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# FAA 118-119 ANALYSIS CONSERVATION OF TROPICAL FORESTS AND BIOLOGICAL DIVERSITY



**MARCH 2011**

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**COVER PHOTO:** Young bull elephant grazing along the banks of the Lower Zambezi River. Photo credit: S. Sieber.

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# INTRODUCTION

This report was produced by the U.S. Department of Agriculture's Forest Service International Programs (USDA/IP) to inform operational and strategic plans of the Agency for International Development Zambia Program (USAID /Zambia). This report provides information necessary for USAID to comply with Sections 118 and 119 of the U.S. Government Foreign Assistance Act (FAA) of 1961, as amended, to guide and inform USAID/Zambia as it develops Annual and Operational Plans, and a Country Assistance Strategy. The last FAA 118/119 Analysis was completed in 2007.

Zambia continues progress in its efforts to address natural resources utilization, and management. Zambia has formulated numerous environmental policies, laws, management plans, guidelines, and planning documents. In addition, Zambia is a party to many conventions of international importance, among them the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), the Ramsar Convention, the African Convention, and the Convention on Biological Diversity. However, most policies and laws are sector-based and therefore somewhat fragmented. There is need for a more overarching legal and policy framework so that integrated management frameworks are fully realized.

As per FAA Sections 118 and 119, this report examines environmental threats and opportunities inherent to USAID/Zambia's Country Assistance Strategy, and Annual and Operational Plans. This report reviews the extent to which the Mission's strategy incorporates or addresses tropical forests and biodiversity concerns. It is not a substitute for the Initial Environmental Examination (IEE). The Mission is responsible for ensuring that an IEE or a Request for a Categorical Exclusion is conducted for all activities funded by USAID.

## OVERALL CHALLENGES FOR CONSERVATION EFFORTS IN ZAMBIA

Despite the great steps taken by the Government of the Republic of Zambia to address issues related to biodiversity conservation, forestry, and the environment in general, major challenges lie ahead within both the governmental system and society. Government policies have contributed to environmental degradation by not discouraging cultivation of marginal lands or by providing subsidies for heavy maintenance crops such as maize. Heavily subsidized fertilizer support and maize marketing programs have encouraged small-scale farmers to focus on maize production, leading them to become dependent on a mono-crop system. Continuous use of synthetic fertilizers eventually leads to lower soil fertility and high pH levels. This situation causes farmers to abandon their existing holdings and migrate to lands that are more fertile.

Rapid population growth and rural-urban migration amidst limited job opportunities leads to over-exploitation of forest reserves and illegal off-take of fish, wildlife, and forest resources. Worse still, a large percentage of Zambia depends upon either fuel wood or charcoal for their domestic energy supply. This trend indicates the extent to which natural resources are threatened.

In this report, we define environmental threats as the root activities or causes that lead to environmental degradation. Based on this definition, the *key* threats to Zambia's environment were identified as:

- Unsustainable Agricultural Practices
- Charcoal Production
- Illegal Off-takes
- Mining Operations and Expansion

- Poor Governance
- Climate Change

Key threats to Zambia's natural resources are primarily human-caused. Climate change is considered a threat magnifier.

## **Tropical Forests**

There are 480 forest reserves in Zambia covering a total land area of approximately 7.2 million hectares. Local Forests are meant to conserve forest resources for sustainable use by local people, while National Forests protect major catchment areas. Expanding settlements and agriculture activities have encroached upon and depleted some forest reserves, and as a result, the Government has excised and degazetted some previously protected reserves. Fifty-one percent of Zambia's Forest Reserves are either encroached upon or depleted due to the over-exploitation of wood products, settlement, cultivation, and inadequate natural resources governance (Convention of Biological Diversity, Fourth National Report). Of the National Forests, 2% are "depleted," 46% are "encroached," and 3% have been degazetted for other land uses. More Local Forests have been excised than National Forests. This may be attributed to a high rate of urbanization leading to high demands for forest products and land. Local forests in the Copperbelt, and in Eastern and Lusaka Provinces have been most affected. The opening of new mines in Northwestern Province is expected to bring pressure on the undisturbed forest reserves (GRZ 2009).

