ecological functions (Kanabahita 2001). There is, therefore, minimal room for expansion of agricultural land, insofar as maintaining wetlands and forests curtails soil erosion and has positive impacts on soil fertility, water quality, and water quantity.

Modernization may also negatively distort the balance between food and market crops, thereby increasing food insecurity. Analysis has shown that since 1995 the share of the non-monetary agricultural sector (mainly food crops) in the country's overall real GDP has decreased while the share of the monetary segment has increased (Opondo and Okumu 1999). While a trend toward monetization can be anticipated as a function of development and is not necessarily undesirable, when as in this case it occurs during a period of severe and simultaneous food shortages in several regions it can have very adverse consequences for human security. Specifically, in places where farmers turned to commercial crops less food was available at a critical time, which contributed to severe food insecurity at the household level.

Two additional impediments to agricultural development alluded to previously are the lack of access to low-interest finance and the absence or inadequacy of extension services. Improving these requirements for increased agricultural production will take considerable time and significant resource allocations.

Affordable financing for the purchase of improved agricultural inputs would help alleviate problems of food insecurity in Uganda. Both farmers and traders are severely constrained by lack of credit. IFPRI studies have found that "limited access to credit, agricultural extension and market information were also associated with less use of fertilizer and, in the case of credit, lower productivity" (Nkonya et al. 2005). A lack of access to credit and finance was also cited in the PMA's study of farmer-identified constraints to agricultural productivity. Currently, available credit is primarily used for non-agricultural activities. As Deininger and Okidi found, in 1999, "15 percent of loans were used to purchase inputs, and only seven percent of loans

were used for agricultural investments in land and livestock" (Deininger and Okidi 2001). The largest proportion of loans went for health and education expenses (Nkonya et al. 2005; Pender and Nkonya 2005).

Agriculture extension is available and effective in increasing output, but it is not reaching enough farmers. As the PMA describes it, "[m]any communities blamed lack of productivity on lack of information, knowledge and skills concerning better methods of food and income-generation (crop production, animal husbandry, fishing methods and alternatives), soil conservation, pest and disease control, marketing opportunities, prices, processing and pertinent government policies and regulations" (MAAIF and MFPED 2000). Armed with the skills and knowledge to both increase output and properly conserve the soil, farmers would be better equipped to combat declines in agricultural production and increase food security.

Finally, the role of market access and the debate surrounding the very existence of sufficient domestic and international market demand for agricultural products is crucial in relation to the issue of food security and agricultural development. According to some observers, viable markets to sell agriculture goods at the local, district, and possibly the international level do exist; however, a consistent supply of quality goods to meet the demand does not exist. Ministry of Finance staff, for example, noted willing buyers in the Middle East if production capacity were consistent and large enough to meet their need. Other analysts disagree and argue that if the there were demand growers would attempt to acquire the knowledge necessary to meet it, provided the conditions necessary to reach consumers were in place. Indeed, many districts even lack the relevant market for the local sale of produce and the "average distance to a periodic consumer market is 5 kilometers" (MAAIF and MFPED 2000). Without a reason to intensify production, analysts argue, farmers are not adopting new practices and food security is compromised.

The Permanent Secretary for Agriculture, Mr. David Obong, categorized Uganda's farmers in three categories: traditional subsistence farmers, emerging commercial farmers, and commercial farmers. As Obong described, traditional subsistence farmers are concerned with household food security, so the government's goal is to increase production, recognizing that whatever surplus subsistence farmers achieve will never exceed local market demand. The second category is that of emerging commercial farmers who sell in regional and national markets. With this group, according to Obong, the government is focusing on increasing access to effective agricultural techniques and markets. The final category is the commercial farmer. The government's role in relation to this group is to ensure access to the market and to encourage the use of sustainable practices (Obong 2005). These classifications can help further target agricultural development assistance and help improve the efficiency of donor and government projects.

These two sets of market-related problems, inadequate access and inconsistency of high-quality supply, do not appear to be mutually exclusive. The degree and severity of each is unclear and worthy of more detailed investigation in order to identify the most effective approaches to advancing the agriculture sector.

The inadequacy of market mechanisms has its origins in relatively recent changes in the country's political economy. Historically, cooperatives played an effective role enabling Ugandan farmers to distribute products to consumers. Since their demise, an effective replacement has not materialized.

Experts agree on the inadequacy of the road system and its adverse consequences for access to markets. The country's deficient infrastructure impedes getting crops to local and district markets as well as to areas facing food shortages. The PMA identifies the "inadequacy of physical infrastructure such as feeder roads, communication facilities, power supply, education and health facilities, water supply and market infrastructure" as constraints to marketing (MAAIF and MFPED 2000). The road infrastructure is particularly inadequate as "more than 90 percent of Uganda's road network consists of earth and gravel roads

and about 25 percent of the rural feeder roads are impassable during the rainy seasons" (MAAIF and MFPED 2000).

Most of the produce transported within the country is carried on the heads of women. Seventy percent of total marketed produce in Uganda is transported by women in this manner. Bicycles carry an additional 20 percent, motorized transport carries approximately 8 percent, and donkeys and ox-carts are used for the remaining two percent (MAAIF and MFPED 2000).

Evidence of the weaknesses of the transportation system is everywhere clearly visible. For example, in the countryside it is common to see bags of food sitting on the road waiting to be picked up and shipped to a larger community, but as this does not always happen in a timely fashion there is much spoilage. Because of infrastructural inadequacy and the fact that it is not cost-effective for business people to move small quantities of agricultural products, market mechanisms often are not effective in correcting regional imbalances. Thus, for example, surpluses of food in the west can coexist with pockets of shortages in the center or north (MAAIF Staff 2005). In sum, while there are some geographical areas that suffer chronic food shortages, mostly it is the ineffective distribution of agricultural products that results in food insecurity by preventing the balancing of surpluses and deficits.

Investment priorities in Uganda must include both hard infrastructure (roads, electricity, and irrigation) and soft infrastructure (transport services and community-based institutions). Since transportation mechanisms are severely underdeveloped, much of the crops produced never reach even the local market. According to MAAIF staff, the country loses up to 40 percent of fruit and vegetables and about 10 to 15 percent of root crops to spoilage (MAAIF Staff 2005). Developing the country's food processing industry would be a way to use surplus crops and thus reduce major post-harvest losses from spoilage.

The modernization and commercialization of agriculture are made even more challenging insofar as they are being undertaken simultaneously with a process of decentralization and other changes in governance. These administrative changes were undertaken because the centralized system for tracking production in place previously had broken down. But the new system has its own problems. With decentralization, local agricultural officers are no longer directly subordinate to the agricultural ministry but rather to the district chief. One consequence is that the scant data collected at the local level does not necessarily get transmitted to the national agricultural authority. Incredibly, the last national scientific survey of agricultural production was completed in 1991 (MAAIF Staff 2005). Available data on agriculture are based on implausible extrapolations from data collected fifteen years earlier and therefore are widely considered to be inaccurate.

Water Management

The management of water for intensive agricultural practices is another important component of the country's food security picture, albeit along a longer time horizon. Given the need to increase agricultural productivity, the PMA is placing a high priority on the development of sustainable irrigation and water harvesting systems.

Along with the predicted increase in demand for water for agricultural uses, other developments in Uganda and the region are likely to increase competition for water resources. These include population growth, industrialization, and withdrawal of water from internationally-shared sources by the various countries in the region. The level of demand for water for livestock alone is expected to increase 185 percent, or from 81 million m^3/year to 233 million m^3/year, between 2002 and 2010 (2005c). Given these trends, water management is a moderate medium- to long-term threat to the country's internal stability and to cooperative international relations in the region.

According to FAO data, total water withdrawal was 300 million m^3 in 2002, representing .4 percent of total renewable water resources for Uganda. Some 45 percent of the demand comes from the domestic sector,

closely trailed by irrigation and livestock at 40 percent (FAO 2005). The water used for agriculture is predominantly from rainfall. With the exception of the north and northeast, the country receives sufficient rainfall during what are typically two annual rainy seasons. The rural population and their livestock extract the water through springs, boreholes, and hand dug wells (FAO 2005). In the south in particular, rainfall conditions permit semi-continuous cropping. Given the relatively abundant rain, coupled with the sector's tendency toward low adoption of improved agricultural practices, the total irrigated area in Uganda is only around 9,000 ha to 14,000 ha, or approximately 0.2 percent of the cultivated area (FAO 2005). Rice, sugar cane, citrus fruits, and vegetables are currently the main food crops grown under irrigation.

Small-scale farmers have employed irrigation techniques since the 1940s, but progress in developing a more formal and efficient system has been slow. Many of the projects were managed by the government and are now operating with serious difficulties, given the limited budget. High-value crops, such as flowers, use irrigation, but the practice is still limited to a few crops (FAO 2005).

In terms of specific approaches to expanding the area under irrigation, the Ugandan government has given some consideration to better ground water utilization and more efficient irrigation techniques as well as water conservation measures. However, as with the adoption of fertilizers, existing technologies for water harvesting generally still are not used. Irrigation using ground water is under consideration in the Karamoja area, although it is not clear how the attendant risks of water salinization and the heightened effects of over-grazing would be minimized (NEMA 2002). As the African Development Bank warns, "[w]ithout the requisite capacity to manage the growth of irrigation, some of the schemes may be developed haphazardly and even encroach into wetlands" (AFDB 2005). Irrigation projects may also begin drawing on rivers, thereby reducing the flow of the affected water bodies.

Water management issues, if not addressed effectively, could form another significant constraint to agricultural growth and food security by limiting the degree and extent of irrigation. However, given the current state of the nation's overall water profile, an immediate threat to stability and security is unlikely.

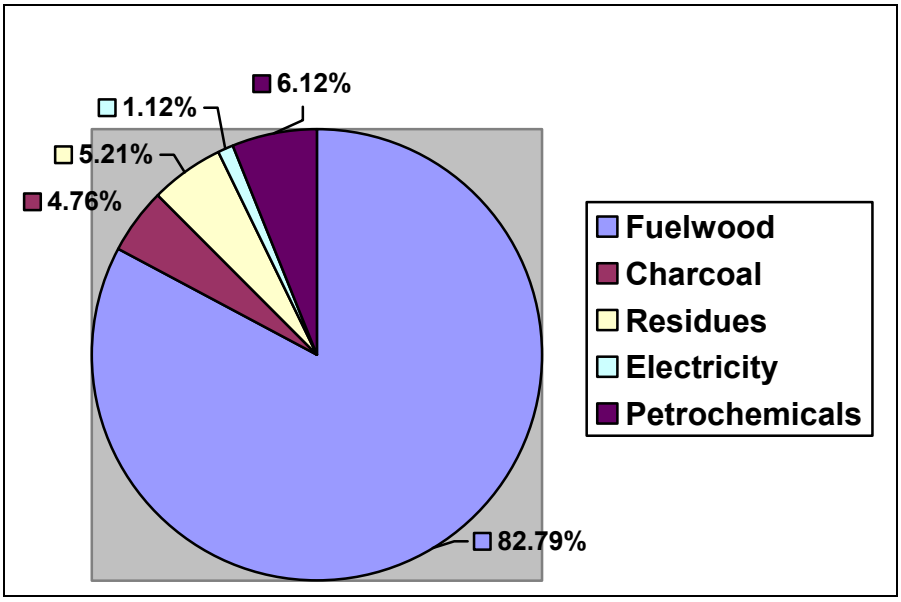
Energy Security: Approaching a Limit?

The discussion of energy security in Uganda is linked closely to enduring development challenges of environmental degradation and poverty. A staggering 93 percent of Uganda's energy comes from biomass, particularly wood and charcoal, and only 5 percent of the country is connected to the electricity grid. In rural areas, only about 2 percent of households have access to electrical power. The population is expected to double in 20 years, yet limited progress has been achieved in developing tree plantations and in increasing electrification transmission. The massive and increasing volume of biomass consumption helps drive a deforestation rate ranging from 2 percent to 3 percent a year (NEMA 2002). Energy consumption is also increasing rapidly. Between 1996 and 2003, fuel wood and charcoal use increased 54 percent while consumption of petroleum products increased 46 percent (MEMD 2003).

A description of an energy-secure country includes such factors as cost-effectiveness of the energy system, reliable supply from diverse sources, and a consistent balance between supply and demand. In sharp contrast, Uganda's current energy costs are high, the supply is inconsistent, and most of the population relies on biomass, which is currently extracted in an unsustainable fashion. The ability of Uganda to meet even the basic energy consumption needs of its population, much less future industrial requirements, is in jeopardy. A disproportionate reliance on a dwindling energy supply is placing the country's energy and economic security at risk at a time when industry, services, and agriculture must expand in order to meet the employment and economic needs of an impoverished population. Uganda's energy picture is in disarray and merits urgent and continuous attention to prevent the deepening of energy insecurity throughout the country.

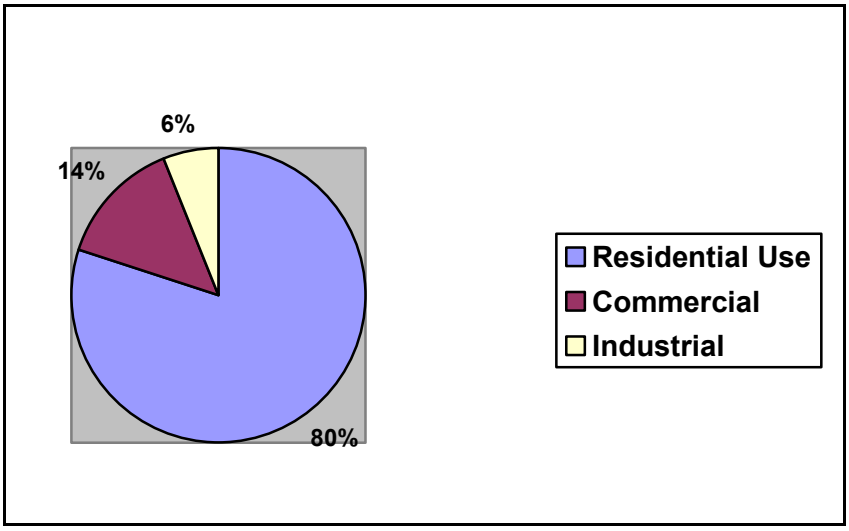
The figures in the two charts below disaggregate energy consumption by source and by sector. Wood accounts for nearly 83 percent of overall energy use. In urban households, biomass is used for 78 percent of energy needs and in rural homes it supplies a staggering 99 percent (Pedersen et al. 2003). Per capita consumption of electricity is only 44 kWh/year (GOU 1999), one of the lowest in the world (NEMA 1996). Households use four-fifths of the energy, a reflection of the nascent state of industry in the country. However, industrial use of wood and charcoal is on the rise. The construction, tea, brick, fishing, sugar, and lime industries, which use highly inefficient drying, curing, and firing methods, are expanding their consumption. The tea industry consumes more than 30,000 tons of wood fuel (World Bank/UNDP 1996), the brick and lime sectors use 230,000 tons, and the sugar industry accounts for 100,000 tons (NEMA 1996). The irony is that, while industrial development is important for economic growth, an increase in wood fuel consumption may undermine long-term development.

Figure 16: Energy Consumption Proportions (2001)



Source: GSMD 2002.

Figure 17: Biomass Use by Sector



Source: MEMD 2001.

The power sector in Uganda receives few accolades and suffers from serious problems including a supply deficit, frequent load shedding, financial limitations, illegal hook-ups, corruption, and mismanagement. Twenty years of political turmoil, civil war, and economic instability decimated the energy sector, curtailing efficiency in energy consumption and production and reducing commercial energy supplies. These factors have combined to create a situation in which the country's only reliable source of energy is its rapidly-dwindling forests (NEMA 1996).

Insufficient capacity is one of the largest threats to the electricity sector's viability. In the middle to late 1990s, load shedding of 40MW occurred on a daily basis (NEMA 1996). Currently, peak demand for power is estimated at 350MW, but the current installed capacity is only 300MW, implying a 50MW deficit. Moreover, energy demand is growing at an average of 80MW per year (Mwanguhya et al. 2005).

More recently, the severity of the problem of insufficient energy supply has grown more acute. Daily power load shedding returned in September 2004 as a result of a region-wide drought that caused low water levels in Lake Victoria. Low water levels have reduced energy output to well below the level of installed capacity and thus there is now a deficit of 115MW to 120MW rather than 50MW (Biryabarema 2005 and Mwanguhya 2005). Consequently, planned outages and system breakdowns are a daily occurrence and place significant strain on domestic consumers and businesses.

