



USAID | **ZAMBIA**
FROM THE AMERICAN PEOPLE

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



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USAID/ZAMBIA SOUTHERN AFRICA REGION

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IN COLLABORATION WITH
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ENVIRONMENTAL ANNEX

Zambia Country Operational Plan FY 2007-FY2008

FAA 118-119 ANALYSIS

This report was produced by USAID/Zambia in collaboration with the Regional Center for Southern Africa's (RCSA) Regional Environmental Advisor as part of the mandatory Tropical Forestry and Biodiversity Conservation analyses under the new USAID Strategy Framework and adapted for the requirements of the Operational Plan by USAID Zambia.

This assessment has revealed that Zambia has taken huge strides in the past decade in the establishment of an effective and comprehensive environmental management system. Extensive policies are in place, and clear steps are being taken toward implementation. The Government of Zambia's progress is underscored in its ambitious undertaking of a new National Biodiversity Strategy and Action Plan (NBSAP) which was published in November 1999. Final recommendations are still being vetted throughout the Government. Several of the documents that are part of the NBSAP were key resources for this report. In particular, the NBSAP itself, in addition to the Zambia Forestry Action Plan (3 volumes), the State of Environment in Zambia, 2000, the National Environmental Action Plan, 1994, among others. In its efforts to address natural resources utilization and management, the government has also given prominence of the sector in its Fifth National Development Plan 2006-2010 of June 2006.

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 both within the governmental system and in society at large. Zambia lacked a clear and consistent environmental management policy until the mid 1980s. Accordingly, environmental concerns were not a major input in the social and economic development processes of the country. In addition to the absence of a consolidated 'environmental policy', there has been a myriad of various pieces of legislation dealing with different aspects of the environment; some dating as far back as the pre-independence era and others have not been reviewed. These pieces of legislation were scattered in different Acts relating to many activities such as use of water, wildlife, land, mining and others. These have been noted to be rudimentary, sectoral, scattered and at times contradictory to each other.

The ZFAP was set in place in response to the 1985 summit on Environmental degradation recommendation that National Forestry Action Plans should be developed to address the problems of deforestation and to enhance the contribution of forestry sector to national social economic development. However, the objectives as outlined in the Zambia Forestry Action Plan appear far from being achieved owing to a chronic shortage of information on the dynamics, content, context and extent of the country's ecological profile.

According to the GRZ in its State of Environment, 2000, Biodiversity issues, especially in lower plants have not received yet as much attention as in higher plants mainly because knowledge of lower plants is sparse and sometimes completely non-existent. According to the Fifth National

Development Plan of 2006, rapid increases in population combined with over-exploitation of resources have threatened the resource base and in turn the lives of the people. The growing population and some localized high density areas due to migration have exerted a lot of pressure not only on social and economic services, but also on land, resulting in deforestation, biodiversity loss and land degradation. The southern half of the country is the most affected.

The capacity of the GRZ to implement government legislation is a cause for concern at all spheres of government, particularly at the provincial, and district levels. This is exacerbated by a shortage of qualified scientists in Zambia.

Currently, the sector lacks systematic and comprehensive information management systems to effectively support decision-making and operations and facilitate information dissemination. As a consequence, it is difficult to establish any credible trends in the status of the country's natural resources. It is also essential that the GRZ develops mechanism to inform and makes the population aware of the economic value of biodiversity. Valuing biological resources so that it can be taken into account in development decisions is currently a tall order to the Government of Zambia.

Tropical Forests

Zambia is well endowed with forest resources. The total area of indigenous forests in the country is about 44.6 million hectares and cover about 60 percent of the total land areas out of which about 9.6 percent are gazetted forest. There are variations in the *vegetation* types found in the country, but the most extensive is the Miombo Woodlands. The natural vegetation formation has been influenced by a combination of geographical and geological factors. The Teak forests found in the south-western parts of the country are rich in commercial timber species namely *Baituidla plurijuga* and *Pterocarpus angoleusis*.

The country's vegetation is classified into four major categories. These are *Closed Forests*, *Open Forests*, *Termitaria* and *Grass Lands*.