## **Biodiversity**

An estimated 7,774 species of organisms occur in Zambia. Microorganisms make up 8% of this biodiversity, while plants and fauna comprise 47% and 45% of the population, respectively. Out of the estimated 3,407 faunal species, there are 1,808 species of invertebrates, 224 species of mammals, 409 species of fish, 67 species of amphibians, 150 species of reptiles, and 733 species of birds. There are an estimated 4,600 floral species in Zambia, with diversity dominated by herbs and woody plants. Two hundred eleven floral species are considered endemic.

A recent International Union for the Conservation of Nature (IUCN) Red List query revealed there are 47 endangered or vulnerable (i.e. threatened) species in Zambia, an increase from the 4th National Report. It is difficult to determine whether the increase in the number of species can be attributed to a decrease in populations or rather, that better assessments simply have been undertaken. Many of the listed species are aquatic organisms found in select systems and are threatened by siltation, dams, poisoning or competition from non-native species.

There are 19 National Parks established in the country to conserve faunal biodiversity, covering 8% of Zambia's total land area. Six of the National Parks have management plans of some form. Sustainable use of wildlife and its habitats in the parks is promoted through eco-tourism while settlements and hunting are prohibited. Only the surface of land contained within parks is protected; subsurface mineral deposits are not withdrawn from entry and are controlled by the Ministry of Mines and Minerals Development.

Game Management Areas (GMAs) are protected areas established to control the hunting of wild animals through a licensing system. Thirty-six GMAs exist in Zambia that are essentially buffer zones to the National Parks, covering an additional 23% of the land areas. The GMAs are communally owned areas where human habitation is permissible and over 1.5 million people are estimated to live in them.

Additionally, Zambia has eight Ramsar sites covering more than 4 million ha and 39 Important Bird Areas. Within the National Park system, there are 59 botanical reserves established to conserve floral biodiversity.

## **Climate**

The Republic of Zambia has a relatively moderate climate with seasonal rainfall unevenly distributed throughout the year. Most of the rainfall occurs between November and April, the growing season, while the

rest of the year is typically dry. Both the country's socio-economic health and native ecosystems depend upon the timing and amount of rain that falls during the rainy season each year. Across the country's three agro-ecological regions, the average annual temperature and rainfall vary mostly by elevation. Climatic patterns and predictions for the country are difficult to formulate due to the strong influence of the El Niño Southern Oscillation and other multi-decadal climatic phenomena have on annual rainfall patterns. The limited amount of long-term data available on Zambia's climate also impedes the discernment of climate patterns and hinders predictions. The records and data that are available for Zambia and surrounding countries indicate that there have been significant increases in regionally averaged daily rainfall intensity and dry spell duration. These trends are predicted to worsen in the future with the potential for wide-spreading negative effects.

## **Threats to Tropical Forests and Biodiversity**

Because tropical forests and biodiversity are strongly interconnected, threats to one area often translate to threats in the other. The following represent only the major threats to loss of biodiversity and tropical forests in Zambia. Key causal factors of these threats have been inadequate capacity to manage the forestry estate, weak or poor law enforcement mechanisms and monitoring by the agencies, and lack of implementable land use and development plans.

## **Unsustainable Agriculture**

An estimated 80% of Zambia's rural population makes a living through subsistence farming on customary land. Small-scale agriculture is by far the most common source of livelihoods and income for rural dwellers in Zambia and has a significant impact on the environment. Issues with food scarcity, inappropriate agrarian policies, and migratory farming caused by unsustainable agricultural practices are catalysts for tropical deforestation.

One of the main factors to be considered in relation to agro-ecological sustainability is the soil, as it is the basis for food production in Zambia. Soil tillage, as conventionally practiced, leaves the soil surface bare, and is one of the major causes of erosion on agricultural land.

In most years, the majority of Zambian smallholders in marginal agricultural lands almost never attain yields sufficient for food and income security or business expansion and investment. This prevents farmers from breaking out of poverty cycles and causes families to engage in off-farm income generation activities that are ecologically degrading such as charcoal production, roadside trading, poaching, tree harvesting for sale, or fishing during banned periods.