The United Nations Environment Program estimates that businesses in Uganda lose an average of 90 working days each year at a cost of approximately two percent of economic growth as a result of power outages and load shedding (Wamukonya 2003). Another estimate finds that industry is losing an average of around 30 days of output per year (New Vision 2006a). The June 2005 installation of the Aggreko thermal power plant supplying 50MW of electrical power is intended to end current load shedding problems. However, less than average rainfalls in the Lake Victoria basin have experts predicting continued load shedding due to lower than normal water levels (Ariko 2005).

Further plaguing an already beleaguered system is electricity theft. According to the Commissioner for Energy, Paul Mubiru, the national grid loses as much as 28 percent of transmission from theft (Luggya 2005). This amounts to a loss of 45MW, which would provide Shs 3 billion (nearly $1.8 million) per month in fees (Luggya 2005). Collusion among power company personnel, paying customers, and non-paying customers is rampant; some highly publicized cases have demonstrated the scope and impact of the problem. For example, the army and police units in Kakiri and Naguru barracks allegedly throw bare wires onto conductors to tap into the power grid, factories often operate at night when they can secretly connect to power lines for free, and Uganda Electricity Distribution Company Limited employees try to cheat customers through fraudulent connection and billing schemes (Luggya 2005). While efforts reportedly are underway to curb theft, poor management of the sector has allowed a high level of corruption to develop unchecked.

Figure 18: Children carrying underbrush.

Cost is another problem; most Ugandans cannot afford electricity. In Uganda, approximately 61 percent of the population is poor, and the poor are generally forced to use traditional energy sources such as biomass instead of commercial fuels and electricity (Reddy et al. 1997). But the practice is not confined to the very poor. Even one highly educated and prominent academic remarked, "I still use charcoal to cook because I can't afford electricity."

The result of unaffordable electricity relative to low average

incomes is a high dependence on biomass, which sets up a vicious cycle that ultimately threatens human security. Without sustainable energy access, daily life is consistently disrupted and dependence on forests grows. As the forest is depleted, land becomes degraded and agricultural output declines. The destructive relationship between energy and poverty places the country in an untenable situation.

Changing the energy equation in Uganda is critical for several reasons. First, energy is already an important component in Uganda's economy, providing substantial employment and generating significant tax revenues. Second, energy is a key to any modern economy as well as a necessary condition for economic growth and development. As the International Energy Association argues, "energy is a prerequisite to economic development" (IEA 2004).

This assertion is echoed in the Uganda Ministry of Energy and Mineral Development's analysis, "Rural Electrification Strategy and Plan Covering the Period 2001 to 2010." It states: "[e]nergy plays a central role in the socioeconomic development of [the] country, while simultaneously providing the necessary infrastructural economic base…to become an attractive host for investments in the different sectors, especially industry, commerce, and agriculture" (MEMD 2001b).

In Uganda, energy consumption is also a significant source for the financing of public spending through the collection of petroleum taxes that provide 30 percent of total fiscal revenues (NEMA 1996). Taxes from the sale of electricity account for more than one percent of total revenues, while commercial trade in wood fuel accounts for more than two percent of the economy and employs more than 100,000 people (Turyahikayo et al. 1995).

Notwithstanding its adverse environmental impact, the production of charcoal is economically important. It represents a thriving business that enables impoverished farmers to cope with shocks in the agricultural commodity markets. A report conducted by the Wildlife Conservation Society (WCS) estimates that charcoal and firewood provide between 8 and 36 percent of annual income for people living in proximity to forests (WCS 2004). As one expert noted, "you see more bags of charcoal than agricultural products on the road."

Improving health care and reducing poverty also require a dynamic energy sector. Uganda's Rural Electrification Strategy recognizes this relationship explicitly in noting that "[t]he primary objective is to reduce inequalities in national access to electricity and the associated opportunities for increased social welfare, education, health, and income generating opportunities" (MEMD 2001b).

According to the International Energy Association, appropriate energy services enable basic human security needs for food and shelter, education, and public health to be met (IEA 2004). The WWF (formerly World Wildlife Fund) argues that "providing access to electricity is an essential element of reducing poverty and improving living standards" (WWF n.d.). With poverty rates on the rise in Uganda and life expectancy at birth in 2002 at only 45.7 years (UNDP 2004), there is an urgent need for the country to combat poverty and improve public health. Rural electrification is essential to meet these needs.

Sustaining the country's vital forest resources is a second crucial necessity. The need for energy from wood is one of the drivers contributing to land degradation and forest clearing in Uganda. According to a 2002 study by the Ugandan Forest Department, the available stock of wood will be exhausted by 2025 (Bingh 2004). Another expert found an even more alarming scenario. In a 2003 study, forest resources were projected to be depleted between 2011 (assuming a 4.02 percent increase in firewood use and static efficiency rates for stoves and charcoal making) and 2014 (estimating a 2.6 percent increase in firewood and charcoal consumption per year and no increased use of improved stoves or other efficient technologies) (Bingh 2004). A 2004 survey from the Ministry of Energy and Mineral Development illustrates the threat to the country's forests and the population's dependence on this resource. According to the findings, total

Figure 19: Pile of logs located next to the road in Mbale.

consumption of charcoal in Kampala increased at a rate of 300,000 tons per year during the last decade, which is a 50 percent rise in use (MEMD 2004b). One of the many implications of these data is that the need to find alternative and efficient energy sources is a reality that must be addressed.

The need is made more acute because expectations of access to electricity are rising. With a growing population demanding more energy (seven to eight percent a year more according to Electricité de France, Tumusiime 2002), policymakers will have to respond to avoid future risks to social and political stability. While overall expectations may not lead to demonstrations in the countryside, urban residents and NGOs have vocalized discontent and the government has been forced to respond. Resistance to the Bujagali Dam facility is a well-cited example of public protest, and President Museveni's 2002 tariff reductions were intended to quell public outrage over electricity bills that had risen by 158 percent (Wamukonya 2003). People have also grown weary over daily load shedding, increasing prices, and inconsistent supply, and this sometimes has culminated in visible public outcry. In 2002, irate consumers threw rocks at staff from the Uganda Electricity Distribution Co. Ltd. (UEDCL) and threatened to lynch them before police arrived to quell the violence (Asia Africa Intelligence Wire 2002).

Solution or Disillusion?

Uganda must tackle the structural and technical challenges facing the power sector and develop and implement a comprehensive energy policy if it is to breach the growing gap between energy needs and delivery of energy. In an effort to overcome the sector's daunting challenges, the government introduced a strategic plan in 1997 to "transform Uganda's power sector into a viable electricity industry capable of providing the people of Uganda with a reasonably priced and reliable power service…." (GOU 1999). Rural electrification programs aim for a modest increase in access—to 10 percent in 10 years. For the government to meet its rural electrification goals, however, donor funding is required for most of the initial expenses (MEMD 2001b). With 50 percent of the government's budget already derived from donors, the ability to attract additional funds sufficient to achieve electrification goals is questionable.[7]

The use of more efficient cooking practices would reduce the amount of fuel wood consumed, but the adoption of more efficient cooking techniques has been slow. Ninety-seven percent of cooking stoves in Uganda are traditional, using the three stone fire or traditional metal *sigiri* fueled by charcoal (Bingh 2004). The energy efficiency of these stoves is only 5 to 15 percent (Bingh 2004). Other sources cite a similar level of energy inefficiency. Based on the work of O.S. Kalumiana, the State of the Environment report calculates a 90 percent loss of biomass energy during transformation to charcoal (Kalumiana 2001).

Figure 20: Sigiri Pots.
Source: MEMD.

The lost energy takes an unnecessary toll on the nation's forests. Yet, according to Energy Commissioner Paul Mubiru, "biomass will remain an important energy source" for the country given that the rate of electrification has barely increased since the first hydropower dam in 1954 (Mubiru 2005). With an estimated equivalent value of $350 million/year attributed to Uganda's forest products and the non-marketable environmental services of its forests (WCS 2004), this natural resource is a critical element in determining

the well-being of the people of Uganda, yet it is being destroyed. Improving energy efficiency and increasing the use of renewable and alternative energy sources will enable the country to reduce its demands on the forest, prevent the devastating loss of a key resource, and improve prospects for human and environmental security.

Figure 21: Nile River.

The country's hydropower potential is significant and represents a viable renewable energy option. The country's installed power capacity is 300MW from two hydropower stations (Kiira and Nalubaale at 215MW) and several small thermal and sugar mill plants. The estimated potential is more than 2,000MW (NEMA 2002), the largest in the region (U.S. Department of Energy 2004). In comparison to its regional neighbors, Uganda's per capita consumption of hydroelectricity is quite low in relation to its potential (MEMD 2001).

Additional hydropower sites have been selected for large-scale and small-scale projects, but progress has been limited or non-existent. Controversy and criticism over efforts to construct dam projects along the Nile have beset both large and small projects that many experts see as necessary for electrification. One of the most notable controversies is over the Bujagali dam, named after the nearby falls. Expected to nearly double the output generated by Owen Falls dam, the Bujagali dam project has been met with a series of concerns—including environmental, financial, cultural, and engineering—that have delayed construction for more than 10 years.

In 1994, AES Corporation of Virginia had struck a $500 million deal with the government to build the dam, but the company, stymied by corruption and opposition (Lacey 2001), pulled out in 2003. Even if a compromise is reached between opposition groups and the government, the construction of Bujagali will take at least four years.[8] Recognizing the growing frequency of power outages and shortages of electricity, Museveni recently announced that the government would move forward simultaneously on Bujagali and Karuma dams with or without international loans (New Vision 2006b). Despite such intentions, the obstacles are so great that no relief from electricity shortages via hydropower development can be expected in the immediate future.

The Uncertain Promise of Oil

As noted earlier, petroleum products account for approximately six percent of energy consumption in Uganda. Kerosene and liquid petroleum gas are used mainly in the domestic and commercial sectors, and gasoline, diesel, and aviation gas dominate the industrial sector (NEMA 2002).

According to the Electricity Regulatory Authority's Manager for Economic Regulation, Benon Mutambi, the production cost of a unit of thermal power is three times as much as the unit cost of hydropower (Biryabarema 2005). While thermal plant fuel costs currently are subsidized by the government, the government is unlikely to be able to provide the current level of subsidy in the future, and this failure would require additional charges to be passed on to the consumer (Biryabarema 2005). One hope is that a renewed search for oil in the Albertine Graben area (near the border with the Democratic Republic of Congo) may succeed, helping to alleviate the high petroleum costs the country faces.

The population of the Great Lakes Region is more than 150 million and uses more than six million tons of oil products per year (MEMD 2004a). The potential market for Ugandan petroleum is large both domestically and regionally. Since 2002, South Africa's Energy Africa and Canada's Heritage Oil Corporation have conducted exploratory drilling and studies (U.S. Department of Energy 2004). Surveys from one site estimated the area may contain as much as 1.2 billion barrels of oil (U.S. Department of Energy 2004). Several multinational companies are looking for oil in other areas of western Uganda.

Despite the hope that the prospect of finding significant oil deposits implies, many challenges lie ahead for Uganda's energy sector. Diversifying oil supplies through internal sources may enhance energy security if the country avoids pitfalls common to resource-rich countries. These include poor accountability, lack of transparency, ineffective management, and inadequate community involvement. The track record of developing countries that have benefited from similar windfalls is not encouraging. Resources such as oil and gas have become notorious as catalysts for violence and corruption in already unstable countries (FESS 2005). Preventing a slide toward an over-reliance on this potential windfall and avoiding the negative effects besetting other countries would be critical for the country's medium- to long-term stability.

Another challenge involves secure distribution, specifically safely transporting the oil away from the extraction site for refinement and consumption. Extending a pre-existing pipeline in Kenya is under consideration in order to increase the access to crude oil within the region, but funding has not been obtained to date. If funding does materialize, pipeline insecurity may threaten regional stability. According to one energy security expert, pipeline sabotage has become the "weapon of choice" for terrorists because of the ease in attaching an explosive device that can shut down operations for weeks (Luft 2005). The tactic requires minimal effort and produces a significant economic impact. Given the ongoing perception that terrorist networks are infiltrating East Africa, a threat to a pipeline linking Kenya and Uganda is an issue of serious concern.

Water Security: an Emerging Destabilizing Factor

A Model of Successful Reform

Since the late 1990s, Uganda has rapidly transformed its water sector through a reform process built on prioritization by the GOU; commitment of financial resources from the GOU and the donor community; and institutional support. Uganda has dramatically increased rural water supply, reaching a large number of people in a relatively short period of time. For this reason, the country's reform of its water system is widely viewed as a model of success.

According to figures from the Directorate of Water Development (DWD), total rural water supply coverage rates have increased from 18.4 percent in 1991 to approximately 58.4 percent in mid-2003 (Sinclair 2004). At the present rate of installation of services, it is likely that Uganda will meet or exceed the Millennium Development Goal of 62 percent (Sinclair 2004). Further, Uganda has set an ambitious target of 100 percent coverage of both its rural and urban population by 2015 (Badaza and Kabirizi 2005). Although progress so far is encouraging, there are significant obstacles in the way of the country's drive to meet the demand for water.

Steadily Increasing Demand for Water

Historically, Uganda's water resources have been sufficient to sustain the population. However, despite having one of the most abundant endowments of freshwater resources in Africa, Uganda faces an uncertain water future. A rapidly expanding population and increasing per capita water usage suggest that Uganda's water requirements are rising at a potentially unsustainable rate. NEMA estimates that Uganda will need to more than double the current accessibility of water to meet future requirements and that demand may outpace supply of accessible water by the year 2025 (NEMA 2002).

The water sector is facing not only higher costs from problems associated with drought and pollution, but also increased competition from other sectors to receive government and donor funding. If current trends continue into the next decade as expected, it may be quite some time before Uganda can provide its entire rural population with access to a clean, reliable, affordable, and sustainable water supply.

Uneven Availability of Water Resources

Groundwater and springs are widespread sources of domestic rural water supply. There are wide variations in relation to access to water. Some regions tend to have water reserves, some experience seasonal water shortages, and others face chronic scarcity of water. These differences are explained mainly by the great range of variation in rainfall across regions, with some endowed with abundant annual rainfall and others suffering from insufficient precipitation. Rainfall ranges from 750mm per year in the arid northeastern Karimojong pastoral areas to 1,500mm per year in areas including the shores of Lake Victoria, eastern highlands of Mount Elgon, southwestern Rwenzori Mountains, the Masindi in the west, and Gulu in the north (FAO 2005).

Figure 22: Water Distribution at Pabo Camp, Gulu.

Inadequate and Uneven Distribution of Water Services

Access to a clean, sustainable water supply has implications for human security, health, food security, and economic growth. Nearly 87 percent of Uganda's total population and about 96 percent of its poor live in rural areas and depend on rain-fed subsistence agriculture (Sinclair 2004). Despite the fact that the vast majority of Ugandans live in rural areas, rural residents are disproportionately underserved. According to figures from the FAO, by the year 2002 only 52 percent of the rural population had access to improved drinking water supplies compared to 87 percent of the urban population (FAO 2005). The disparity between rural and urban areas eventually may become a trigger for conflict as increasing population densities put more stress on limited rural water supplies.

Where rural populations lack sufficient water to meet their basic livelihood and household needs, competition for access to water to sustain humans, crops, and livestock tends to give rise to conflicts over water rights. In addition, contaminated water supplies in drought-prone areas are a major cause of waterborne diseases. High population densities in rural or urban areas exacerbate the threat of water-borne diseases from contaminated drinking water. Growing population pressure can be expected to increase the demand for water for human and animal consumption, as will the development of industry and the expansion of irrigation in order to improve agricultural productivity.

The problem of water delivery is complex, and experience shows that the provision of water points alone is not necessarily an adequate and sufficient solution (Engorok 2005). Sustainable water service relies on effective management and governance of the system. The existing situation of uneven development in water facilities and management across the country results from neglect of certain areas, weak management at the district and local levels, and low institutional capacity for regulation and enforcement.

An example of uneven water development is the relative lack of investment in Alemi, Iganga, and Kamuli towns in contrast to the high investment in Tororo, where the water supply is efficient and reliable (Tumwine 2002). Low provision of water supply to Alemi is due to limited government funding, poor extension staff, and mismanagement at the local council and chief levels, all of which are exacerbated by instability in the region. As for Iganga and Kamuli, it is not evident why there has been a deterioration of public investment in these two areas (Tumwine 2002).