The closed forests are limited in extent, covering only about 6% of the country. The *Cryptosepalum* evergreen forests are the most extensive and occur in the western part of the country, while the *Baikiaea* forests, found in the south west parts of the country, are the second most extensive forests characterized by the commercially valuable indigenous tree species known as *Baikiaea plurijuga*.

The open forests or woodlands known as Savannah woodlands are the dominant vegetation type in Zambia covering 66 % of the land. There are four types of these woodlands of which the most extensive being the Miombo woodlands that covers about 42% of the country characterized by the *Brachystegia*, *Julbernadia* and *Isobertinia* species. This is followed by the Kalahari woodlands, Mopane, Munga and *Termitaria*.

Threats to Tropical Forests

The following represents only the major threats to loss of biodiversity and tropical forestry in Zambia. Key causal factors to these have been inadequate capacity to manage the forestry estate, weak or and poor law enforcement mechanisms and monitoring by the agencies and lack of implementable land use and development plans. Means to conservation such as Community Based Natural Resources Management require to be strengthened.

Forest conversion for Agriculture: The conversion of forests into agricultural land is a threat to Zambian forests in open areas and protected reserves while settlements in wetland areas have negative effects on surrounding forests to the wetlands. Likewise, transformation of rangelands and sylvo-pastoral dryland systems to croplands increase the risk of desertification due to increased pressure on the remaining rangelands or to the use of unsustainable cultivation

practices. The manifestation of desertification is apparent in all categories of ecosystem services, especially food, forage, fiber, and fresh water. As a result, affected communities either increase use of other relatively marginal land (not yet degraded but having lower productivity) or transform more rangeland to cultivated lands.¹

Deforestation: Deforestation is the widespread removal and disappearance of vegetative cover as a result of clearing of trees. In Zambia, the average rate at which forests are deforested is estimated at 250,000-300,000 hectares per annum and the annual forest decrease factor is 0.5% on average. The annual decrease-factor of forests, by province, is as follows: Copperbelt and Lusaka have the highest at 20% per annum, followed by Southern (0.7%), Central (0.6%), Eastern (0.5%), Luapula (0.5%) and Northern (0.3%). The least are Western (0.2%) and North Western (0.2%). Deforestation is taking place both in forest reserves and open areas. Management efforts appear to fail to halt the situation. These figures are, however, conservative ones, as these estimates are based on the 1980s inventories and the rate of deforestation could be higher at the present moment.

Clearing forests for agricultural production is the major cause of deforestation. In Zambia, it is estimated to account for about 90% of forest clearing. Most of the agricultural activities such as large-scale agricultural clearing systems, cultivation along streams or riverbanks and the semi-shifting cultivation prevalent in Zambia have resulted in detrimental effects on the environment. It has been observed that the cut and burn semi-shifting cultivation practice in areas where population densities are high, and the destructive method of cutting trees is employed, slows down the forest regeneration process.

Fuel Wood Use: Although Zambia is a country with abundant resources, the electricity grid penetration is still very low, about 20% of the total population mostly in urban areas has access to electricity while less than 2% of its rural population has access to electricity². Energy resources available in Zambia include wood fuel, electricity, petroleum, coal, solar and wind. The national energy consumption in 1996 showed that 72% was fuel wood (firewood and charcoal). It is important to note that out of the total energy resources available, households consume 68.5%. Fuel wood constitutes the largest resource base. In the same year it was reported that households consumed 88% of firewood and 96% of charcoal. Charcoal is used by 85% of urban households for cooking and heating. The highest prevalence of consumption is (98%) is among the urban low-cost households.

The current trend of wood fuel consumption is projected to increase by 79% and the amount of wood that is converted to charcoal is expected to increase by 119% by the year 2016. This demand has implications on the available forest resources. Due to the high demand and high prices it fetches in urban areas, charcoal is increasingly becoming an important source of income for the peri-urban people.

Bush Fires: Setting of bush-fires is a common phenomenon in the Zambian society. Some fires are set indiscriminately. Various communities set bush-fires for a number of reasons which include: vegetation control and clearing of fire-breaks around homesteads and gardens, clearing of fields for cultivation, provision of potash, visibility improvement during hunting, as well as, gathering and pasture management.