Expanding land holdings under low productive systems will continue to put environmental pressure on finite resource bases. Continued low productivity in the smallholder sector remains an overriding problem and will continue to exert negative effects in local ecosystems.

Prior to the 1970s, the systems that farmers applied to grow crops were more efficient and environmentally sustainable than today. Since that time, government policies that encouraged maize production while keeping maize meal prices low have created a system that relies heavily on subsidies. This system, coupled with unsustainable land preparation practices, has degraded once productive, arable land into marginal farmland, incapable of sustaining and producing enough food and cash crop required by the majority of Zambian small-scale farmer households.

Farmers who have degraded their land through continuous soil disturbance, maize mono-cropping, and non-replenishment of soil nutrients may migrate and occupy pristine or rejuvenated woodland to temporarily exploit natural fertility in order to provide for the basic needs of their families. Clearing forests for agricultural production is a major cause of deforestation. In Zambia, it is estimated to account for about 90% of forest clearing.

## Charcoal production

Charcoal production to supply fuel for inefficient household cook stoves in Zambia contributes to numerous environmental threats across multiple sectors. The direct and indirect ecological impacts from charcoal production are primarily deforestation and land use conversion, particularly where access is available. Among other impacts, charcoal production can lead to biodiversity loss and negative impacts to ecosystem services. Deforestation and production practices supporting the charcoal industry directly contribute to land use conversion, forest degradation, unplanned road creation and the unsustainable use of natural resources.

With roughly 25% of households having access to electricity, charcoal and firewood provide nearly 75% of the energy used in Zambian households. Conventional charcoal and wood cook stoves tend to be dirty and inefficient, requiring approximately 1.3 tons of charcoal per household annually. The process of charcoal creation is inherently inefficient with six kilograms of wood needed to create only one kilogram of charcoal. Most of this wood is procured as illegal off-take, driving deforestation and unplanned land conversion. Zambia has one of the highest deforestation rates in the world, and this is largely due to charcoal production.

## Illegal Off-Takes

Forests in Zambia have been experiencing a decline in extent and quality since 1998. The decline is confined primarily to the forests accessible by the line of rail in the Copperbelt, Central, Lusaka, and Southern Provinces. Forest losses are experienced through the cutting of trees to feed kilns and produce charcoal, and the illegal exploitation of timber resources. A lack of law enforcement, absent management plans for sustainable management, and porous borders allow this exploitation to continue.

Animals are poached for food, for income from the selling of bush meat, and for illegal export. Well-intended projects in some areas have resulted in facilitating the poaching of animals by unintentionally supplying poachers with material for snares. A lack of law enforcement and ineffective sharing of revenues through community resource boards also have potential to contribute to poaching as a means to gain income if village scouts hired to spot poachers must wait several months for their payments.

## Mining Operations and Expansion

The expansion of mining operations and mineral processing has tremendous impacts on the environment and biodiversity. Rapid economic growth in Asia has led to a global demand for technological commodities and a “scramble” for natural resources across Africa. Copper is the backbone of the Zambian economy. New foreign direct investments have exceeded US\$4 billion in the last five years resulting in new mine concessions in forests of the Northwestern, Central, Eastern and Southern Provinces. Mining and mineral processing affect the forest environment by the impacts listed below:

- **Displacement of Forests and Customary Land-Users in the Mining Concession Site** – The displaced populations usually seek alternative areas to settle and embark on for agriculture, which magnifies the expansion of deforested land.
- **Consumption of Timber in Mining Related Activities** – Mines historically have depended upon indigenous timber sources. The demand for specific tree species has largely resulted in forest degradation in concession areas, causing impacts on regeneration and biodiversity of targeted forests. Communities in customary forests now have to travel long distances to source mushrooms, medicines, and other non-timber forest products.
- **Release of Mine Effluents** – Mining operations that release large amounts of chemicals (e.g. mercury, cyanide, sulfuric acid, arsenic, and methyl mercury) into nearby water bodies negatively impact aquatic biodiversity. The release of mine effluents is harmful for the aquatic flora and fauna of the water bodies, impacts human use and life, and affects downstream industrial activities. The released and leaked chemicals change the chemical composition of the land and make soil unsuitable for plant growth. Organisms can no longer use the polluted environment, as it is no longer suitable habitat.