A serious constraint to sustainable water service delivery in some areas is the lack of security because of sporadic or ongoing conflict. In the rural Apac district, for example, a water shortage in April 2005 followed the breakdown of 168 out of 560 boreholes. The district water officer reported that contractors were fearful to enter the conflict area. Furthermore, insecurity prevented residents from raising the money required for the district to award contracts to local repair companies. The GOU requires districts to co-fund repairs, which entails a significant cost burden for many districts, particularly those experiencing insecurity from conflict and endemic poverty. Water coverage has been improved for about 54 percent of households in the Apac district; sanitation coverage has been improved for about 58 percent of households (Muwanga 2005).

Sanitation and Waste Management: Need for Accelerated Development

Uganda has established the policy, legal, and institutional framework for integrated water resources management. Overall responsibility for the water sector is with the Ministry of State for Water, through the Ministry of Water, Lands and Environment (MWLE) and its Directorate of Water Development (DWD).

The DWD is responsible for planning, monitoring, and supervising water supply and sanitation services. Implementation and management is delegated to the private sector under a public company, the National Water and Sewerage Corporation (NWSC). In accordance with the GOU's decentralization strategy intended to promote "ownership" by stakeholders, local governments are responsible for ensuring that communities participate in implementation and contribute to the capital costs involved in establishing and maintaining water and sanitation facilities.

However, because local governments are still in the process of developing implementation capacity, it is actually the DWD rather than the NWSC that is directly involved in implementing water supply and sanitation services in rural areas and small towns. The DWD's role has been strengthened recently to include water resources monitoring and assessment, regulation of wastewater discharge, and water extraction (Badaza and Kabirizi 2005). NWSC manages large town and city water supply and sanitation. Whereas in the past the Ministry of State for Water sub-contracted with large private companies (German and French), the ministry now plans to provide its own management. The Water Authority will oversee investment (most of this is by the government) and the Ministry of State for Water will be the regulator. This three-tiered system, comprised of an operator, a public water company responsible for management, and a regulatory authority, is soon to be in operation (Mutagamba 2005).

NEMA has been tasked by the GOU to provide guidance in relation to access, availability, and adequacy of water sources. NEMA also is involved in negotiating water management in the southwest part of the country. In addition to accessibility and long-term adequacy of water supplies, NEMA is currently concerned about water pollution as it relates to inadequate latrine coverage and general waste management (Aryamanya-Mugisha 2005).

National sanitation policies provide good guidance for implementation—they are conceptually strong, based on state-of-the-art methodologies, and are mainly well developed. At the local level, however, sanitation policies are weak and have had minor, if any, effect on the delivery of improved and expanded sanitation services. In cases in which programs are primarily donor funded, projects tend to emphasize water supply over sanitation and to favor urban over rural areas. Households generally have unmet sanitation needs, but usually receive no material support for the construction and maintenance of latrines. Some sanitation

assistance is available at the household level but it is grossly inadequate to meet the current need (IRC n.d.). Insufficient latrine coverage around the country contributes to the spread of a wide spectrum of diseases.

There are significant obstacles to making water and sanitation more widely accessible, although these are not necessarily insurmountable. Financing is limited, and institutional capacity and transparency are of even greater concern. Sending money through the districts for water and sanitation development is a relatively new concept, and there is a pressing need for training and supervision on the district and local levels such that the financing can be maximized to benefit the intended communities. The Ministry of State for Water is working with donors to address indicators and targets, as well as cooperating with ministries in other sectors, such as agriculture and education, and with local governments, in order to improve policy implementation (Mutagamba 2005).

Sporadic, Drought-Induced Water Scarcities

Sporadic, drought-induced water scarcities constitute time- and site-specific deficits that disrupt livelihood and settlement strategies in ways that often have long-term consequences for local communities. For example, over the past 50 years western Uganda has experienced a greater number of dry years than the rest of the country and has faced some especially severe droughts, notably in 1999 when people and livestock were forced to relocate in search of water.

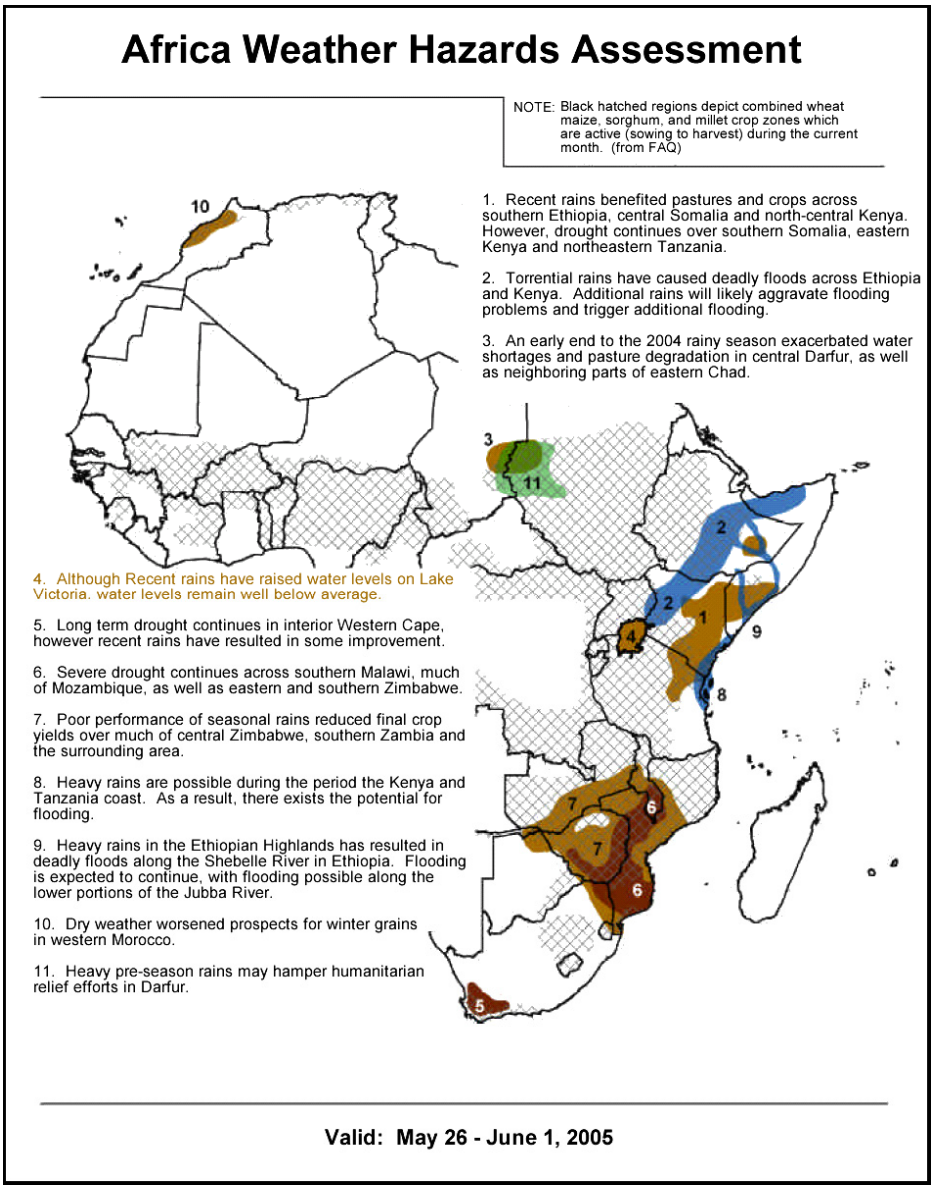
The arid sub-region of Karamoja perennially faces critical shortages of water for people and livestock, only partially recovering when the rains come. For example, drought in August 2004 stressed crops and increased the ongoing threat of raids by armed pastoralists in search of watering and grazing areas. By October, near-normal to above-normal rains had resumed in most areas of Karamoja, albeit too late for a full recovery of food crops. This meant that the population of the area required a major international relief effort; the United Nations World Food Program (WPF) estimated that it would provide drought relief to one half million people, approximately half of the Karamoja population, between January and September 2005 (USAID 2005c).

Longer-Term Water Resource Depletion

There is a widespread perception in Uganda that the country is becoming more arid. A time-depth study of households reveals a dramatic increase in the percentage of rural households storing water (1.2 percent in the late 1960s to 86.6 percent in 2002). The study attributes the impetus to store more water to the increasing unreliability of water sources and the increased labor costs to find and deliver water to households. As water sources dry up, members of rural households expend greater energy and time to walk longer distances to water sources. In urban areas, with growing population densities, there is greater overcrowding at water points that results in more time on average spent waiting to collect water (Tumwine 2002). These findings are consistent with those of this pilot study, which show that many Ugandans believe the country is steadily becoming drier and they are concerned over its future water supply.

The water levels of Lake Victoria have been declining on average over the past several years (figure 22). The effects of low water levels in Lake Victoria include poor water availability for irrigation purposes and low well water for household consumption. The National Water and Sewerage Corporation recently reported that as a result of steadily falling levels in Lake Victoria over the last year, water flowing to pump stations has been reduced in volume and quality. In Jinja, the water level of Lake Victoria has fallen to approximately the level of the pipes that carry water to the pumps for distribution. NWSC estimated that it would cost $2 million to extend the pipes 1 kilometer farther offshore to access cleaner water. In addition, it could cost as much as $6 million to relocate the pumps on a lower gradient. NWSC would use internal resources to finance the work but eventually would pass on the cost to consumers (New Vision 2005).

Figure 23: Lake Victoria Water Levels



Source: Famine Early Warning System Network (The USAID FEWS-NET). http://edcw2ks40.cr.usgs.gov/sa_floods/files/awha/bull237.pdf.

Conflicts over Water

In Uganda, water systems in many parts of the country (for example, the northern conflict zone, Karamoja, Lake Victoria perimeter, Jinja, and Kampala) are stressed as a result of such factors as ongoing violent conflict, drought, high population densities, domestic pollution, and urbanization (Ndege 2004). In the northern districts, inadequate water and sanitation are major issues in the IDP camps (Aporu 2005), where insecurity has led to overcrowded conditions and put undue strain on limited resources.

When water scarcities create insecurity, outbreaks of violence occur periodically. The effects of drought may be exacerbated by over-exploitation of localized water sources, such as bore holes and wells, when humans and livestock compete for water. For example, in the drought-prone Karamoja area, where the keeping of large livestock herds intensifies the demand for water, violent raids on other communities occur sporadically and are a source of destabilization. For the Karamoja, losing cattle is a major threat to

livelihood and cultural tradition, but their own intrusions into areas occupied by other groups also generate conflict. Water scarcity has forced some of the Karamoja people into the Katakwi district, for example, where the newcomers' cattle encroach on agricultural farms, turning them into pasture and sparking conflict with established local residents. The number of agriculturalists permanently displaced by pastoralists who are taking over their land for grazing is estimated to be over 88,000 (Owor 2005).

Population pressure contributes to environmental degradation and spring water contamination from intensive cultivation on slopes and along lower hillside areas where protected springs are located. The dense population in Mwisi, for example, has outstripped the available water resources and led to frequent conflicts and occasional but serious violence (Tumwine 2002). Periodic conflicts have occurred along streambeds, in Mbarara for example. While small in scale, these sorts of fights are socially disruptive (Mutagamba 2005).

Management of Transboundary Water Resources

The management of transboundary water resources in the Lake Victoria and Nile Basins has important implications for national, regional, and international security.

Lake Victoria

Lake Victoria, the second largest freshwater lake in the world (Ndege 2005), is a natural resource of immense significance for the entire region of East Africa. The waters and shoreline of Lake Victoria are shared among Uganda (43 percent), Tanzania (51 percent), and Kenya (6 percent) (Odada et al. 2004). The water and land resources of the Lake Victoria Basin are of great value in the region as a source of drinking water, hydroelectric power, and inland transportation, as well as a support for industries including agriculture, fishing, trade, and tourism.

Currently, over 30 million people live in the Lake Victoria Basin. The vast majority are dependent upon the Basin's natural resources for their basic livelihoods (Odada et al. 2004). More than 80 percent of the population is engaged in agricultural production, primarily as small-scale farmers and keepers of livestock. About three million people are engaged in subsistence and commercial fishing activities.

Figure 24: Countries Expected to Experience Water Stress or Scarcity in 2025

Source: UNEP 1999, quoted in UNEP 2005b. http://www.unep.org/dewa/Africa/publications/AEO-1/148.htm.

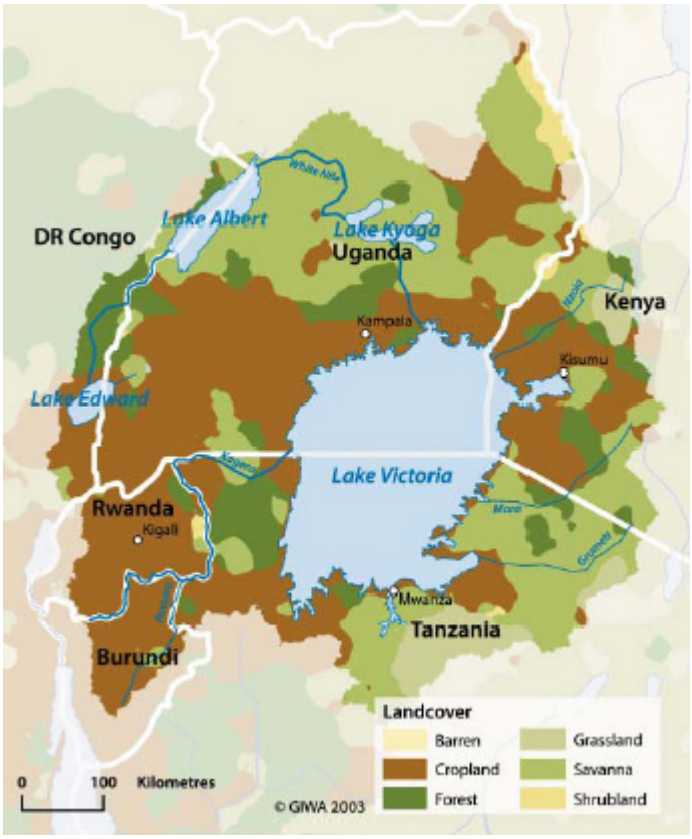
The Lake Victoria Basin area is one of the most densely populated and poorest regions in the world, with an estimated 1,200 people per square kilometer and an average annual income less than $250 (UNEP 2005). Pressures on the natural resources in the Basin are mounting as the density of population in the Basin is already above the average for each of the riparian countries (Klohn and Andjelic 1997) and steadily increasing. As Figure 23 indicates, of the three countries bordering Lake Victoria, Uganda and Tanzania will experience water stress and Kenya will face water scarcity by the year 2025 (UNEP 2005b).

Unsustainable practices in the utilization of natural resources in the Lake Victoria Basin threaten the food security and economic well-being of the entire population. Most of the drainage basin has been cleared and wetland areas filled in for cropland and rangeland, as Figure 24 indicates. Encroachment into the wetlands to create land for agriculture and livestock production prevents the wetlands from performing their natural

filtration function. This destroys a critical mechanism for moderating the flow of soil nutrients and other contaminants into the lake waters.

Inappropriate land use practices associated with intensive agriculture and deforestation lead to soil erosion. The forest cover has been largely depleted through harvesting for household energy consumption. Tests of the groundwater in areas around Lake Victoria show high salinity (200-300 mg/L), signaling the presence of soil nutrient runoff that is the result of soil erosion (Prepas and Charette 2003) not only in the immediate vicinity of the Lake, but also in tributary areas. Rivers deposit the silt in the Lake, which leads to eutrophication that destroys valuable aquatic species (Ndege 2005). In addition to soil nutrient runoff, a source of contamination is the human and solid waste entering the Lake in various proportions from urban centers (72 percent), industrial sites (15 percent), and fishing villages (13 percent) (Tenywa 2005). Pollution is a significant threat to the large human and livestock populations dependent on Lake Victoria for water consumption and domestic use.