Fire destroys the vegetative cover in the agriculture areas, which is meant to add organic matter to the land. Indiscriminate late bush fires have been observed to reduce wood annual increment by 50% in miombo woodland. However, deliberate late burning of pasturelands can indeed increase their productivity (a late season burn favors regeneration of grasses, rather than woody species). In woodland areas, 75% of trees of less than 3m high are generally susceptible to

¹ Zefar Adeel, Uriel Safriel, David Niemeyer, " Millennium Ecosystem Assessment, World resources Institute, 2005

² CORE International "Rural electrification master plan phase 1 Rapid Resource Assessment in Zambia" Final Report,2005

destruction and late fires destroy 84% of the herbage biomass. In tree-less areas, and in the dry season, burning may promote soil erosion by wind and by water at the on-set of the rain season before sufficient herbage cover develops. These factors reduce the potential of the woodland to regenerate.

Climate Change: The agricultural sector in sub-Saharan Africa is predicated to be especially vulnerable to climate change because this region already endures high heat and low precipitation³ Scientists predict that global climate change is likely to have effects in tropical countries including Zambia⁴. For example, global warming and reduction of rainfall is likely to contract aquatic and dry evergreen forest ecosystems in Zambia. The Lukanga swamp in central Zambia almost dried up due to frequent droughts of the 1990s. Shallow rooting trees, such as *Parinari curatellifolia* which support epiphytic flora, e.g., orchids, are drought intolerant and die, along with their epiphytic associates, during severe droughts. Recurring droughts especially in the southern part of the country have resulted in crop failure and starvation of livestock, which make the preservation of seeds and animal breeds quite difficult.⁵ According to Climate Change and African Agriculture policy note 27, 2006; shows that the mean temperatures computed for the agro-ecological zones indicate that the summer temperature is increasing at a rate of about 0.6°C per decade, which is ten times higher than the global rate.

Invasive Species: According to the Ministry of Environment and Natural Resources some introduced species have become very invasive and pose serious threats to ecosystems and indigenous species. For example, weeds, such as lantana (*Lantana camara*), kariba (*Salvinia molesta*), and water hyacinth (*Eichhornia crassipes*) have become serious weed in forest plantations in the coppebelt area and at Victoria Falls World Heritage in Livingstone.

The introduction of fish species in Zambia has been more damaging than doing well to the country. It is estimated that 42% of fish introductions in Zambia have not been successful. *Oreochromis niloticus*, escaped into Kafue river from aquaculture ponds in the Mazabuka area.

Biodiversity

Zambia is immensely endowed with biological diversity albeit amidst numerous and intense threats for its sustenance. The country has diverse landscape formations ranging from valleys, rivers, lakes, swamps and plateaus to escarpments and mountains. The scenic and aesthetic values these areas present offer an attraction and appreciation to masses especially visitors. The formations have given rise to habitat diversity for living things. Although definition of the Biological Diversity from the Convention on Biological Diversity (CBD) was adopted as variations in landscapes, ecosystems, species, genetic resources or any combination of these, with consideration of process and the function they have (GRZ, 1999), much of the focus has been limited to species and ecoregions to some extent.

Zambia takes centre stage in endemism in the Zambebian Region with relief between 1000 and 1500m. Zambia is not mountainous but has extensive miombo woodland plateau interrupted by dambos, swamps, rivers and large wetlands. The wildlife-protected areas in Zambia were not established for biodiversity conservation as the primary reason. This explains why there is no relationship with areas of high biodiversity. Since the principle of biodiversity conservation might be high priority there would be need to re-examine the existing wildlife protected areas and areas outside for inclusion.

³ Climate Change and African Agriculture, Policy note no. 27 2006

⁴ Zambia Biodiversity Strategy Action Plan, November 1999

⁵ Zambia biodiversity Strategy and Action Plan, 1999

Species Diversity

There are 8017 species of organisms that occur in Zambia. There 316 endemic species, 174 rare species and 31 endangered species of plants and animals. These figures are seemingly underestimated inasmuch as knowledge about most species is incomplete.