- **Green Site Development** – Mining operations require large areas of land, mainly forested land, to be cleared creating large tracts of deforested land. The loss of forest and woodland habitat, which supports a large number of fauna and flora, causes a loss of biodiversity.
- **Indirect Effects of Road Expansion** – Vegetation adjoining the mining areas is cut to construct roads and residential facilities. The extensive tree cutting and vegetation removal caused by road expansion negatively effects biodiversity and provides improved access point for illegal off-takes.
- **Mining-induced Population Growth in Forest and Woodlands** – Human population growth associated with mining increases environmental and biodiversity impacts. A large number of animal and plant species are jeopardized by indiscriminate forest clearing to meet the increased demand for timber, non-timber forest products, charcoal, and fuel wood.

## Poor Governance

The lack of strong, cohesive leadership in relation to Zambia’s natural resources has significant indirect impacts on the country’s tropical forests and biodiversity in several ways. Zambia has no coordinating governance structure, policy, or law that brings together the ministries tasked with planning, implementing, and monitoring integrated natural resource management plans. As a result, lands are often allowed to be utilized in ways that are in conflict with natural resource conservation and sustainable long-term utilization. The following are considered major factors regarding how weak leadership affects Zambia’s tropical deforestation and biodiversity loss issues:

- Ineffective institutional capacity
- Unplanned development
- Inconsistent enforcement of environmental laws
- Absent land tenure
- Customary rights displacement
- Inadequate monitoring, reporting, and verification of data.

Sectorial institutions of government typically formulate periodic and isolated sector-based development plans. This non-collaborative method frequently results in conflicts between sectors. Without specific instruments of regulation, many customary areas experience conflicts over un-delineated land uses. For example, unregistered agricultural expansion into wooded areas outside of gazetted forests is typical in many of Zambia’s rural environments. Currently, the Forestry Department administers forest resources under an inadequately facilitated centralized system. Current legislative proposals emphasize collaboration and shared responsibility with local communities in forest resource management.

Unplanned development is also a factor in tropical deforestation and biodiversity loss. Natural resource matters are discussed within sectors, and because there is no well-coordinated master plan, interaction at the District or Provincial level is often marred by sectorial interests. There are no specific resource use allocations to major land uses besides the protected lands under wildlife (30% of Zambia) and forests (8%), some of which overlap. High level, effective natural resource planning and coordination mechanisms are absent, which leads to the ineffective, unilateral management of Zambia’s natural resources.

Enforcement of environmental laws requires adequately trained specialists at appropriate staffing levels. This does not always happen, and as a result, the flow of information to the public may not be sufficient. The few Specialists at the Lusaka and Kitwe offices of the Environmental Council of Zambia (ECZ) cannot attend to the increasing number of environmental cases, which creates situations where the illegal use of forest and wildlife resources becomes inconsequential to violators.

The absence of secure land tenure promotes deforestation, forest degradation, and biodiversity loss, as well as impedes the ability of communities to protect and sustainably utilize forests. With few people investing in customary land areas, people often move from one area to another without practicing sustainable land management. Since resources on communal land are not private and cannot be privatized, communities have resource use rights but not resource management rights. This presents legal obstacles to the implementation of benefit sharing between government and local communities.

Under customary land tenure, which covers most of Zambia, “non-traditional areas” are held by individuals, families, clans, or communities. The pressure to open up new areas for development following urban population growth has led to the creation of new mines and investments in these “non-traditional areas.” The conversion of land from customary tenure to statutory tenure has seen at least 10% of land titles being redistributed to foreign investors, local elites, politicians, and land speculators. This has created situations that may demand the relocation of people or disturbance to natural habitats in terms of wildlife and biodiversity.