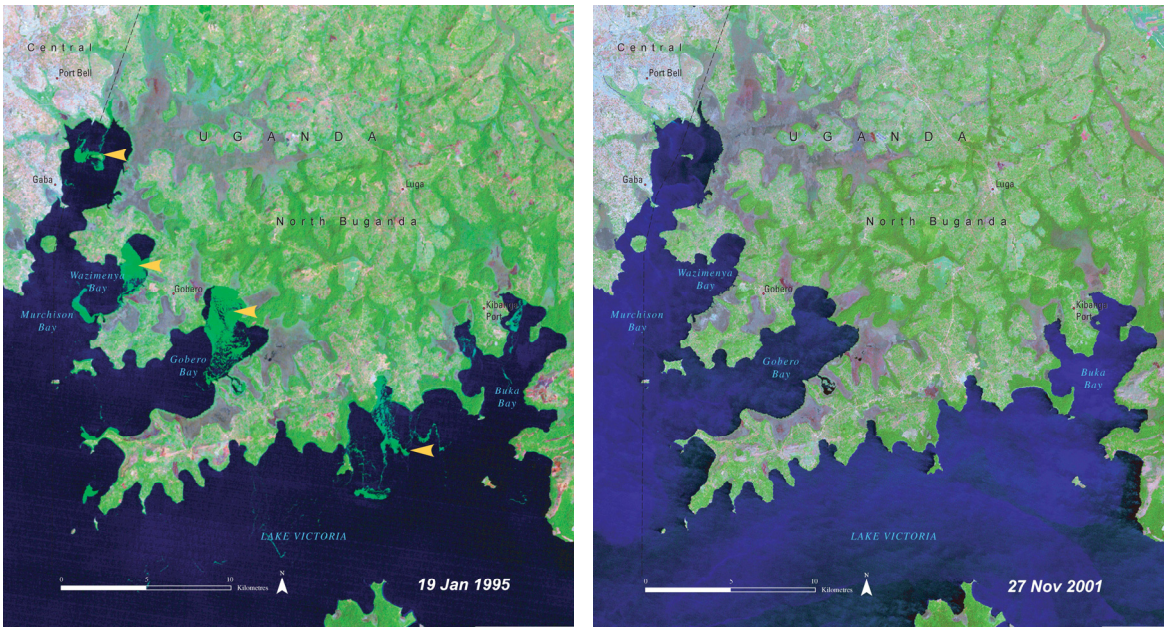
Figure 25: Lake Victoria Water Basin



Source: Odada et al. 2004.

In addition to pollution, unsustainable fishing practices, including overfishing, threaten the fish supply upon which a substantial number of Ugandans depend for consumption and employment. The lake is an important source of cheap protein for the millions of people who live along its shore. Fish, however, are becoming more costly and less nourishing for local communities, as overfishing and inefficient processing methods used to produce fish for the export market leave inferior fish parts for local consumption. A balance must be established which takes into account the need to sustain local populations and to contribute to economic diversification on the national level through fish exports.

Figure 26: Environmental Change in the Lake Victoria Basin



Lake Victoria (1995)

Lake Victoria (2001)

Source: UNEP. n.d.

How Uganda approaches the utilization and management of natural resources in the Lake Victoria Basin in the next two decades will have an impact on social and economic stability in the country. On the local level, a key question will be how to enact laws that empower local groups to be legally responsible for the management of Lake Victoria and smaller lakes through marine resources associations and integrated lake management programs (Engorok 2005). On the national level, the issue of overfishing must be addressed as a tangible threat to the longer-term food supply and livelihood security. Intermittent conflicts are erupting in fishing communities between operators of commercial fishing enterprises and artisanal fishermen, with the latter becoming significantly disadvantaged as dwindling fish supplies require advanced technologies for fish capture.

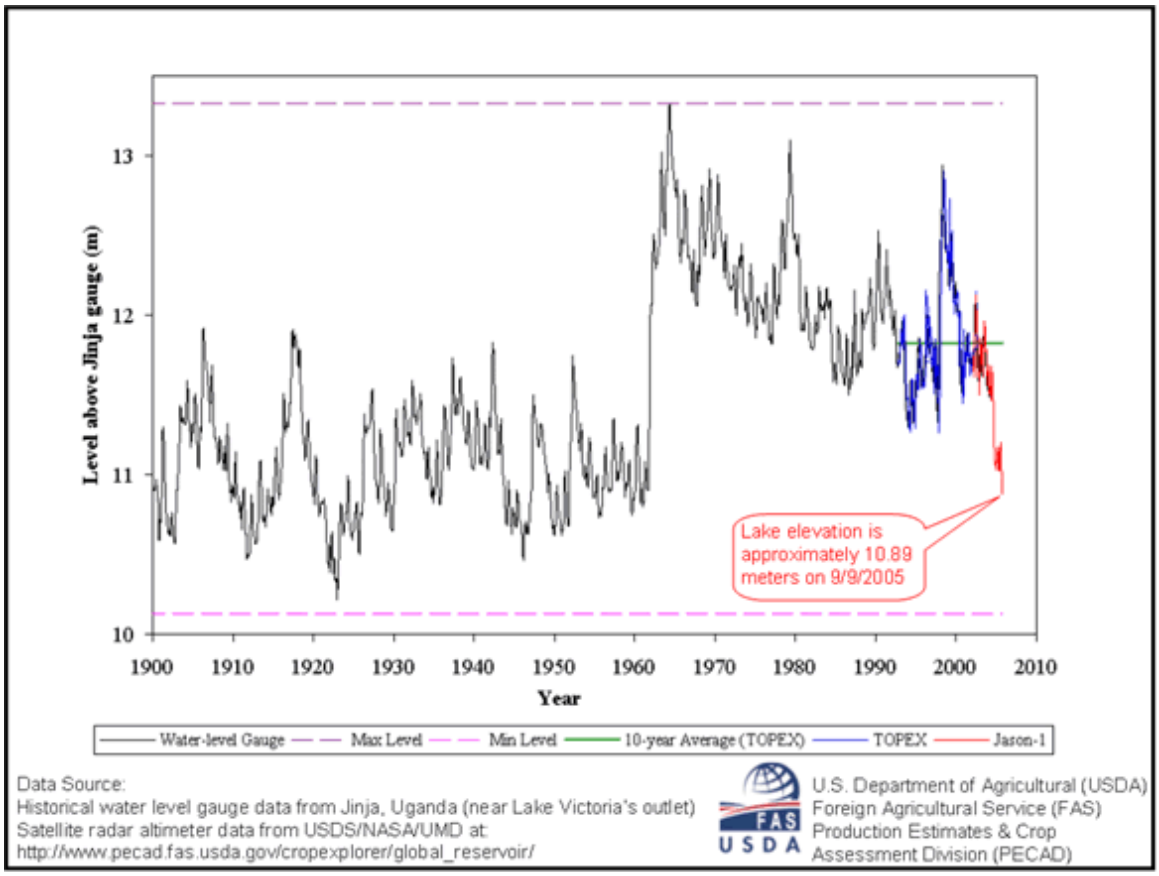
Effective management and regulation of natural resources in the Lake Victoria Basin is a critical environmental security concern with implications for the entire region of East Africa, as competition is steadily increasing over natural resources to sustain livelihoods and conflicts are occurring in local communities and across national borders. The Ministry of State for Disaster Preparedness and Refugees, in coordination with the Ministry of Agriculture and the Ministry of Internal Affairs, is responsible for handling the intermittent conflicts that occur when fishermen use illegal techniques or equipment that facilitate overfishing (Aporo 2005). A recent case of Kenyan fishermen arrested by Uganda for fishing over the boundary line in the Lake escalated into an international incident for which President Museveni met with President Kibaki in Nairobi to arrange a settlement.

A high profile concern in Uganda and the broader region of East Africa is the capacity of Lake Victoria to sustain rising demands on its water resources, as evaluated in part by measures of the lake's water levels over time. Specialists are evaluating the significance of changes in water levels in relation to what is currently known about the potential impacts of climate variability, longer-term climate change, and hydropower generation.

Climate is clearly a factor that affects water levels because Lake Victoria has a massive surface area but it is relatively shallow and dependent mainly on precipitation and secondarily on inputs from tributaries. Water levels are extremely sensitive to moderate changes in rainfall over the lake surface area and rain catchment basin. The lake typically recharges during two annual rainy periods, from October to December and from February to June, but fluctuations in precipitation are common.

The hydrology of Lake Victoria has been a focus of much research attention since the early 1960s, when the lake experienced a rapid rise in water level due to unusually abundant rainfall in the area. Since the 1960s, water levels have shown a declining pattern (Figure 26). In August 2005, the water level was reported to have dropped to approximately 1.2 meters below the long-term mean level and to have hit a near 10-year low. After a period of rainfall contributed to partial recovery, the water level was reported in October 2005 to have reached 0.7 meters below the long-term mean level (Apuuli 2005b). By December 2005, however, the water level was reported to have dropped to its lowest point since 1961.

Figure 27: Historical Water Levels for Lake Victoria



Source: USDA.
http://www.fas.usda.gov/pecad/highlights/2005/09/uganda_26sep2005/images/100_years.htm

Effects of lower water levels are evident in the riparian countries of Uganda, Kenya, and Tanzania. For example, the Kenyan press (East African Standard 2005) reported that low water levels have forced ships to dock in deeper waters located away from the shores, affecting inland water transport, agricultural markets, and trade between Uganda, Kenya, and Tanzania (Figure 27). The press article also mentioned that local fisheries have been affected from the low lake water levels. Lowering of lake water levels also has reduced the hydropower output along the Victoria Nile River at the Nalubaale and Kiira hydropower stations.

Figure 28: Historical Water Levels for Lake Victoria

Jinja, Uganda where motorized boats can no longer use the dock due to shallow waters along the shoreline. *Source*: USDA 2006.

While the effects of low water levels are visible in their direct and negative impacts on livelihoods, the causes are controversial, particularly with regard to the role of hydropower generation, since this has significant implications for Uganda's relationships with other countries in eastern Africa. Construction in 1959 of the original Owen Falls Dam effectively transformed Lake Victoria from a natural lake to a reservoir (Kull 2006). Ripon Falls, located near Jinja Uganda, was the natural topographic feature that originally regulated the level of the Lake. Whereas Ripon Falls (submerged in the building of Owen Falls Dam) used to act as a natural hydraulic control, the outflow of Lake Victoria has, since the dam construction, been under human control. The operation of Owen Fall Dam (now called Nalubaale Dam and its extension called Kiira Dam) can have a direct effect on the water level of Lake Victoria and thus on the entire population of the Basin.

Uganda has agreed that, in utilizing the two-dam system, the goal of producing hydropower is supposed to be second in priority to operating in a manner that ensures that the relationship between lake level and outflow corresponds to what would occur naturally in the absence of a dam. Uganda has a longstanding agreement with Egypt to operate in accordance with an "Agreed Curve" measure that approximates the natural conditions including inputs (rainfall and tributary flows) and outputs (evaporation and "natural" outflows). Hence, the term "over-release" is used to refer to dam operation where more water is released than would have flowed out naturally (Kull 2006).

A UNEP report presented at the 11th World Lake Conference in 2005 cites drought and the "over-releasing of water at hydro-power facilities" as the two key causes of falling water levels in Lake Victoria (Olita 2005). The Ugandan Ministry of Water, Lands and Environment estimates that approximately 40 percent of the lowering of the water level in 2004–2005 is the result of drought, with the remaining 60 percent resulting from obstruction of the flow by hydropower generation (Apuuli 2005b). These figures essentially conform to those reported in a recent hydrologic study that estimates the severe drops in water levels in Lake Victoria during 2004–2005 were approximately 45 percent due to drought and 55 percent due to "over-releases" from the Nalubaale and Kiira Dams on the Victoria Nile below Lake Victoria (Kull 2006). The study concludes

that recent operating practices have exceeded past sustainable operating water levels, suggesting that this situation together with future projections of drier climatic conditions and lower lake levels will make it difficult for the Victoria Nile dams to reach their projected hydropower goals.

The hydrologic study (Kull 2006) reinforces the importance of some problems brought to light through the present pilot study that may have serious implications for national and regional security. Non-adherence to agreements on water releases from the Victoria Nile dams, in addition to the omission of environmental impact assessments before the dams were constructed, point to weak governance in the management of Uganda's key water resources. This is coupled with a lack of transparency, as evidenced by the dearth of public information that would enable sound assessment of existing as well as proposed dam operations, such as the controversial Bujagali project, by the public and by policymakers. Projected climate variability, and possibly long-term climate change, threaten lake water levels in the short and longer term and exacerbate the difficulty of developing hydropower as a viable energy alternative for Uganda.

The potential for conflict can be expected to rise over the next two decades as the addition of five million more inhabitants through population growth and migration will intensify demands put on the natural resources base. The Lake Victoria Environmental Management Plan (LVEMP), initiated in 1994 by Kenya, Tanzania, and Uganda under the auspices of the UN Global Environment Facility, works to develop land use management, Lake Victoria ecosystem management, and community participation. The organization includes task forces responsible for fisheries management and control of invasive species, management of water quality, and land use, including wetlands. The Ministry of the Interior is working to negotiate a political treaty to encourage increased cooperation among the three riparian countries and to reduce rising tensions (Rugunda 2005).

The water resources of Lake Victoria support activities not only of the large human population within the lake basin but also of the inhabitants of downstream countries, where water is becoming increasingly scarce (Prepas and Charette 2003). From Lake Victoria, the Victoria Nile flows northward, picking up water from Lake Kyoga and Lake Albert, to become the White Nile that flows into the Sudan (Figure 28). Eventually, the White Nile joins the Blue Nile below the Ethiopian highlands to flow through Egypt and ultimately into the Mediterranean Sea. Thus, Uganda is linked by its position in the Lake Victoria Basin to the larger Nile River Basin and to a host of additional riparian countries.

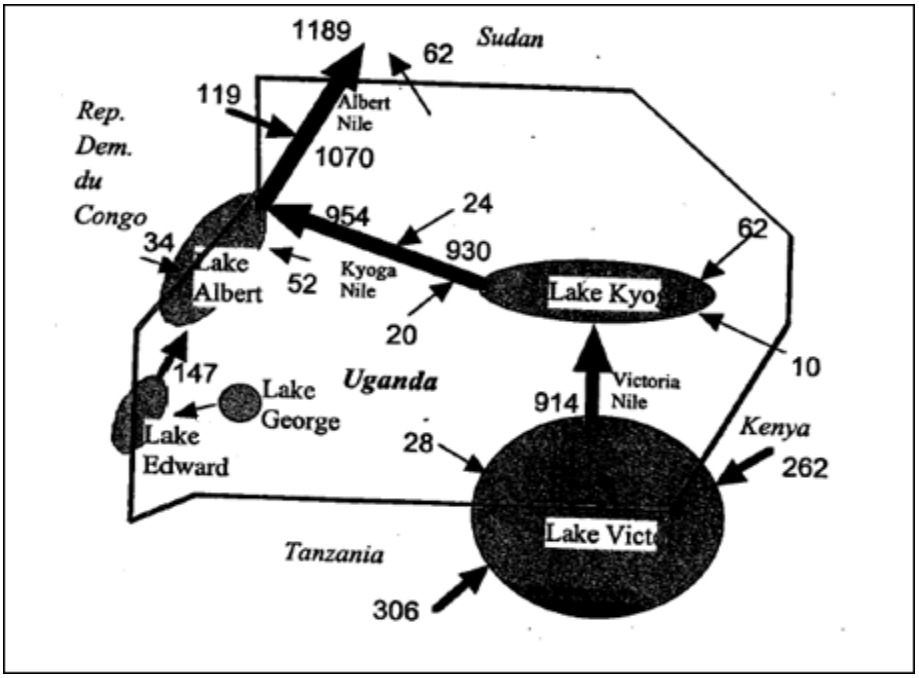
The Nile River

Most of Uganda's water resources, estimated to be 220 cubic meters (AFDB 2004) per capita annually, fall within the Nile River drainage basin. This immense basin, covering approximately one-tenth of the African continent, has a catchment area of over 3 million square kilometers (Nile Basin Challenge Program 2005) and is shared by ten countries: Uganda, Kenya, Tanzania, Rwanda, Burundi, the Democratic Republic of Congo, Egypt, Sudan, Ethiopia, and Eritrea.

Since the Nile Basin constitutes about 98 percent of the total area of Uganda, virtually the entire Ugandan population can be considered to reside in the Nile Basin (FAO 2005). Thus situated, Uganda needs to address, as an environmental security concern, the potential of water stress and scarcity (real or perceived) to contribute to tensions within the Nile Basin region that could lead to conflict.