Miombo woodlands and grasslands are ecosystems with the highest biodiversity while montane forests have the highest number of endemic woody plants. The diversity of ferns and orchids is correlated to ecosystem diversity of some invertebrates (arachnids and butterflies) and ferns show a south-north increase in relation to rainfall /moisture gradient.

There are approximately 598 species of micro-organisms, of which approximately 497 species of microorganisms have been listed in Zambia. These consist of 12 species of bacteria, 446 of fungi, 4 of protozoa and 35 of viruses. 2032 species of invertebrates, 3774 species of both lower and higher plants, 409 species of fish, 733 species of birds and 224 mammal species.

The diversity of flora in Zambia has been estimated at 3788 species of which 211 species are endemic to Zambia. 418 are lower plants consisting of non-seed bearing plants namely Thallophyta (algae, fungi, lichens) and Bryophyta (ferns, horsetails, clubmosses). 3370 are higher plants consisting of seed bearing plants namely Gymnosperme (coniferales, genetales and cycadales) and Angiosperme (monocotyledons, dicotyledons and crops including vegetable species)

Ecosystems Diversity

Biological diversity is the variability among living organisms to include diversity within species, between species and ecosystems. Biodiversity can therefore be considered at ecosystem, species and gene levels. Much of the work on biodiversity in Zambia is at species level and to a limited extent on ecosystems. Consequently the country study when formulating Zambia's Biodiversity Strategy and Action Plan (BSAP) focused more at species and ecosystems levels.

Zambia has fourteen (14) ecosystems based on vegetation types. It also has fresh water aquatic ecosystems and entropic land cover types for different forms of agricultural land uses. The aquatic ecosystems consist of natural and man made lakes and the major perennial rivers.

Zambia is the wettest country in the Southern Africa in terms of fresh water wetlands. The sustainability of wetland resources is threatened essentially by lack of appreciation of their biological and economical values, the lack of coordination in the utilization of wetland services and the fragmented management

Agricultural and Livestock Biodiversity

Zambia has identified agricultural biodiversity as an important aspect upon which almost 1,000,000 households depend directly for their livelihood.

Agro-biodiversity is therefore used to refer to the variation between and within crop and livestock species. This diversity is affected by historical factors and differences in farming systems, agro-ecological and socio-economic conditions. The main categories of ecosystems in Zambia are forests, thickets, woodland and grassland.

There about 100 cultivated plant species. There are also wild plant species related to cultivated crops and include wild relatives of rice (about five species), cowpea, sorghum, sesame and various cucurbits species. Crops with most significant genetic diversity include cowpea, bambara

groundnuts and beans. Crop genetic diversity is high under traditional farming systems than commercial farming. The total diversity of domesticated animals is estimated at sixteen (16) species.

Fauna Diversity in Zambia

The diversity of Fauna has been estimated at 3631 species of which 204 species of fish and 200 species of birds are endemic in Zambia. 76 species of birds are considered rare or endangered. The diversity of invertebrates is estimated at 2032 species, of these, the insect group is the most diverse followed by snails and roundworms. Grasshoppers are estimated at 172 species of which 27 are endemic to Zambia.

The diversity of fish has been estimated at 409, information on the endemism of species is poorly documented while data on rare and endangered species of fish is scanty and difficult to find. The diversity of amphibians has been estimated at 67 species, only *Hyperolius kachalolae* is known to be endemic. The diversity of reptiles is estimated at 150 species whilst that of birds is estimated at 733. 100 species of birds are endemic in Zambia; 76 species are rare or occur infrequently. The diversity of mammals is estimated at 224 species. Twenty-eight of the species are considered as either endangered or vulnerable. The number of endemic species is not known.

Threats to Biodiversity

Biodiversity in Zambia is increasingly threatened by both human and natural factors. The major human threats are:

Human Actions:

Human Actions are threatening biodiversity in Zambia, as the population increases there is a demand to clear more areas for people to settle and the demand for livelihood especially for rural populations for plants and animals as a source of food increases. Conversion of forestlands to agriculture has also contributed to the depletion of some species and without an appreciable gene pool extinction is threatening

Over fishing and destructive practices in the major lakes and water ponds in Zambia and timber harvesting in the Western province greatly contribute to the depletion of biodiversity.