## Climate Change

Unlike the other threats outlined in this assessment, climate change does not directly affect natural resources in most cases, but acts more as a “threat multiplier.” Potential impacts from anthropogenic climate change are wide-ranging and affect multiple sectors:

- **Agriculture and Food Security:** Already marginal, low-yielding agricultural systems will be adversely affected by climate change. This will become a driver of charcoal production, illegal off-takes, human migration, and unplanned development/land conservation as farmers try to offset low incomes and meet their livelihood needs.
- **Water Stress:** Water availability and accessibility across all sectors will be negatively affected. More intense storms may increase erosion, crop damage, incidences of floods, and threats to fisheries.
- **Ecosystems and Biodiversity:** Interaction between climate change and human drivers such as deforestation, unplanned development, and wildfire will affect populations and distribution of endemic species, impacting ecosystem services.

# SUMMARY OF FORESTRY AND BIODIVERSITY CONSERVATION ACTIVITIES IN ZAMBIA

The Republic of Zambia, in partnership with the private sector, civil society groups, international donors, and non-governmental organizations, support many activities and initiatives that protect biodiversity and tropical forestry in the country. The following opportunities were identified through interviews with individuals, organizations, and institutions that best address threats to the conservation of forests and biodiversity. Many more opportunities may exist to enhance the environmental health of Zambia, but these six best address the current threats.

## Conservation Agriculture

The benefits of conservation agriculture include:

- 25% to 100% yield increases (1<sup>st</sup> season) and soil improvement (medium-long term)
- Increased labor productivity and income through timely planting and the precise outlay of inputs
- Adaptation to climate change

- Small holder risk aversion – farmers can learn and adopt basic practices quickly
- Decreased land degradation, migration, and deforestation
- Increased family nutrition through the integration of high protein legumes
- Increased on-farm revenues through off-farm business opportunities and increased marketable surpluses.

The number of farmers using conservation farming methods represents 13% of the total farming households across Zambia. Expansion of conservation farming activities through the Zambian Conservation Farming Unit and other NGOs with government support represents an opportunity to address the poor productivity and environmental destruction characteristic in the Zambian small-scale farming sector.

Organizations that work with the private sector to build in-community agricultural services, without becoming the supplying markets, integrate the long-term systemic growth into the small-scale farming sector. This is the type of investment needed to lower poverty and environmental destruction as demonstrated by the Production, Finance, and Technology (PROFIT) project. On-farm economic activities, such as access to transparent and open markets, reliable and affordable access to yield-enhancing inputs, and market support services, are also vital if small-scale farmers are to increase on-farm productivity on existing holdings. This would help mitigate migratory farming with the ensuing encroachment and environmental impacts those migrations entail.

### **Diversify the Food and Income Base**

Diversifying the food and income base would help farmers spread risk and mitigate external shocks such as higher food prices, and changing or erratic climatic conditions, as well as increasing nutrient and vitamin uptake. The promotion and integration by future USAID projects of income-generating poultry and small ruminant production, as well as improved cassava, sweet potatoes, and climbing beans into current small-scale crops, would ensure household food security and increase protein availability at the household level. This would help negate off-farm poaching and deforestation activities required by many households to supplement maize food stocks. However, the private sector growers and transporters need to be engaged in the production and supply of growing material.

Tillage practices, soil fertility, and water conservation systems need to be improved before the traditional development interventions of improved access to seed and markets can address environmental degradation or low yields associated with traditional farming systems. The benefits derived from fertilizer use will only significantly contribute to yield increases when soil fertility and soil organic matter is improved through better tillage systems.

Promotion of farmers establishing *Faidherbia albida* could become a key component of future agricultural-related projects. *Faidherbia albida* is a leguminous tree with reverse phenology; it defoliates after the onset of rains and refoiliates near the onset of the dry season. Through leaf and pod fall and nitrogen fixation, soil fertility accumulates under the mature canopy and off-sets the need for fertilizer inputs (ETOA 2011). Planting this tree is a practical method of reducing the negative effects of dry periods on maize crops

### **Public/Private Conservation Partnerships**

Public-private partnerships that incorporate household-level needs provide opportunities for enhanced service delivery and enforcement amidst limited ability for local, collective planning. These partnerships promote household “buy-in” to reduce practices harmful to their environment. Community Markets for Conservation (COMACO) is an example of such a partnership and introduced farming methods that encourage long-term residency, reducing the need for large-scale slash-and-burn type practices used to open up new land. These methods include the use of lime, basin plantings, mulching, composting, and regular

crop rotation with legumes for fixing nitrogen in the soil. Registered farmers learn improved farming practices that help address local and regional environmental challenges.