Today, the Nile Basin serves about 336 million of Africa's total population of 850 million (Fisher-Thompson 2006). The population within the ten riparian states is predicted to double between 1995 and 2025, given that the annual population growth rates for the states range from 2.5 to 3.0 percent (Fisher-Thompson 2006; Nile Basin Challenge Program 2005). Already, some of the basin countries are experiencing acute water stress and others are suffering water scarcity during much of the year as a result of drought cycles, migrations, and degradation of water sources. As the population in the region grows, there is greater pressure on water resources to meet rising consumption and energy needs. As each of the riparian states

Figure 29: Schematic Representation of the Ugandan Nile System



Arrows indicate water flows into the lake system. Values are expressed in cubic meters.
Source: USDA 2006.

strives to meet its current domestic water requirements and to prepare for the future, it creates a cumulative strain on the resources of the Nile Basin.

Water shortages constrain food production in many parts of the Nile Basin (Lirri 2005). Many riparian countries, including Uganda, are planning to use water from the Nile to develop irrigation as a means of addressing their declining per capita food and agricultural production rates. Uganda, Tanzania, and Kenya, for example, intend to develop jointly an area encompassing 387,000 ha for irrigation of agricultural land. Egypt and Sudan have a combined total of over 5.5 million ha under irrigation and plan to expand irrigation over an additional 4.9 million ha. Ethiopia has as many as 265,000 ha of land that could be put into irrigation. Irrigation has the potential to draw a substantial volume of water from the Nile River and create a potentially unsustainable water utilization regime in the basin.

Adequate water supply is needed not only for human consumption, but also for livestock production, which is a key to livelihood security in the region. The number of livestock occupying the Nile Basin is anticipated to expand along with the rapidly expanding population, magnifying water requirements and putting enormous pressure on water resources, according to the International Livestock Research Institute based in Ethiopia (Lirri 2005).

Increasing in tandem with rising consumption requirements are energy needs that may be served in part by the generation of hydroelectric power from Nile water flows. Although, unlike irrigation, hydroelectric power generation on the Nile River does not extract large volumes of water, dams may divert the water course or periodically reduce the flow to downstream countries. Uganda's immediate needs for energy generation are driving efforts to pursue the development of ten small dams plus a major dam at Bujagali Falls (Apuuli 2005b; Musoke 2005). Uganda's push to develop dams on the Nile coincides with a similar move by Ethiopia and an effort by Egypt to develop extensive irrigation projects.

Competing interests and needs among the riparian countries make water allocation a divisive issue. Within the next two decades, high population growth and increasing water requirements are projected to escalate conditions of water stress to water scarcity in most, if not all, of the countries that depend upon the Nile River. The ten riparian states in the Nile Basin, the largest number of independent states in any river basin in the world, have their own specific interests in the Nile waters and varying capabilities to pursue them. Growing pressures on Nile water resources mean that the riparian states must make resolution of contentious issues a high priority if they are to maintain stability and avoid interstate conflict.

Uganda and other riparian states for many years have debated issues of Nile water allocation and utilization practices and their relationship to historic agreements. Longstanding international agreements favor two downstream countries with large percentages of their populations highly dependent upon the Nile for fresh water: Egypt (95 percent) and Sudan (77 percent) (Fisher-Thompson 2006). Based on an agreement in 1929 with colonial Britain, Egypt reserves the right of consent over any prospective project on the Nile River that could affect the flow, as well as the privilege to monitor the Nile flow in upstream countries. An agreement in 1959 between Egypt and Sudan, both users but not contributors to the Nile water, allocates the entire annual average water yield to these two countries.

Uganda, Tanzania, and Kenya argue that the historical agreements are not equitable insofar as they do not take into account the present and future needs of the upstream countries. The three East African countries are seeking to establish new agreements that would provide them with bulk water transfers for agricultural production (Etengu 2005). The East African states are also exploring possibilities of growing crops to offer for sale in Egypt and Sudan in exchange for water withdrawals (Mutagamba 2005). Egypt and Sudan are reluctant to renegotiate the old treaties and concerned to ensure that Uganda (and other countries that might follow suit) not withdraw or divert Nile waters in ways that are incompatible with their needs. Thus far, the Government of Uganda has not pursued the course suggested in 2002 by Parliament Member Amon Muzoora to renounce unilaterally the pre-independence Nile water agreements and make claims for annual compensation of US $1.2 (IRIN 2003). Nevertheless, tensions around the unresolved issues continue to strain relations between the upper and lower riparian states.

A perception is evolving among downstream riparian countries that Uganda may become a potential "taker" of water and, as such, represent a new type of threat to their water security. Whereas Uganda has in the past met its water needs without drawing volume or significantly reducing the flow downstream of water from the Nile, some experts suggest that, in the medium to longer term, the country may not be able to avoid creating this effect as it strives to meet its growing domestic water consumption requirements. "…if Ethiopia develops one dam … they can't expect that Uganda will just sit and watch. They have said ok to Aswan and ok to Ethiopia. But the 1959 arrangement was made by colonial powers, essentially. Now Uganda needs water for irrigation…" (Etiang 2005). This unanticipated prospect raises the profile of water allocation issues to a potentially explosive level in the Nile Basin.

To encourage peaceful negotiation and facilitate basin-wide cooperation and sustainable socioeconomic development, the riparian states have worked together over the past several years through the Nile Basin Initiative (NBI), a program founded in 1999 with a secretariat in Entebbe, Uganda. The NBI has had a temporary mandate to initiate, coordinate, and implement basin projects in anticipation of instituting a legally-binding instrument to create a permanent governing body. Uganda's Minister of Internal Affairs has expressed support for a treaty that focuses on the Nile River Basin as a permanent common resource (Rugunda 2005). Participation in the NBI has been helping to increase awareness and regional understanding of the water requirements of each riparian country and to build the foundation for a basin-wide treaty.

In April 2006, as a result of the work of the NBI and years of tough negotiations, all of the riparian states (except Eritrea) reached a decision within the Nile Council of Ministers to set up the Nile Basin Commission as a permanent body to govern the Nile waters. The general principles, functions of the ministers, and a Technical Advisory Committee of the Commission are now established. The Commission has a mandate to act on behalf of member states to promote cooperation and resolve any contentious issues on the use of the Nile River as a transboundary water resource. When a complaint is raised, representatives from the aggrieved country, another riparian state, and an independent country, will be nominated to conduct a fact-finding mission to investigate and assist the Commission in reaching a solution.

The formal regional authority of the Commission will take effect after the proposed treaty is fully constituted. Some questions are as yet unresolved, including how the authority of the regional Nile Basin Commission will be articulated with that of 1) sub-basin organizations such as the Lake Victoria Basin Commission and the Blue Nile Commission, and 2) colonial-era agreements (Doya 2006). Agreements on these fundamental concerns must be reached for the Commission to serve as an effective mechanism for resolving diplomatically the Nile water issues before they become drivers of violent intrastate conflict.

Uganda will serve as host for the Nile Basin Commission and a focal point for the Nile Basin. As such, Uganda will have the opportunity to play a leadership role in developing the Nile Basin Commission and ensuring that it will perform as expected. The creation of the Nile Basin Commission represents a promising new phase in the process toward sustainable management and regulation of Nile water resources. It remains to be seen, however, how successfully the Commission will function to fulfill the confident prediction made by Uganda's Minister of State for Water that, "There will be no war over the River Nile" (Mutagamba 2005).

VI. ENVIRONMENTAL SECURITY SCENARIOS: WHITHER UGANDA?

Scenarios are not predictions; rather, they seek to define the boundaries of the possible in ways that illuminate differing potential futures. These possible futures are contingent in large measure on human agency—decisions made by citizens, communities, and policymakers. Policy actions (or the decision not to act) will influence greatly Uganda's development path and its chances for enhanced stability and security.

It is worth restating the definition of environmental security used in this study:

Environmental security is a condition whereby a nation or region, through sound governance, capable management, and sustainable utilization of its natural resources and environment, takes effective steps toward creating social, economic, and political stability and ensuring the common welfare of its population.

As can be seen in this definition, environmental security is an ongoing process rather than a static achievement. Similarly, the purpose of the three scenarios that follow is to trace out possible trends and directions rather than predict certain outcomes.

In the case of Uganda, assumptions about a set of key factors necessarily affect each of the scenarios. First, the range of climate variability that the country faces will be a significant conditioning factor, especially in terms of drought and other natural hazards. All of the scenarios assume that in the near- to medium-term climate variability will not increase markedly. Second, the chances for stability and security in Uganda are closely linked to the eventual resolution of the conflict in northern Uganda. The study assumes that the conflict will come to an end—at least in its present form—over the next few years. Third, changes in the rate of population growth will produce differential effects on the environment and human security and on the probability of conflict. The study anticipates a range of outcomes, from continued population growth at current rates to a gradual but steady decline in the rate of growth. Fourth, the openness of foreign markets to Uganda's products will have significant effects on the potential for economic growth. In the near to medium term, this scenario assumes that the trend toward incremental but not dramatic liberalization of Uganda's foreign markets will continue. Lastly, the wild card in all scenarios dealing with Uganda's future security is the political evolution of the country. Will Uganda definitively move into stable electoral politics and beyond the extra-constitutional changes of government and violence that have marked the post-colonial era? Given the shifts over the past two decades in domestic political life and international norms, there is reason to be optimistic, but this question remains a cloud over the country that has not been entirely dispelled.

Scenario One: A Slide Toward Breakdown?

In comparison with other African countries, the state of Uganda's environment and natural resources is not seen as alarming by most knowledgeable observers. However, an initial scenario, which plays out over time the baseline trends identified in this study, suggests serious problems and the potential for a breakdown of stability and security.

For agriculture, the first scenario envisions modest successes at reversing soil productivity declines in certain areas. Nevertheless, overall the country would continue to face mounting problems of food insecurity. As a result of continued population increase, the number of farmers would rise in relation to total agricultural land. No groundbreaking transformations in the sector would dramatically mitigate land degradation and plant disease outbreaks. Sluggish rates of agricultural technology adoption would hamstring the country's ability to export commodities and feed the domestic population. Much of the remaining wetland and forest areas would be converted to agricultural land in order to produce for a growing population, with negative consequences for energy supply and environmental integrity. The development of irrigation would lead to occasional conflicts between pastoralists and farmers, with each competing for the use of stored water resources. In the near term, government spending on public goods, such as health and education, would take precedence over agricultural investments.

Given the heavy dependence on wood and charcoal by a growing population unable to afford electricity, the country would encounter limited success in solving the critical problems afflicting the energy sector. Only incremental progress in providing electricity and alternative energy sources would be anticipated. Intermittent load shedding, with the potential for periodic sustained blackouts, would occur. The extraction of oil resources might alleviate some problems, but oil discoveries could not be expected to act as a panacea for the struggling energy sector. Some progress in hydropower expansion might occur, and negotiations over pending projects would continue, with aggrieved communities typically excluded from the decision-making process. The availability of wood would remain tenuous as some successes in commercial plantations would offset the increasing demand for energy. Some areas of the country would fully deplete their meager wood supplies and resort to less efficient forms of biomass to cook, while the incidence of health problems would increase as indoor air pollution grew. Communities without energy alternatives would see significant migration flows.

In this initial scenario, the ambiguities and tensions over land tenure would heighten, especially in northern Uganda. In the context of the Plan for Modernization of Agriculture (PMA) and donor priorities, both of which envision a more market-based and export-oriented economy, there would be a secular trend away from customary land tenure toward leasehold and freehold tenure, which would facilitate the buying and selling of land for commercial purposes. Where overlapping and unclear tenure claims existed, the asymmetries of power would favor modern court and tribunal procedures over traditional forms of adjudicating disputes. While this might resolve individual cases, grievances would linger, adding to latent tensions and instability. With the land tenure system biased in favor of male ownership, women and children would be vulnerable to dispossession and landlessness. The further fragmentation of landholdings, in combination with persistent levels of low agricultural productivity and reduced opportunities for relocation through migration, would add to the seeds of conflict in the land sector.

In post-conflict northern Uganda, absent a concerted effort on the part of government to assuage fears and clarify uncertainties over land rights, contention and conflict over land would increase, and the traditional authority by which chiefs and elders enforce negotiated compromises would diminish. Insofar as the decision of modern tribunals tended to reflect the preferences of the central government for alienable land rather than customary tenure, tensions between the north and central authority would be reinforced, if not amplified. In addition to these pressures over land issues, there would be instability resulting from the

difficulty of integrating an entire generation of young people who, having grown up mostly or entirely in IDP camps, had neither the disposition nor the skills to develop a sustainable livelihood based on the land.

Looking ahead, in this scenario, if new policies are not developed, it would be hard to envision any lessening of land conflicts in Karamoja and the Albertine Rift. Indeed, in Karamoja, with population increasing and the amount of available and productive land limited, the Karimojong's search for water and grassland would become even more difficult, and conflict would increase. The spillover of pastoralist-cultivator and pastoralist-pastoralist conflict into Sudan and Kenya would raise the possibility of higher-level conflict over issues of sovereignty and law enforcement. The increasing availability and spread of small arms and other weapons would add a further destabilizing element to the equation. In the Albertine Rift, steady population increases would contribute to intensified competition over land. With sparsely settled land disappearing, the previously available escape valve of migration would begin to close. As land fragmentation and declining productivity eroded the viability of agricultural livelihoods, some persons would be driven into illicit crossborder activities, involving the smuggling of contraband such as gold, coltan, precious stones, ivory, and skins. These activities would raise the potential for transboundary conflict among the security forces or other armed groups in Uganda, the DRC, and Rwanda.

On the other hand, in the near to medium term, water is not likely to become a serious security issue. In this scenario, one would expect to see Uganda working to strengthen institutional capacity, especially at the local and district levels, although progress would be incremental, especially in terms of building transparency and accountability. Inefficient management and enforcement would continue to result at times in poor construction, inequitable distribution, and inadequate supervision of water and sanitation facilities. However, in coordination with donors and the private sector, Uganda would be able to continue to develop water and sanitation delivery to the rural population and be able to meet the Millennium Development Goals (MDG) for access to water before beginning to direct its focus away from simple provision of water points and toward more sustainable and integrated services. Increasingly frequent meetings with neighboring riparian countries over issues of transboundary water basin management would keep any international tensions over water within manageable bounds, although the institutionalization of these processes would remain incomplete.

Scenario Two: From Pressing Problems to Intractable Insecurity?

Although it is perhaps unlikely, it is by no means unimaginable that several of the many pressing problems faced by Uganda might worsen in sequences clustered so closely in time that they would produce strongly negative synergies. The second scenario considers such possibilities and tries to envision some of the likeliest of these "less-than-likely-but-real" possibilities.

In agriculture, this scenario would entail continued rapid population growth, little or no change in the rate of agricultural technology adoption, and a steady decline in output, leading to increases in food shortages, often severe in some areas. The spread of banana wilt would destroy nearly all banana crops, exacerbating periodic food shortages and mortality. Minor conflicts in markets and other public spaces would occur over the price and availability of foodstuffs. Farmers unable to adapt quickly to growing new crops would migrate or be displaced. An eventual reliance on rice, cassava, and other calorie-dense food might mitigate the impact of the decline in bananas, but rice and cassava diseases already existing in Uganda would periodically place the country in an even more precarious position. An increased reliance on rice would result in further wetland encroachment, decreasing water supply and increasing pollution. The demand for rice would also politicize the agriculture sector in northern Uganda with powerful entrepreneurial forces advocating the development of large-scale rice plantations at the expense of small-scale farming. Long-held expectations concerning Uganda's food self-sufficiency would be overturned, and the country would begin to resemble other African nations facing severe food insecurity.

Under this scenario, the viability of the electricity sector would be severely threatened, and domestic and international efforts to support it would experience limited success. Incremental policy steps aimed at reform in the energy sector would not be effective enough to keep pace with biomass loss, bringing the sector to the brink of collapse. During several periods of intense drought closely bunched together, the water levels in Lake Victoria would drop, and frequent load shedding would be impossible to avoid. Small and medium enterprises would suffer from high failure rates as a consequence of constant interruptions in energy supply. Where electricity did exist, prices would increase. The number of users able to afford electricity would decrease, and they would turn to other unsustainable sources. Electricity theft also would surge. The high rate of population growth would have a proportional effect on the rate of deforestation, and the supply of wood would become nearly depleted. The government would face frequent incursions into national protected forests as people became desperate for resources for cooking and other basic needs. Conflicts over private property also would be likely to arise. In areas with minimal or no access to biomass, problems of malnutrition would increase; the worst-hit areas could face starvation. With government institutions weakened by crisis, the extraction of oil (were it to be found) would be marked by corruption and significant environmental degradation.