The Introduction of exotic species such as the Water Hyacinth and Carpfish threaten the existence of indigenous species in many water ponds in Zambia.

As a result of increased industrialization especially along the line of rail, there is an increase in effluent discharges that have polluted the rivers. The Kafue River is the most polluted, receiving effluent discharges from various activities including mining, manufacturing, and agricultural and sewage treatment plants threatening the flora and fauna in the river system. In addition, pollution of water systems has reduced invertebrate diversity. There is also an increase in aerial discharges of Sulphur dioxide resulting in acid rain. The local authorities lack capacity to manage domestic, industrial and hazardous waste. This was exemplified by the recent serious water pollution of the Kafue river in November 2006 when the Konkola Copper Mines discharged toxic waste in the river system causing death to fish and other marine life.

Natural Factors:

The natural factors include **climate change** as a result of global warming which makes conditions unfavorable for some species and encourage the invasion of alien or invasive species displacing indigenous ones. Among such weeds are lantana camara, Kariba weed (*salvinia molesta*) and water hyacinth (*Eichlornia crassipes*).

Summary of Forestry and Biodiversity Conservation Activities in Zambia

The Government of the Republic of Zambia is supporting a fair amount of activities to protect biodiversity and tropical forestry in the country. Zambia Wildlife Authority has developed a five-year Strategic Plan (2003 – 2007) to which it is committed to implement. The plan attempts to address the challenges through a number of means, which would include a combination of adaptive management using the best industrial practices with appropriate deployment of staff for effectiveness and efficiency, decentralized budgetary and cost-control systems, strengthening of business management experiences and systems, building partnerships and developing a culture of customer-oriented service delivery.

The International Donors, the private sector, Non-Governmental Organizations (NGOs), and civil society groups have played and continue to play a key role in Zambia's biodiversity and tropical forestry conservation under various mechanisms. Below is a summary of the interventions:

World Bank:

As from the year 2002, the World Bank has been substantially financing the \$ 15 Million Biodiversity Project, which is aimed at revamping the conditions of Mosi-oa-Tunya and Kafue National Park. This will be achieved with the help available funds in form of a grant from Global Environment Facility (GEF) and an advance from International Development Association (IDA) to the Government of Zambia. Currently the Project comprises the preparatory phase with funding support amounting to US\$ 500,000 for various studies, capacity building and emergency support for resource protection in Kafue and Mosi-oa-tunya National Parks

European Union:

A direct investment programme has been developed amounting to Euro 10 Million for resource protection. The European Union (EU) has also supported the transformations in ZAWA. In addition the European Union funded the consultancy for the development of the five year sector based strategic plan. The strategic plan provides a framework for effective management in the Conservation and Commercialization of the protected areas in Zambia. Furthermore, EU has also agreed to support resource protection in the Lower Zambezi NP and build the capacity of the new institution to implement the 5-year strategic plan. In 2002 EU also provided Euro 350,000 for the village scouts programmes in 14 selected communities involved in wildlife management. The EU has also set aside about Euro 250,000 for emergency support to ZAWA.

Finland:

Finland is propping a E2 million over three years; Climate Change and Development programme to address the vulnerability and enhance adaptive capacity to climate variability and climate change to be carried out under the national IUCN office.

United States Agency for International Development (USAID):

The USAID has been very supportive of natural resources conservation efforts in Zambia and has been the brain behind a lot of the programmes being undertaken currently. In spearheading these efforts the USAID contracted the Environment Conservation Association of Zambia in mid 1998 to perform a range of monitoring evaluation, adaptive research and impact assessment services for an initial period of one (1) year.

USAID in close collaboration with other stakeholders participated in the US\$ 224,527 ECZ/WRMU Project whose main deliverable was the Aerial Sample Survey of the Central

Luangwa Valley, which covers South Luangwa National Park, Luambe National Park, Lupande Game Management Area, Part of Lumimba, Munyamadzi, West Petatuke, Sandwe and Part of Chisomo Game Management Area (GMA's) in 1999. USAID also supported CLUSA (Cooperative League of the United States of America) an NGO, in undertaking community based forest preservation programmes in the Eastern Province of Zambia. Specifically the projects were conducted in Chipata, Petauke and Katete.