Public-private partnerships that assist communities at the nexus of Game Management Areas, National Parks, and National Forests should be given priority investment and consideration. Partnerships around these protected areas would provide multi-sectorial benefits.

Another potential opportunity for improving rural livelihoods and encouraging conservation and stewardship is to support the creation of community-owned game ranches or communal wildlife conservancies (Lindsey et al. 2009) located on customary lands. These areas could be managed and operated for the multiple purpose of raising game to restock GMAs (supporting biodiversity), to provide a sustainable source of protein for rural populations (supporting health initiatives), and be managed for guided hunting and wildlife viewing (supporting improved livelihoods). Zambia could apply lessons learned from long-standing and successful Community-based Natural Resource Management (CBNRM) efforts in neighboring countries. Communal conservancies should be designed as integrated land use plans to ensure they create conservation benefits, such as habitat corridors and habitat connectivity, while minimizing harms from development.

## **Integrated Land Use Planning**

The absence of a national land use plan and subsequent implementation plans at lower levels create intra-resource use conflicts within GMAs among various resource users across wildlife-related sectors. Sustainable management of these natural resources requires a formal system of recording land ownership and land use linked to a textual and graphic land information format. Planning of land uses and management of the natural resource base is a paramount requirement to achieving sustainable development and in reducing potential resource/human conflicts.

Historically, land use planning on customary land has been on an ad hoc basis and lacks a long-term, coordinated policy. Enforcing regulations on customary land is challenging due to the open access nature of customary land as well as loose regulation by local traditional leaders. Despite national legislation protecting certain forest areas within customary lands, charcoal burning and other land clearing operations are common. Land use planning provides a basis for improved management and use of resources and, where implemented, can assist in the appropriate use of land types. For example, by promoting agriculture on appropriate soil types, fewer inputs may be required, potentially decreasing practices such as slash and burn.

National policies that impact land use planning need to be revisited by the Zambian government. For example, the current focus on expansion of agricultural exports is leading to an expansion of agriculture into previously forested land. Designated forest lands, some within critical headwaters regions, have been de-gazetted to provide land for farming, negatively impacting river flows, and resulting in some flooding. If the National Agricultural Policy specifically stated that such an outcome was to be avoided, a focus on agricultural intensification would emerge, reducing deforestation and degradation at the same time as increasing productivity.

## **High Efficiency Household Cook Stoves**

Charcoal production for the supply of inefficient cook stoves in Zambia contributes to multiple environmental threats across sectors. Charcoal production drives deforestation and human health impacts, and indirectly drives climatic change effects, soil erosion, and biodiversity loss. As such, the promotion of high-efficiency cook stoves and sustainable fuel procurement mechanisms can positively mitigate deforestation, climate change effects, biodiversity loss, and negative impacts to human health in Zambia.

There are two primary opportunities to support and expand the mitigation of charcoal production:

**Demand Side:** Funding and distribution of high-efficiency household cook stoves (charcoal and non-charcoal fueled)

**Supply Side:** Improved biomass utilization through high-efficiency charcoal kilns, community forestry, and twig farming, as well as cross-sectored natural resources planning

Several types of cook stoves fueled by small-diameter twigs, charcoal, or solar power qualify as “high-efficiency.” High-efficiency cook stoves can be relatively expensive, and the economic and socio-cultural drivers of charcoal production are complex. Integrated planning associated with community forestry, the United Nations Reducing Emissions from Deforestation and Forest Degradation (REDD+) program, the Clean Development Mechanism (CDM), and the use of existing biomass waste are all vehicles to explore the sustainable provision of fuels for household cook stoves. Supply-side and demand-side household energy improvements provide a significant need and opportunity for donors to fund projects that positively impact multiple sectors.