In a situation of food insecurity and energy crisis, the forces contributing to conflict over land would be intensified. Pressures on landholdings with declining productivity would increase and, for many people, access to the remaining sources of biomass would become a matter of survival. The government would turn to the rapid opening of public lands to the private sector in hopes of spurring investment and the commercialization of agriculture. Already unclear and overlapping land tenure rules would be subject to manipulation by powerful interests as they sought coping mechanisms or exploited opportunities created by economic disarray. The erratic, unpredictable, and ineffective implementation of government policies would deepen citizen cynicism and call into question the rule of law.

In northern Uganda, the crisis would be acute, with already suspicious former IDPs finding their fears confirmed in apparently arbitrary land decisions that undermined traditional forms of authority and destabilized the effort to restore secure livelihoods. Over time, the fallout of the extremely high HIV/AIDs infection rates in the north would become a serious drag on labor productivity and a burden for government services. Protests and continued instability would push the government to maintain the presence of the UPDF in the north, whose personnel would be pursuing their own coping strategies, often involving the illegal use of land or other natural resources. Out of these economic, social, and political stresses, a post-LRA rebel group might emerge in Acholiland, with perhaps a wider social base and a more coherent political message.

Instability and insecurity would spread similarly to Karamoja and the Albertine Rift. Food shortages would heighten conflict between the Karimojong and cultivators, with both sides seeking to better arm themselves. Pockets of severe food insecurity would be found along the densely populated Albertine Rift. In both regions, the crisis would drive people across the borders in search of basic needs, and Uganda's neighboring states would feel obliged to attempt to secure their borders in response to the prospect of large-scale migration. The resulting instability in Uganda would have regional effects, given its role as a source of steadiness and strength for both East Africa and the Great Lakes region.

Confronted with urgent problems in agriculture and the energy sector, and with growing security concerns, Ugandan policymakers would shift funding away from the water sector. Existing gaps would widen in the development and delivery of water and sanitation facilities. Rural areas would be underserved, while their populations continued to expand and have greater per capita consumption needs. No structural changes would be initiated, with the result that sanitation would continue to be considered secondary to water access as a national concern. Inadequate sanitation development would become a major health hazard, especially in communities with increasingly dense populations. The lack of clean, readily accessible water would exact a toll on the health and livelihoods of the Ugandan population, with polluted and inadequate water sources adding to declining health and decreased economic productivity. Were there to be, as might be expected,

inadequate waste management in the heavily populated Lake Victoria basin, it would cause disease and pollution that would threaten the viability of fishing livelihoods, having a significantly detrimental impact on the dynamic and growing fish export sector.

Preoccupied with its domestic crises, Uganda might well fail to commit adequate resources toward negotiation, policy development, and financial contributions to the regional organizations dedicated to address transboundary resource management for Lake Victoria and the Nile River. Competition over shared water resources would intensify as the demand grew over time within the various states for hydropower generation and irrigation, while the resources continued to be degraded by human activity. Relationships among the states would be eroded by lack of cooperation and coordination of policies and regulations, destabilizing the Great Lakes region.

Scenario Three: Gaining Ground in Pursuit of Environmental Security

The foregoing scenario is alarming by any standard. But what is perhaps most noteworthy, beyond its very preoccupying possibilities, is the interconnectedness of the various elements of food security, energy security, land security, and water security. The negative synergies that unfold among them are clear and powerful—a downturn in any single sector increases (although by no means guarantees) the chances of a downturn in the others. However, just as the lack of effective governance and poor policy choices can lead to vicious cycles, wise policy decisions can lead to *virtuous cycles* that support sustainable development and contribute toward the goal of environmental security.

A productive and sustainable agricultural sector would play a central role in the stability of Uganda in the near and medium-term. New and ongoing efforts to resolve challenges in the sector would begin to bear fruit. Some of the necessary elements would include measurable adoption of appropriate fertilizer use, near containment of banana wilt and other harmful diseases and pests, and an increase in market access. Cultural, financial, and educational barriers to appropriate agriculture technology adoption would be overcome by concerted and coordinated policies and adequate resources. Soil degradation problems would receive enhanced levels of attention by the government, the international community, and individual farmers. A better balance of small-scale and industrial farming operations would emerge, and value-added industries would begin taking root, providing alternative sources of income for Ugandans and a strengthened economy less vulnerable to international price fluctuations for basic commodities. Ugandans would experience less food insecurity throughout the year in all parts of the country, but particularly in the north. Greater food security in the north would result from the cessation of violence, a peaceful return of IDPs to their homes, and the provision of resources needed to begin planting crops as soon as possible. These outcomes would be based on a sustained dedication of resources to preventing land conflicts, fostering sustainable agriculture and rural economic development, and financing transportation infrastructure.

Access to sustainable and affordable sources of energy would entail the initiation of a comprehensive paradigm shift in the country's approach to energy sector development. To put into motion such a process, policymakers, academics, and environmental activists would lay the foundation for initiatives to help the country establish sustainable alternative sources of affordable, efficient energy. The country's policy would seek a profile composed of a balance of renewable energy sources including such elements as solar power, hydropower, and biofuels. Critical components of a revitalized energy sector would entail the development of hydropower projects in coordination with the interests and needs of surrounding communities, resulting in supply of electricity to increasingly larger parts of the country. Wood and charcoal use would decrease, as ever larger segments of the population would begin converting to energy efficient practices, including improved cooking stoves and industrial reliance on renewable energy. Profits from investment in wood plantations needed to replenish biomass stocks would encourage expansion of the industry throughout the country. Plantations would gradually serve as a reliable source of local employment and income. The

growth of plantations and the reduction of wood cutting would decrease soil erosion and improve soil fertility, with tangible benefits visible in agriculture and water.

Appropriate governmental oversight would ensure that any oil discovered in the Albertine Rift would benefit the country in the form of revenue and energy generation. The government, oil companies, and NGOs would actively participate in preventing or minimizing harmful impacts on local communities and protected areas. The government and the oil companies would agree to an extraction process conducted in a transparent and sustainable manner with active community participation. Effective environmental assessments and practices would guarantee minimal environmental damage. Regional discussions over the transport and sale of the commodity would push all participating countries toward enhanced regional integration and cooperation, with corollary benefits for regional security.

Increased agricultural productivity and a shift toward alternative energy sources would reduce pressures on the land and remove many of the underlying sources of conflict. The point of departure for a more secure land tenure system would be the completion of a systematic review of land titles, accompanied by a commitment to clarification of overlapping forms of tenure and the dissemination of reliable information to the public. The principle of resolving land disputes through traditional forms of dispute resolution wherever appropriate and whenever possible would be implemented, and the gazetting and degazetting of land would be done in the public interest rather than for the benefit of private parties.

The attainment of sustainable peace in post-conflict northern Uganda would be based on the early recognition of the urgent need to build trust between IDPs returning to their lands and the national government. This would entail a coordinated effort with the donor community to ensure the provision of education, farm implements, and credit sufficient to establish sustainable livelihoods. An active effort to reintegrate the citizens of northern Uganda into the nation's political life would be carried out and coupled with social and economic assistance. This would reflect a conscious acknowledgement of the need for reconciliation beyond the simple cessation of violence. Dealing with land issues in a transparent manner respectful of local authority would be a cornerstone of political reconciliation. The return to barracks of the UPDF at the earliest time possible would be part and parcel of the process of confidence-building.

A more productive and diversified economy would relieve pressures in both Karamoja and the Albertine Rift, although perhaps to a greater extent in the latter region than in the former. In Karamoja, sporadic conflicts would be apt to persist, but the more secure position of cultivators might somewhat attenuate the frequency and intensity of conflict. To the extent that new forms of employment become available through economic diversification, tensions would ease in the Albertine Rift as job-seekers from the region migrated to urban centers or acquired employment with new agricultural enterprises.

With a stronger economy and greater resources, the government would continue to place a high priority on the water sector and to provide it with adequate financing as to remain on target to exceed the MDG goals by 2015. Water and sanitation facilities would become more equitably distributed throughout the country in accordance with varying population densities and in order to provide equal access to people in rural, urban, and semi-urban areas. These facilities would meet the growing needs of an expanding population for household consumption, waste management, irrigation, energy generation, and the development of industry.

Data collection and analysis would be improved. A non-centralized system of tanks and pipes for rainwater harvesting would be implemented in areas of the country most in need of increased water supply. Implementation of water and sanitation programs would reduce or prevent conflicts within and between communities over water rights. Although competition for water resources within the Nile and Victoria basins might increase over time, Uganda would play a constructive role in establishing effective transboundary management and governance to ensure the long-term peaceful sharing of water resources in the Lake Victoria and Nile River basins.

VII. CONCLUSION: DRIFT OR DECISIVENESS?

The effects of environmental degradation and the use or abuse of natural resources on stability and security are embedded in important ways in the broader political and economic life of a nation.

During the time that this environmental security assessment was conducted, Uganda was experiencing continuing violence and conflict in the north, and tensions were building over an amendment to the Ugandan Constitution to allow President Yoweri Museveni to stand for a third term of office. The arrest of Museveni's main opponent, Dr. Kizza Besigye, which sidelined him for much of the campaign, as well as the ruling party's domination of state resources and the media, raised concerns among international donors about President Museveni's leadership, leading some of them to reduce their levels of assistance.

In the immediate aftermath of the presidential election of February 23, 2006, voting irregularities were reported by the European Union, Human Rights Watch, and the Democracy Monitoring Group, a Ugandan NGO. Problems in voting did not appear to be of sufficient scale to reverse President Museveni's huge lead in the vote total, which the Ugandan Electoral Commission declared had given him 59 percent of the vote compared to only 37 percent for his opponent. However, complaints about the latest electoral cycle rekindled political tensions that are rooted in the nation's colonial legacy and in successive cycles of post-colonial conflict. Despite President Museveni's new mandate, these tensions could continue to shake donor and business community confidence.

In northern Uganda, violence continues, although the Lord's Resistance Army has been reduced in number and weakened. The dispersal of the LRA leadership to the northeast of the Democratic Republic of the Congo, the arrest warrants issued by the International Criminal Court for LRA leader Joseph Kony and four of his deputies, and Kony's sudden public appearance with government officials in southern Sudan have complicated what may yet be the endgame of the conflict that has plagued northern Uganda for 20 years.

Certainly, the Ugandan government will want to try to end the conflict in advance of the Commonwealth Heads of Government Meeting scheduled to be held in Uganda in July 2007. However, at present, the dire realities and challenges of daily life in northern Uganda persist, with over one million internally displaced persons still living in fear in makeshift housing in camps provisioned by the World Food Program and other international organizations.

The country’s excessively large defense budget continues to divert funds that potentially could be used for urgent development needs. As observed throughout this report, as desirable as is the end of the conflict with the LRA, very difficult decisions involving land and livelihoods will have to be faced immediately upon the cessation of hostilities.

The Ugandan economy is now suffering the effects of a prolonged drought, which has reduced water levels in the Nile, aggravating an already serious energy shortage and causing chronic blackouts. The production of cash crops fell nearly 14 percent in the past year, according to government estimates. Overall, projected GDP growth for fiscal year 2006–2007 has been revised downward from around 6 percent to a little less than 5 percent (New Vision 2006c).

The lower figure is in line with the deceleration in economic growth from the decade of the 1990s to the first decade of the new century. Given Uganda's rapid population increase, a 5 percent annual increase in GDP only translates into modest, incremental improvements in per capita GDP. Both the Ugandan government and the IMF estimate that a 7 percent GDP growth rate is necessary to meet the country's poverty reduction targets.

Lingering tensions produced by the recent electoral controversy, by unresolved conflict and population displacements in the north, and by the slowdown in economic growth, all raise the possibility of a difficult period ahead for Uganda. Yet, this outcome is not inevitable. President Museveni's new mandate, however imperfectly achieved, represents an opportunity to make significant advances in relation to each of these major challenges. Indeed, the transition from the almost inevitable lull in policy innovation during the election season to a new five-year term of office offers a window of opportunity for new policies that can counteract political and social fragmentation, threats to security, and economic stagnation. As this report shows, many of the elements of a new policy agenda for the next five years can be found in steps that can be taken to respond to threats to Uganda's environmental security.

For a heavily rural and agricultural society like Uganda, the question of land is of paramount importance. Land policy is an especially urgent issue for the country in light of very uneven access to land and the high probability of land insecurity and post-conflict land disputes in northern Uganda. Despite some progress in addressing land-related legislative issues, the land sector faces several pressing challenges, including insecurity of tenure, overlapping and conflicting land rights, and inequities in access to and ownership of land, especially for women. These problems have been compounded by growing and high population densities, severe deforestation, declining soil quality, unsustainable agricultural practices, unsound policies, and institutional weaknesses.

There are three regions facing particularly acute land security challenges. In northern Uganda, the forced displacement of the population, generational change during the two-decades-long conflict, and unclear boundaries between traditional and more recent forms of land dispute adjudication constitute a potential threat to social peace.

Less acute but important land security issues need attention in Karamoja and the Albertine Rift. In Karamoja, the scarcity of pasture and water continues to feed instability and conflict, at times even involving cross-border conflict. The Albertine Rift region, featuring rich biodiversity set against a backdrop of high population density, soil nutrient mining, and militarization, is an environmental security hot spot.

Although land security issues in northern Uganda are more urgent than in the latter two regions, they are also more likely to be subject to resolution in the near term through appropriate policies. For this reason, land security in northern Uganda should be at the very top of the country's policy agenda. A failure to address land issues in the north could mean that the "post-conflict era" simply becomes an era of renewed conflict in a different form.

In terms of immediacy and acuteness, energy insecurity also belongs in the top tier of pressing policy issues. Uganda's overwhelming dependence on a shrinking supply of biomass is unsustainable, especially given that the growing population is demanding 7 percent to 8 percent more energy each year (Tumusiime 2002). Growing energy insecurity undermines gains in poverty reduction and is a potentially destabilizing factor in the countryside, where only about two percent of households have access to power. In urban areas, current energy costs are high, and electricity supply is highly erratic, with frequent disruptions in Kampala. High-cost oil imports are a drag on many sectors of the economy.

However, the most far-reaching effect of energy shortages may be a complete short-circuiting of the country's plans for economic modernization. If Uganda's industrial and service sectors cannot meet their basic energy needs, the country will fall far short of its goals for economic growth. In sum, there is at present a marked disconnect between Uganda's aspirations for expanding commerce and trade and the realities of its current energy capacity. A heavy reliance on a dwindling energy supply, albeit potentially renewable, is placing the country's energy and economic security at risk at a time when industry, services, and agriculture must expand to meet the needs of a rapidly growing population. Without sufficient energy supplies, per capita economic growth in Uganda will stall or decline.

The most urgent task at hand is jumpstarting the production of hydropower through the completion of projects at Bujagali and Karuma. However, these and future hydropower projects will need to take into account cautionary lessons from dam-building projects in other developing countries. Historically, hydropower is often a mixed blessing, especially in the absence of extensive (and often conflictive) community consultations that are now the recognized international prerequisite for dam construction.

The Ugandan government will have to resolve, in a transparent and accountable manner, many complex social, political, and financial challenges in order to ensure that hydropower is developed in the least harmful way. Hydropower will also need to be complemented with other strategies for energy efficiency and alternative energy production if it is to be a part of a fast-moving, comprehensive national energy strategy.

In the near term, threats to food security are not as critical as energy insecurity, but unless progress is made in the next five to ten years, growing food insecurity and unsustainable agricultural practices may pose threats to Uganda's political economy. Agriculture is the mainstay of Uganda's economy and the provider of the population's basic needs, accounting for close to 40 percent of GDP and providing livelihoods for over 80 percent of the population. This agricultural output, dominated by cereal crops, root crops, and bananas originates almost entirely from smallholders with average landholdings of 2.5 hectares.

There is, among a significant number of Ugandans, an understandable but unrealistic tendency to project Uganda's agricultural past into its future. Through much of Uganda's history, the country's very fertile agricultural land and dependable rainfall enabled Ugandans to produce ample food for internal consumption. Recently, however, the cumulative effects of severe land degradation, massive deforestation, wetlands loss, heavy internal migration, and unsustainable subsistence farming practices are making Uganda a food-insecure country.

Crop yields are often less than one-third of optimal yields obtained by research stations, and yields of most major crops have been stagnant or declining since the early 1990s. Land degradation has continued unabated, characterized by soil erosion, soil nutrient mining, and declining soil fertility. In some parts of the country, there are signs of an increasing tendency toward desertification. Perhaps driven partly by land degradation, crop pests and diseases have become serious problems. Of major concern to food security is the country's staple food crop, the banana, already threatened by declining yields as a result of banana wilt.