Norwegian Agency for Development (NORAD):

NORAD has been funding the management of the South Luangwa National Park and the surrounding Game Management Areas in particular, the Upper and Lower Lupande GMA for over 10 years. It has also developed Community Based Natural Resources Management Programmes.

Canadian International Development Agency (CIDA):

CIDA is very instrumental in providing appropriate and meaningful environmental interventions. Most importantly it has long been recognized that the ECZ depends on the government for financing which is very irregular. CIDA has however been supporting ECZ for over ten (10) years and facilitated organizational design, establishment of the organization and formulation of its strategic plan.

CIDA is also involved in a joint venture with Zimbabwe in undertaking the strategic environmental assessment of the developments around the Victoria Falls. The project is called the Victoria falls Environmental Capacity Enhancement and Master Plan Project and has been running in Zimbabwe for the past two years and an extension to the Zambian side is being sought

CIDA is working in conjunction with International Centre for Research in Agro-forestry (ICRAF) stationed at Msekera Research Station in Eastern Province of Zambia promoting Agro-forestry as a vehicle for improved productivity, poverty alleviation and soil preservation. This is a regional project with total funding amounting to US\$ 9,348,228 (or Canadian \$ 14.8 million) of which Zambia's benefit is a total of US\$ 2,779,203 (or Canadian \$ 4.4 million). The project was for an initial 5year period.

The International Fund for Agricultural Development (IFAD):

The International Fund for Agricultural Development (IFAD) supports a multiplicity of projects in environmental conservation. Effective from June 2002 IFAD embarked on a massive US\$ 15.6 million Forest Resources Management Programme. IFAD is providing loan finance of up to US\$ 12.6 million while Germany Technical Aid to Zambia (GTZ) and Irish Aid will provide a grant amounting to US\$ 3 million. The programme is to run for six (6) years. The project purports to harness and develop forestry products.

World Wide Fund for Nature (WWF):

WWF have had a long-standing partnership with ZAWA. It has supported with technical and financial resources some wetlands programmes and various projects countrywide. Among the areas of support include the infrastructure development, law enforcement and community based natural resources management and planning initiatives. WWF has actively worked in Kafue flats and Bangweulu swamps

WWF is implementing several programmes which address development complexities in the Zambezi River Basin, conservation of the Miombo ecoregion and other protected areas. The basic aim is to put people in the center of development by ensuring that responsibilities of conservation and benefits sharing is equitable among all stakeholders; communities, public and private participants in the sub-sectors

USAID/Zambia: Actions, Opportunities, and Threats

While the USAID/Zambia does not have a stand alone Environmental Functional Objective (FO), it will however, where possible, address tropical forestry and biodiversity needs in its other FOs. In addition, should additional resources be made available for these purposes, USAID/Zambia would consider funding additional activities (with agreement for the South African Government), some of which are identified below.

USAID/Zambia has finalized the transformation of the Strategic Objectives into Functional Objectives for FY06-FY08 adopted from the its 2006-2008 Country Strategic Plan. This has formed the basis of the recommendations given here.

Economic Growth Functional Objective (EGFO) (former SO5: Increased Competitiveness of the Private Sector)

Land use: USAID will as much as possible continue to support the application of conservation farming (minimum tillage) and the use of small-scale irrigation systems will significantly increase productivity while contributing to decreased soil erosion, improved moisture retention and better aerated soils. Conservation farming techniques will be expanded by all present and future implementing partners that are/will be focusing on the production side of the value chain. Agroforestry techniques will be promoted where appropriate.