The Zambia Forestry Department noted that charcoal production is not necessarily the environmental threat, but that the production, location, and intensity is proceeding in an unplanned, unsustainable, and unmonitored fashion, which is destroying Zambia’s forests (D. Kasaro, pers. comm.). Charcoal production may be brought to a sustainable level with proper land use planning, sustainable management of biomass-producing forests, joint forest management mechanisms, and improvements in the efficiency of charcoal production through high-efficiency kilns. Charcoal production may have a place in a diverse portfolio of sustainable household energy strategies.

### **Monitoring, Reporting, and Verification**

The inadequate monitoring, review, and verification capacity affects the availability of good baseline and verifiable data on wildlife species and their numbers in National Parks and game management areas, tree species, timber stocks, and fish populations. The lack of information potentially hampers private sector participation in natural resource management, transparency in agency reporting, economic contributions of the natural resource management sector, and government budgetary support to natural resource management. Integrated Land Use Assessment II (ILUA II) provides technical support towards developing a monitoring, review, and verification system. The system is based on integrated and correlative models that use ground-verified data and other tools that allow the determination of changes in wildlife numbers, fish stocks, forest cover, and land use patterns. Financing for ILUA II is available from the governments of Finland and Norway through the United Nations Food and Agriculture Organization (FAO) but will require supplemental technical assistance to broaden the scope of sectors and methodologies in ILUA II.

### **Urban Health and Environment Improvements**

Sustainable environmental and natural resource management plays a vital role in the socio-economic development of a country. Current urban landscapes are often devoid of greenery and poorly designed to handle the rainy season. This poor drainage, in combination with a lack of solid waste management and pit latrines in urban settlements, contributes to water borne diseases. Support for urban infrastructure with tree planting and the creation of “bioswales” (and other green infrastructure) that filter and reduce the movement of contaminants would contribute to the health of the urban population.

### **USAID/Zambia: Actions, Opportunities, and Threats**

U.S. assistance to Zambia will continue to support the goals of reducing widespread poverty as well as building and sustaining a democratic, well-governed country that contributes positively to regional stability. The FY 2011 Operational Plan for Zambia mirrors the U.S. Mission’s foreign assistance priority goals for *governing justly and democratically*, *investing in people*, and *economic growth*. This section briefly describes USAID/Zambia’s programs and corresponding assistance objectives (AO) as they relate to tropical forestry and biodiversity needs under the broader U.S. foreign assistance goals. It also describes how and if the opportunities identified in the section above align with current programs

## **Economic Growth Assistance Objective (AO5): Increased Rural Economic Growth**

The Economic Growth program includes the Trade and Investment, Financial, Agriculture, and Environment sectors. In FY 2011, U.S. assistance will focus on improving agricultural productivity that targets rural poverty and increases food security through market-driven approaches. The United States will augment environmental programs to act on planned analyses in forestry and carbon financing. In addition, U.S. assistance to combat climate change will include advocacy to extend conservation farming and introduce agro-forestry techniques that increase the productivity and profitability of small farming enterprises. Global Climate Change (GCC) earmark funds under the Environment Sector in FY 2011 are targeted for Adaptation and Sustainable Landscape activities (T. Resch, pers. comm.).

Opportunities identified in the previous section align with the environment sector of the Economic Growth program. Fertilizers, pesticides, and genetically modified organisms all have direct effects on the environment, especially water and biodiversity, and will need to be closely monitored.

**LAND USE:** Support for the application of conservation farming, minimum tillage techniques, and agro-forestry was recommended in the last FAA 118/119 analysis (USAID 2007) and is still a priority opportunity. Taking conservation farming and agro-forestry to the next level by promoting conservation agriculture supports activities in the agriculture, environment, trade, and investment sectors. Conservation agriculture provides a low-technology intervention that can directly improve farm productivity and stimulate small and medium-scale enterprises in the agricultural sector. Conservation agriculture also supports GCC initiatives since increased productivity encourages permanent farms and reduces the need to shift and expand into intact forests and other protected areas.