The developments described above, compounded by existing constraints on access to markets, credit, technology, and transportation infrastructure, make the food and agriculture sector a slowly but steadily weakening pillar of Uganda’s socioeconomic stability.

Water security is a gradually emerging environmental security concern that may become increasingly serious over the medium to long term. Three different kinds of problems are at issue: water access, sanitation and water quality, and transboundary water resources.

Although Uganda approximately trebled its rural water supply coverage in the past 15 years, the country’s fast-growing population, increased per capita consumption, persistent differences in rural versus urban access to clean water, and localized shortages (both manmade and natural) may lead over time to sporadic episodes of conflict. Tensions over water access are likely to emerge when the availability of water is significantly unequal among different social groups and regions (or perceived as such), raising issues of equity and relative deprivation. While continually increasing access to water for the population as a whole, the government will have to strive to minimize existing disparities and guard against new ones.

Sanitation and water quality are essentially problems involving human security rather than conflict. However, in some areas, most notably the IDP camps in northern Uganda, these are urgent concerns. As a

matter of national policy, Uganda has put in place an integrated approach to address sanitation and water quality, but there appears to be a lag between the initial application of institutional reforms and their successful implementation at the local level. It will be necessary to closely monitor and measure actual performance and outcomes in water quality, sanitation, and health to see whether this lag is a temporary problem attributable to the challenges of decentralization and local capacity-building or more fundamental difficulties with the overall scheme itself. The extensive experience of the international donor community on such matters can make an important contribution in determining the next steps required for improving water quality.

An increase in tensions over transboundary water resources is not likely in the near term, but is possible in the decades ahead. Water levels in Lake Victoria have been declining recently, while siltation, pollution, overfishing, and the encroachment of wetlands have heightened environmental stress on the entire water basin. Looking ahead, if these trends continue, the next generation of Ugandans, Tanzanians, and Kenyans may engage in disputes over scarce water resources. Successful management of the Lake Victoria Basin will require both the strengthening of local capacities for environmental governance and the incorporation of stronger provisions for international cooperation within the Lake Victoria Environmental Management Plan. The situation with respect to the Nile Basin is different in nature and in some ways more complex. The waters of the Nile are shared by ten different states; international agreements dating from the early and mid-twentieth century give Egypt and Sudan the right of approval regarding development on the river. Throughout its history, Uganda has been perceived by the downstream riparian countries as a water "giver" not a water "taker." However, Uganda increasingly will need to make use of the Nile waters for human consumption, livestock, hydropower, and the expansion of food production through irrigation. At the same time, other countries are likely to increase their own water takings, especially for irrigation. Uganda will be well positioned as the host country of the newly created Nile Basin Commission to take a leadership role in the development of mechanisms for joint planning and conflict resolution, but this will require a steady commitment of political and diplomatic resources.

Although this report has not focused on environmental health, the linkages between malaria and the environment are gaining increasing attention from researchers (Castro and Rothstein 2006). Given the huge toll of tens of thousands of malaria deaths each year in Uganda, these linkages are worthy of the close attention of policymakers. Recent evidence makes a strong case that certain types of land conversion, such as deforestation and the destruction of wetlands, may lead to an upsurge in the incidence of malaria (de Castro 2006; Vittor et al. 2006; Afrane et al. 2006). Health officials, environmental specialists, and land use planners will need to work together in Uganda to track the latest scientific findings and adapt their policies to take into account the environmental linkages to malaria as they become more firmly established.

The problem of rapid population growth is a thread running throughout all of Uganda's environmental security problems. In a variety of different ways and along different time-scales, scarcity is becoming an issue in Uganda in relation to land, food, energy, and water. No overwhelming crisis is at hand, but a historical shift without precedent is underway, and it calls for a major adjustment in the thinking of policymakers. The population issue is beyond the purview of this report, but many of the issues discussed herein do have implications for the rate of population growth. For example, the experience of many other developing countries shows that when women are given equal rights to land and access to credit, their economic standing increases and fertility rates go down.

We began this conclusion by noting that the manner in which environmental problems affect stability and security is conditioned by the broader political and economic setting. The reverse is also true. The capacity of political and economic decision-makers to secure their citizens' interests and well-being is conditioned by the environmental setting and the state of their country's natural resources. This is especially true in a country like Uganda, where a majority of the population still lives close to the land and uses it to obtain daily needs.

Environmental security assessments provide tools for decision-making. After the interregnum of electoral contention and drift, President Museveni's new mandate provides the opportunity for more decisive action on the challenges described in this report. The international donor community can make important contributions to this effort.

Indeed, the success of the new government of President Museveni will depend in no small measure on successfully addressing some of the environmental security problems and challenges identified in this report. It is not difficult to see that many of these problems are interrelated and interact in ways that can produce either vicious cycles or virtuous cycles. An integrated strategy that recognizes the key relationships among land tenure, food production, energy resources, and water supply and quality will have the best chance for success.

We conclude by noting that not all environmental problems are problems of environmental security—although they may be environmental security problems in-the-making. Policymakers have limited resources and have to establish priorities. While all of the issues discussed in this report are consequential and require attention, we have tried to indicate the scale, intensity, and pace of those likely consequences.

Water security can be ensured with coherent planning that is sustained into the medium and long term, while adequately addressing food security will require more intensive efforts in the near term. However, the energy crisis is immediate, destabilizing, and has the potential to derail hopes for future economic growth.

Most urgent of all is the need to engage community leaders, review existing policies, and come to agreement on socially and culturally acceptable post-conflict land policies for northern Uganda. Without genuine engagement on this issue by the government, the return to the land by the hundreds of thousands of displaced persons (and the settlement there of young people who have never lived on the land) is likely to be marked by numerous land disputes and, perhaps, violent conflict.

VIII. RECOMMENDATIONS

Based on our findings, we make the following recommendations:

To the Government of Uganda (GOU):

1. The GOU needs to continue taking concrete steps to reduce and overcome the trends leading to food insecurity in the country. Some of the key strategies to address this issue include:

    a) Developing a practical and efficient system for gathering crop, livestock, and other agricultural data from district officers. Currently, the collection of accurate data on a regular basis is almost entirely lacking.

    b) Enhancing the promotion of organic and inorganic fertilizer use and training in the areas where application is appropriate to improve production and food security levels, particularly in areas experiencing heavy nutrient mining.

    c) Balancing efforts to commercialize the agricultural sector with the needs of small, subsistence farmers in order to avoid leaving a majority of subsistence farmers behind. "Outgrower schemes," which were first introduced in the 1960s, could effectively address this challenge. In these schemes (which were particularly utilized in tea and tobacco agriculture), small subsistence farmers at the outskirts of big industrial estates sell their crops to the company, which takes the responsibility for

processing, marketing, and other infrastructure that peasant farmers cannot afford on their own. The company also provides extension services that expose subsistence farmers to better farming practices.

d) Focusing on the critical issue of soil erosion and nutrient mining in order to stem the decrease in productivity and wealth from land degradation.

e) Strengthening agricultural research programs that study preventive methods to curb pest and disease outbreaks, particularly those threatening key crops integral to the country's food security.

f) Maintaining and further improving the investment climate in order to advance food processing businesses and in order to provide additional income, jobs, and export revenue.

g) Strengthening agricultural extension services. Recent policies and innovations aimed at improved agriculture, e.g., the National Agriculture Advisory Services (NAADS), have not incorporated effectively the lessons of the traditional agricultural extension services, particularly the two-way exchange of information between government and the peasant farmer. The emphasis has been on research and technology, and there has been insufficient attention paid to grounding these in cultural and traditional practices. A review is needed in order to synthesize innovations with lessons from previous practices.

2. Improving current energy initiatives to reduce dependence on dwindling forest resources, avoid the use of expensive fossil fuels, and harness renewable sources would greatly enhance the country's security. It will also reduce deforestation and accompanying problems of soil productivity loss, lake and river turbidity, disease outbreaks, and threats to forest-dependent livelihoods. Efforts to advance the attainment of energy security should include:

   a) Increasing investments in energy efficiency, not just in electricity access. Reducing electricity theft is one important element; promoting the spread of improved cooking stoves and other efficient technologies is another.

   b) Developing a strategy to increase biomass density, which will both increase energy supplies and improve the environment.

   c) Avoiding increases in the country's reliance on imported fuel, which could lead to instability as price and availability fluctuate.

   d) Integrating the Ministry of Agriculture in planning on alternative energy sources, including biogas, biofuel, and biodiesel.

   e) Focusing on small-scale hydropower projects to win the support of local communities and to minimize damage to surrounding environment and natural resources.

3. To increase land security throughout the country, ongoing and emerging threats should be addressed by:

   a) Developing a sustainable land use policy and management framework. The formulation of policies that promote equitable access to land and tenure security is indispensable for ensuring sustainable peace and development.
   b) Building understanding on all levels of government and society regarding existing land tenure practices, land rights, and legal procedures for obtaining titles.

c) Clarifying and changing as necessary Land Act language to offer the greatest protection of rights and minimize conflicts between traditional and modern systems of land tenure.

d) Amending the Land Act to establish and protect the rights of women to own land.

e) Establishing public trust in the fairness and equity of land allocation decisions. Showing by example and by enforcement of the laws that land grabs will not be tolerated in the north or anywhere in the country.

f) Raising institutions, such as the National Environment Management Authority (NEMA), the Uganda Wildlife Authority (UWA), and the National Forest Authority (NFA), up a level from government "authority" so as to increase their government funding and enforcement capacities.

4. A protracted war, pervasive poverty, mass displacement, and constant intimidation and fear, have made northern Uganda highly unstable and insecure in a variety of ways that are specific to that region. A post-conflict environmental security agenda in northern Uganda should include:

   a) Rehabilitating economic and social infrastructure and restoring livelihoods through the provision of an integrated package of agricultural inputs.

   b) Building the trust of internally displaced persons (IDPs) in government through improved communication and participatory development.

   c) Compensating for land occupied by the Uganda People's Defense Forces (UDPF) and IDP camps in the north, land displacements caused by small-scale conflicts as in Karamoja, and land occupied by refugee resettlements.

   d) Planning for the long-term effects of post-conflict urbanization. Because of the protracted displacement of northern populations to IDP camps, many young people are unlikely to pursue traditional agriculture. Putting into place strategies to support small town development, employment, and housing for the poor or homeless may help to avert the growth of slums at the edges of major population centers.

5. Water availability is emerging as a concern in Uganda as a consequence of rapid population growth, increasing per capita water demand, inefficient utilization of water supplies, intermittent and prolonged droughts, and pollution of sources. Water stress, if not addressed through concerted efforts by the government, civil society, and the private sector, may in the longer term lead to water insecurity. The following policy initiatives should help prevent the intensification of water-related conflicts in Uganda and in the Great Lakes region:

   a) Improving the availability of clean, sustainable water supplies for the entire country. While Uganda is on target to meet the Millennium Development Goal for coverage, reaching Uganda's stated target of 100 percent coverage of both the rural and urban populations by 2015 will require an even higher level of commitment of financial and institutional resources than in the past.

   b) Addressing the issues of parity between the urban and rural populations to alleviate tensions across communities and districts. Water and sanitation are managed by different agencies depending on urban or rural location. A structural reorganization potentially would facilitate rural-urban parity.

c) Elevating the priority and funding levels for the extension of sanitation coverage. Currently, the high priority given to attaining the Millennium Development Goal of total rural water coverage subordinates sanitation improvements to expansion of access to water.

d) Increasing institutional capacity for the collection and analysis of hydrological and climatological data. Strengthening capacities for early warning assessment and adaptive strategy planning would help mitigate conflicts that occur over periodic water scarcities resulting from drought and population migrations.

e) Addressing as a priority issue the need to harmonize national policies and regional agreements related to common water resources. Tensions within Uganda, as well as among riparian states, may be anticipated to increase as pressures on water resources grow in conjunction with rapid population expansion.

f) Strengthening institutions developed to coordinate and manage the negotiated use of the basins of the Nile River and Lake Victoria. To envision and plan for a future in which the country may significantly increase its draw on these bodies, Uganda should take an active role in regional discussions.

6. The linkages among environment, health, and security remain insufficiently addressed in government policies. In light of the fact that malaria is the leading cause of illness and death in Uganda, a serious review of all the alternatives to malaria control should be undertaken. Given the controversy surrounding the positive and negative consequences of DDT in fighting malaria, other efforts focused on disrupting the vector's lifecycle, as well as growing trees and flowers that serve as natural insecticides, should be given immediate priority. Efforts to reduce wetland destruction and to control deforestation should take full account of environmental health implications, including the spread of insect-borne diseases.

7. Beyond the foregoing recommendations pertaining to specific issue-areas, there are fundamental higher level policy shifts that can help ensure Uganda's future stability and security. These include three key steps:

   a) Informing development policy-making with an appreciation of the nexus between environmental degradation on the one hand and instability and conflict on the other.

   b) Enhancing the enforcement capacity of existing environmental and natural resource management policies by increasing institutional capacity and coordination among agencies responsible for environmental management.

   c) Using fiscal and monetary policies to encourage the prudent and rational use of natural resources and to minimize land degradation.

To the Ugandan Civil Society:

1. Civil society should promote the country's attainment of sustainable food and energy security by:

   a) Leading local efforts to fight the spread of diseases and pests, including awareness campaigns that educate farmers on control methods.

   b) Improving monitoring of timber extraction and educating farmers and local community members of the importance of forest reserves and their sustainable use.

c) Calling for and ensuring the effective participation of surrounding communities affected by oil drilling and other extraction efforts such that local residents are guaranteed basic rights of consultation and approval.

2. Civil society should continue to build community understanding of the sustainable use of natural resources by:

   a) Engaging the education system to engender cultural attitudes that support protection of natural resources for long-term sustainability.

3. Civil society should help to increase recognition of the value of traditional conflict management mechanisms, particularly in relation to land issues.

4. Civil society and community-based organizations should help local communities respond to current and future water quality and quantity concerns by:

   a) Expanding awareness of the link between water resource degradation and environmental security. Of high priority is Lake Victoria, a critical resource for the 30 million people who live in the surrounding area. As population densities increase, pollution and unsustainable fishing and agricultural practices threaten the viability of Lake Victoria to provide livelihood security for Ugandans.

   b) Strengthening local capacities within communities for the integrated management of water resources.

To the Ugandan Private Sector:

1. The private sector can and should play an integral role in the country's development of renewable energy. Industry leaders should take the lead in initiating partnerships with the public and nongovernmental sectors to initiate research and development efforts aimed at promoting the development of biofuels and other alternative energy sources.

To the Government of the United States (USG):

1. Agricultural development will play a prominent role in the country's food security and stability. Strategies to address potential food insecurity problems must be tailored to meet the needs of local communities and farmers given the diversity of the landscape, soils, rain levels, population rates, and access to markets. The USG should remain engaged in fighting the country's vulnerability to food insecurity by:

   a) Expanding support for agricultural extension programs, including research and outreach efforts intended to devise alternative approaches to increasing production and investing in the sustainability of soils.

   b) Increasing the ability of farmers to reach and sell to local, regional, and international markets by continuing to encourage and fund activities that improve road infrastructure and access to credit.

   c) Helping the country anticipate and plan for the significant environmental, health, and socioeconomic effects of a shift in the country's staple food from *matooke* to other densely caloric items like rice and cassava.

d) Intensifying efforts aimed at increasing the use of insecticide-treated nets in order to reduce the incidence of malaria, given the huge impact of malaria on the labor force and agricultural productivity.

2. Energy insecurity in Uganda can be alleviated only through a fundamental paradigm shift in the country's overall energy strategy. As a contribution toward that end, the USG should encourage and support planning for the use of biofuels.

3. In anticipation of an eventual cessation of conflict in northern Uganda, USAID's advanced preparation to respond to development challenges is commendable. The need to prevent the region from slipping back into conflict will be paramount to ensuring the country's security. Once agricultural development activities can occur without interruption, the following efforts should be considered in order to address issues of food insecurity in the north:

   a) Moving quickly from a relief approach (in order to avoid dependency) and toward a development model to include discouraging international groups from providing unproductive handouts, including uncertified seeds and other purely relief-focused materials.

   b) Putting in place block farming by groups, which involves an organized system of planning food security through shared cultivation, credit, and tools in the production of subsistence and cash crops. There are useful precedents from past experiences in Uganda from which such initiatives can borrow beneficial lessons. The Mubuku Block Irrigation Scheme and Rurandabara Block Farming, both in Kasese in western Uganda, which flourished in the 1960s and early 1970s, provided models that successfully combined food security and cash crop requirements in a coherent block farm system. Both schemes were undermined by the volatile political situation of the mid-1970s but are now recovering. The current government policy to revive the once successful cooperative movement in Uganda offers an excellent opportunity for re-energizing and re-organizing block farming by groups.