**CHARCOAL PRODUCTION/DESERTIFICATION:** Promoting fuel-efficient, culturally adaptable cook stoves along with other low-cost alternative sources of energy was also recommended in the last FAA 118/119 analysis (USAID 2007) and is still considered a priority opportunity. Expanding the presence and use of high-efficiency household cook stoves supports GCC initiatives by reducing deforestation pressure and direct carbon emissions, as well as improving human health. There is also market potential in manufacturing and distributing efficient cook stoves and managing twig and wood lots specifically for the sustainable supply of wood fuel.

**CONSERVATION PARTNERSHIPS:** Investment in public-private conservation partnerships, such as sustainable eco-tourism, wildlife monitoring/anti-poaching schemes, and community game ranches, provides alternative and viable livelihoods while directly promoting the conservation of natural resources. Since there continues to be high worldwide demand for “green” products, recommendations from the previous 118/119 report to promote sustainable harvest of non-timber products (e.g. honey, mushrooms, medicinal plants, essential oils), eco-labeling and “green” sourcing are still recommended. Training on the Environmental Impact Assessment (EIA) process should be included for partners working in small and medium enterprise development.

## **Education Assistance Objective (AO6): Increased Learning Achievement for All**

In FY 2011, U.S. assistance will seek to increase access to basic education by underserved populations. There is untapped potential to bring students, government agencies, and communities together into a service-learning partnership and help build capacity to improve management of natural resources on the ground. Universities can greatly aid government institutions by completing baseline studies, monitoring resources, and providing other needed technical assistance.

## **Population Health and Nutrition Assistance Objective (AO7): Improved Health Status of Zambians**

In FY 2011, U.S. assistance in health will focus on sustainable improvements to the Zambian health system in key maternal and child health services; tuberculosis, and malaria; expand access to services for family planning and reproductive health; and improve nutrition and access to clean water and sanitation.

There are inherent links to improved health conditions in promoting both conservation agriculture and fuel efficient cook stoves. Conservation agriculture contributes to food security by increasing household food staple production and alleviating malnutrition. Minimum tillage techniques favored by conservation farming are also less labor intensive, assisting those affected by HIV/AIDS or other long-term illness. While it is true that farmers who have lost their cattle stocks note an increase in labor in the first year (due to having to lay out planting stations, lines, and basins – work normally done by the oxen), the amount of surface area actually dug out is around 15% under conservation farming systems. By contrast, a farmer who prepares the land using traditional tillage practices, whether it is ridging with a hoe or ploughing with oxen, is required to till 100% of the holding surface area.

### **Democracy and Governance Assistance Objective (AO8): Improved Democratic Governance**

In FY 2011, U.S. assistance will strengthen democratic institutions that support effective stewardship and development of Zambia's natural resources and human capital, and ensure long-term stability and broad-based economic growth.

Since Poor Governance is considered one of the key (albeit indirect) threats identified in this report, continuing to provide assistance and support in this program cannot be emphasized enough. Initiatives that promote coordination and synergy between individual government departments that manage Zambia's natural resources would be a good start. Improved oversight, transparency, and building capacity within the institutions in charge of Zambia's natural resources would directly aid how those natural resources are used and managed. As mentioned earlier, universities can play an instrumental role in providing needed technical assistance, completing baseline studies, and monitoring. Integrated land use planning in GMAs and support of improved monitoring, reporting, and verification of natural resources would also strengthen institutional coordination and oversight.

## **CONCLUSION**

With the scarcity of environmental funding and resources, and demands of non-environmental priorities, USAID/Zambia cannot pursue all of these recommendations. However, it is hoped that by identifying the most critical forest and biodiversity needs and opportunities USAID's can take advantage of partnerships and opportunities that most enhance resources conservation and biodiversity in Zambia.

## **CITATIONS**

Government Republic of Zambia (GRZ). 2009. United Nations Convention on Biological Diversity Fourth National Report. 58 pp.

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**U.S. Agency for International Development**

1300 Pennsylvania Avenue, NW

Washington, DC 20523

Tel: (202) 712-0000

Fax: (202) 216-3524

**[www.usaid.gov](http://www.usaid.gov)**