4. In view of the significant potential for land conflicts upon the cessation of violence in northern Uganda, the USG should provide technical assistance to help Uganda harmonize existing laws, regulations, and procedures pertaining to land tenure and their relationship to important traditional practices for dispute resolution.

Endnotes

[1] "Land degradation," as defined by UNCCD is the "reduction or loss, in arid, semi arid and dry sub humid areas of biological or economic productivity or complexity of rain fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including process arising from human activities and habitation patterns such as: soil erosion caused by wind and /or water; deterioration of the physical, chemical and biological or economic properties of; and long term loss of natural vegetation."

[2] Deforestation is defined here as " the degradation or impoverishment of forests, measured in terms of loss of biodiversity (which includes genetic, species and ecosystem diversity) and economic, cultural and ecological utility and stability, resulting from the selective removal of trees or other forest plant and animal species or the degradation of forest environments, through processes such as destructive logging, burning, or invasion of disturbed habitats by weedy or less useful exotic species." See, http://www.spcforests.org/Library/usestatus/usestatus.htm

[3] According to the Uganda National Household Survey 2002–2003, unemployed persons were defined as those persons within the economically active population who: 1) were without work during the last seven days prior to the interview; 2) were willing to work and were available to start work within a week of the interview; and 3) did not necessarily take any steps to look for work or start some form of self-employment in the four weeks prior to the interview (UNHS 2003).

[4] "Land" refers to both the bio-productive system (comprises soil, water and vegetation-crops, other biota) and also the ecological and hydrological processes that operate within the terrestrial system.

[5] Food crops are crops grown for consumption, and cash crops are crops grown for sale.

[6] Nutrient mining can occur when nutrients are leached out of the soil as a result of frequent cropping without organic or inorganic replenishment.

[7] Other efforts seek to improve the efficiency of cooking and reduce indoor air pollution by introducing improved cook stoves. Other types of biomass, including crop residue, have potential but are slow to gain acceptance. Solar power has potential, but has steep initial costs and is incompatible with high-energy requirements such as cooking, drying, and using heavy equipment.

[8] A consortium of six companies won the government bid to sponsor the Bujagali project in April 2005, but negotiations are still underway.

APPENDIX I: ESAF LESSONS LEARNED

As the third and last in a series of pilot case studies conducted to test the Environmental Security Assessment Framework (ESAF), the Uganda study confirms the utility of an interdisciplinary approach that combines a structured analysis with sufficient flexibility to encompass the historical and cultural specificities of a given country. In the case of Uganda, historical and cultural factors took on heightened significance in light of the conflict in northern Uganda, a critical focus of the research. It would not have been possible to envision credible post-conflict scenarios for northern Uganda through an environmental analysis that did not integrate that crucial historical and cultural context.

History informs perspectives in different ways. Uganda's natural abundance and relatively low population densities have always endowed the country with a kind of built-in coping capacity. In contrast to our experience during the previous ESAF in the Dominican Republic, many Ugandans both in and out of government had a relatively sanguine sense of continuity in regard to the environment and natural resources. This report is intended to raise some fundamental questions about linear projections from Uganda's environmental past into a more uncertain future.

Process and Methodology

The Uganda case study included a new element, a conference that FESS held in Kampala with the participation of more than 35 senior government officials, policymakers, academics, and practitioners from Uganda, Ethiopia, Kenya, Tanzania, and Rwanda in advance of the formal assessment. The conference, held five months before the field work was conducted, addressed environmental security issues in Eastern Africa as well as policy options that might mitigate potentially destabilizing environmental conditions. Participants presented papers covering the socioeconomic, institutional, legal, and biophysical aspects of environmental security, and the links among environmental security, poverty, armed conflict, human rights, and governance in Eastern Africa. The completion and dissemination of a 70-page report helped set the stage for the ensuing assessment. Both the assessment team and the conference participants learned from each other and improved the information-gathering efforts of the assessment itself. While such an event may not always be feasible, it is an important option for the assessment team to consider when time and resources allow.

The implementation of the ESAF in Uganda resulted in revisions to several phases of the methodology. These modifications aim at a more streamlined approach to the framework that makes it easier to follow, use, and understand its progression.

The ESAF research team felt that placing the issue of governance separately within Phase IV was leading to the unintended result of inadequate integration of governance issues within the overall analysis and the appearance that these were being included almost as an afterthought. Therefore, the most basic change was to integrate Phase IV on Environmental Governance Analysis into the previous phase to reflect more accurately that governance considerations are a necessary precondition for a proper treatment of the *Environmental Security Factors*. Rather than reserving this step until after the conclusion of pre-departure research, the policies, institutions, and processes surrounding *Critical Country Concerns* now are being assessed explicitly within Phase III to determine their effects on the issues under examination.

Next, Phases II and III went through minor revisions that slightly restructured the objectives and methods of each. Each phase now functions in a more discrete and specific manner. Phase II now has a more narrow focus that centers on baseline analysis of environmental sustainability, socio-environmental factors, and econo-environmental variables. Phase III focuses on the identification and analysis of the *Critical Country Concerns*, which enables the user to begin identifying underlying issues, sectors, and resources critical to stability. The revised Phase IV identifies and analyzes the *Environmental Security Factors*. These changes are significant insofar as they facilitate the application of the methodology. They do not, however, affect the conceptual approach.

Based on experience gained from the previous pilot study, FESS relied heavily on local knowledge and expertise by conducting the study in partnership with a Uganda-based nongovernmental organization, the Partnership for African Environmental Sustainability (PAES). The PAES staff's knowledge of key governmental, nongovernmental, and academic experts made the organization an invaluable asset in identifying knowledgeable and relevant groups and individuals. PAES was also able to help place in proper context the roles and responsibilities of the respective interviewees.

Prior to the release of the complete study, FESS also conducted a feedback session with a group of ten senior professionals in Uganda. They were drawn from academia, civil society, and the Ugandan and U.S. governments and included individuals with expertise in the areas identified in the course of the research as potential environmental security concerns. This informal peer review process confirmed the main findings of the report and enabled FESS to improve further its analysis of the environmental security challenges facing the country. Future ESAF studies will incorporate the peer review process to the extent possible in order to increase the validity, support, and awareness of findings among in-country stakeholders.

Focus and Strategy

The ESAF was conceived originally as a comprehensive, country-level environmental security assessment across all sectors. This sort of inclusive approach has obvious merits, but the effort to implement it is unavoidably time-consuming and raises questions about streamlining and utility. As a practical matter, a more comprehensive assessment requires more staff time, greater division of labor, and the inclusion of additional staff with varying backgrounds and expertise. A preliminary cost-benefit calculation of whether to proceed with a multisectoral ESAF or a more limited and focused study should be done in advance of each ESAF study.

The question has not just practical implications but also analytic consequences. The experience of ESAF studies completed to date shows that as the number of sectors studied increases so does the challenge of distinguishing between environmental *problems* and problems of *environmental security*. In very poor countries such as Uganda, much of the population is never very far away from falling into the kind of extreme poverty that might threaten the very viability of families and communities. A decline in access to any of a number of resources—e.g., water, forests, energy, land—might precipitate this kind of result. Hence, at the level of *human security*, a multisectoral analysis might be required. However, the central concern of environmental security analysis remains the potential for economic, social, and political instability and conflict. Certainly, problems of human security *can* lead to scenarios of instability or conflict, and this possibility must be part of any environmental security analysis, but such problems are numerous in very poor countries and attempting to include all of them, in all imaginable circumstances, tends to make the overall analysis increasingly diffuse and speculative.

In some instances—for example, countries emerging from extended conflict or countries that have been little studied—it may be advisable to take a comprehensive approach. But for most countries it is likely that the existing studies and relevant literature are sufficient to identify one or two key sectors with clear potential links to security threats. The recommendation of the Uganda ESAF team is that this type of sharpened focus should be developed and used in the next ESAF study.

As part of the process of pre-screening the sectoral or issue-based focus of future ESAFs, it also will be important to pursue more in-depth consultations with USAID colleagues in Washington or in the field in advance of the study. This will not only inform the research effort but also add to the shared understanding of the issues under study and the methodology and goals of the project.

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APPENDIX III: ESAF NARRATIVE OUTLINE

Environmental Security Assessment Framework

PHASE I: Country Profile

OBJECTIVES

Generate an initial overview of the country to provide background and context for the assessment.

Develop a preliminary assessment of potential political, economic, and social cleavages that may contribute to instability and/or insecurity.

METHOD

1. Conduct preliminary research through data collection and literature reviews.

TASKS

a. Draft preliminary country profile, surveying the following areas:
   i. History
   ii. Polity (including World Bank governance indicators)
   iii. Economy
   iv. Society
   v. International/Regional Context
b. Compile an overview of U.S. and international aid (technical and material) by organization/agency.

PRODUCTS

(1) Preliminary country profile
(2) Matrix of international aid

For the purposes of its work, FESS uses the following definitions as a guide:

Environmental security is a condition in which a nation or region, through sound governance, capable management, and sustainable utilization of its natural resources and environment, takes effective steps toward creating social, economic, and political stability and ensuring the welfare of its population.

Environmental insecurity is a condition in which a nation or region fails to effectively govern, manage, and utilize its natural resources and environment, causing social, economic, or political instability that leads over time to heightened tensions, social turmoil, or conflict.

PHASE II: Analysis of Environmental Indicators

OBJECTIVES

Analyze three sets of environmentally linked data to focus the scope of the assessment.

Understand the linkages among economic, social, and environmental factors.

METHOD

1. DATA COLLECTION: Complete *environmental sustainability*, *econo-environmental*, and *socio-environmental* baseline data worksheets, by collecting baseline and trend data through data compilation, literature reviews, and interviews.

2. ANALYSIS: Perform enviro-sustainability, econo-environmental, and socio-environmental analyses to determine key aspects integral to economic and social stability.

Enviro-Sustainability: A condition in which a nation and/or region, through effective governance, accountable management, and sustainable utilization of its natural resources and environment meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Environmental sustainability does not imply absolute limits. It includes those limitations imposed by the present state of technology and social organization on natural resources and the ability of the environment to absorb the effects of human activity.

Econo-Environmental Analysis: An evaluation of economic activities that are dependent on the natural resource base of a country, such as agriculture and its use of land and water, extraction and refinement of minerals and fuels, exports of raw materials and other environmentally derived goods, power generation, production of finished commodities, and the use of the natural environment for subsistence living.

Socio-Environmental Analysis: An evaluation of a population's sustained and secure access to the necessary requirements for life. These factors are encompassed within livelihood security, food security, health, and education.

TASKS

a. Complete enviro-sustainability data baseline (e.g., land, energy, water).
b. Complete econo-environmental data baseline (e.g., PPP per capita, productive sectors, trade, labor).
c. Complete socio-environmental data baseline (e.g., food security, livelihoods, health).
d. Draft enviro-sustainability analysis.
e. Draft econo-environmental analysis.
f. Draft socio-environmental analysis.

PRODUCTS

(1) Enviro-sustainability baseline and analysis
(2) Socio-environmental baseline and analysis
(3) Econo-environmental baseline and analysis

PHASE III: Analysis of Critical Country Concerns

OBJECTIVES

Identify Critical Country Concerns (CCCs) and associated contributing factors and environmental linkages.

Understand which underlying issues, sectors, and resources are critical to stability. How are they critical? Who is affected when these are threatened? What are the potential consequences?

Assess environmental governance to examine its impact on CCCs in the context of natural resource management.

Critical Country Concerns: Underlying issues, sectors, and/or resources that may be directly or indirectly integral to stability, based on their value and significance to economic, political, and social well-being.

Environmental Governance: The traditions and institutions by which power, responsibility, and authority over a nation's natural resources are exercised.

METHOD

1. IDENTIFICATION: Through the analyses completed in phases I and II, determine the CCCs relevant to the country.

2. ANALYSIS: Perform analyses of each CCC to determine key aspects integral to economic, political, and social stability.

3. CONTEXT: Evaluate the impact of environmental governance on each CCC to understand its possible mitigating and/or exacerbating role.

TASKS

a. Complete list of CCCs.
b. Conduct data collection and literature reviews for each CCC.
c. Assess the strength and effectiveness of environmental governance for each CCC through an examination of:
    i) Existing legal and regulatory frameworks
    ii) Socio-cultural values
    iii) Political will
    iv) Institutional structure, capacity, and integrity
    v) Public access and local governance
    vi) Disaster preparedness and response capacity/mechanisms (where applicable)
d. Draft CCC analysis and related environmental governmental findings, including identification of contributing factors and the link to environmental security.

PRODUCTS

(1) CCC List
(2) CCC and Environmental Governance Analysis

PHASE IV: Identify Environmental Security Factors

OBJECTIVES

Further refine and focus the assessment by examining each Critical Country Concern to identify *Environmental Security Factors* (ESF) – those environmental problems and issues that pose a concern for stability or contribute to its creation.

Environmental Security Factor: An environmental problem that has significant implications for economic and social stability and welfare, which may pose a threat to security or contribute to its creation.

Identify mitigation efforts and preventive strategies already in place.

METHOD

1. Departing from the preceding assessment of the relative condition and vulnerability of the CCCs, assess security implications of the contributing factors to determine if the CCC qualifies as an Environmental Security Factor.

Environmental Security Factors Profile Worksheet *Complete for each CCC*			
Insert Name of CCC			
Contributing Factors	**Effects**	**Affected Stakeholders**	**Security Implications**

Environmental Security Factors Assessment	
CCC Evaluation	**Check Box as Appropriate**
Environmental Security Factor	
Environmental Problem Only	
Significant Non-Environmental Problem	

TASKS

a. Assess security implications of contributing factors to identify which CCCs are ESFs.
b. Profile problems and ESFs according to issues, primary causes, effects/security implications, and affected stakeholders.
c. Identify mitigation strategies reducing the effect of the ESFs.
d. Draft targeted question sets for identified ESFs.

PRODUCTS

(1) ESF profile
(2) List of mitigation efforts for each ESF

PHASE V: Field Test Hypotheses & Generate Scenarios

OBJECTIVE

Establish the relative significance of each Environmental Security Factor by developing potential crisis scenarios and possible outcomes.

METHOD

Test preliminary findings and hypotheses through field research.

Develop three scenarios through field research. One will project likely outcomes if trends remain relatively constant; the second will posit shocks to the system and project likely outcomes given the present capacity to respond; the third will describe potential outcomes if the country were to take many of the necessary steps to address identified environmental security threats. Each scenario will be evaluated in terms of probability and potential impact.

TASKS

a. Conduct in-country interviews.
b. Test preliminary hypotheses.
c. Formulate preliminary scenarios.

In consultation with the USAID mission, FESS will design and facilitate a *scenario development exercise*, when feasible, for U.S. government field staffs, implementers, and in-country counterparts to tap in-country experience and expertise to develop and test scenarios. The exercise would seek to provide benefits for all participants, including creating a participatory forum for expanding dialogue and opportunities to leverage available resources.

PRODUCTS

(1) Brief summary of initial environmental security findings and preliminary scenarios

PHASE VI: Review of U.S. Assistance

OBJECTIVE

Identify gaps and target areas to improve U.S. coordination and/or assistance.

METHOD

In the context of international assistance and local initiatives, review U.S. assistance strategies across agencies and assess their role and value in addressing environmental security problems.

TASKS

a. Review international aid matrix and local initiatives.
b. Compare U.S. assistance against potential scenarios and assess results.

PRODUCTS

(1) Evaluation of U.S. assistance with preliminary recommendations for improved coordination and/or targeted assistance

PHASE VII: Response Options & Recommendations

OBJECTIVE

Review and evaluate appropriate responses to the principal environmental security problems and propose alternate remedial actions.

Provide a comprehensive assessment and recommended actions to present options for policymakers and stakeholders to make informed decisions on environmental and resource problems.

METHOD

Consolidate ESAF findings and draft final report.

Develop recommendations that consider policy options, entertaining the full range of actions available to policymakers and stakeholders.

TASKS

a. Draft final report.
b. Develop recommendations.
c. Finalize scenarios.
d. Identify possible distribution formats and channels.

PRODUCTS

(1) Final report with annexes

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