Charcoal production/Desertification: USAID may, if resources are made available continue to work with the Rural Electrification Working Group to encourage the expansion of the power grid into rural areas. As electricity (primarily hydro-generated) reaches more rural clients the demand for charcoal will diminish. Likewise, USAID may complementarily help promote reduced use of wood fuel through the use of fuel-efficient stoves for wood and charcoal using models that are culturally adaptable. Develop and promote low-cost alternative sources of energy (non-wood fuels)

Additional Opportunities for EGFO5

- Extension Services: Direct work of extension on organizing and training communities in preparing and maintaining community owned nurseries and fodder banks for supplying planting materials, managing wood lots and in sustainable utilization of these resources.
- Trade Competitiveness: Zambia's emphasis on expanded trade offers an opportunity to include environmental issues as one of the key elements contributing to competitiveness and productivity. This is an area that USAID can promote within the spheres of the GRZ.
- Lilayi Housing Project: USAID/Zambia may take advantage of the just approved Lilayi Housing Program to ensure that recommendations and follow up actions called for under the Environmental Impacts Assessment are effectively taking place and that environmentally sound technologies and practices are implemented during this major housing project. USAID/Zambia may need to support environmental assessment training and technical assistance for staff of partners in Small and Medium Enterprise development, including communal areas targeted by EGFO. This will lead to best practice being institutionalized, and the internalization of environmental screening and review that is consistent with Zambia's Environmental Impacts Assessment Policy and with USAID environmental procedures and requirements.

Investing in People –Education Sector (SO6: Improved Quality of Basic Education for more School-Aged Children (Phase 2)

The FO will influence policy direction during its interaction with senior GRZ education officials during activity implementation. Where appropriate (during school health and nutrition activities), this Functional Objective may support environmental awareness and sensitization programs in schools.

Additional Opportunities for Education sub-sector

Should additional resources become available, USAID/Zambia may find it strategically attractive to (after discussions with the Zambian Government) including some of the following activities into this program: Incorporate environmental awareness into the curriculum, and train teachers on conservation and biodiversity modules

Investing in People- Health Sector (SO7: Improved Health Status of Zambians and SO9: Reduced HIV/AIDS Transmission and Impact through Multisectoral Response)

- Our review of the GRZ legal and policy frameworks revealed that Zambia does not currently have a very distinct and effective Policy on bio-medical waste management. This clearly poses a danger to the physical environment and human welfare. Although the Mission may not directly cause the generation of the waste, the Mission should, nevertheless, look for opportunities to assist the Zambian government in addressing this issue.
- Because the nutritional needs of many rural poor people, especially around National Parks and their surrounding areas, are met in part through forest harvests such as fruits and mushrooms, and wild game meat, conserving natural resources will help maintain food security and dietary diversity, thereby contributing to improved nutritional status of these populations.

Additional Opportunities for Health sub-sector

- Provide continued support to implementation of the recently development national Infection Prevention Guidelines, which codify procedures for all levels of the health system for handling medical waste up to the point of incineration or appropriate burial. Assist in incorporating these guidelines into health worker training and supervision and as part of quality assurance programs.
- The Avian Flu is becoming a major pandemic that would affect terribly the poorest in Africa. USAID/Zambia may be asked to support programs that would address or mitigate the effects of this pandemic. If that is the case, USAID/Zambia would ensure that the activities minimize any adverse environmental impacts and reduce human exposure to the pandemic.
- USAID/Zambia may need to support HIV/AIDS and natural resources activities that would provide HIV/AIDS vulnerable and affected populations with improved access to water, energy, and low labor intensive agricultural technologies.
- GRZ has launched the malaria control programme using Indoor Residue Spraying as strategy for combating mosquitoes. USAID/Z may support that the conditions outlined in the Supplementary Environmental Analysis are followed through the strengthening of the monitoring activities of the ECZ and the National Malaria Control Center.

Possible Threats from USAID programs and Mitigation Measures

Although most of the activities that will be implemented under this FACTS may not negatively impact the environment, however, some of them, may have indirect negative impacts on the biophysical environment. To minimize and mitigate such possible impacts to the environment, all activities will be subject to an environmental review as required under USAID Title 22 of the Code of Federal Regulations Part 216 (22CFR216). As such, Initial Environmental Examination (IEE) was completed for each Strategic Objective in FY2005. If during the OP process new activities will be introduced not covered by the approved IEE for each FO, an amendment shall be instituted..

Under EGFO, some activities may have negative impacts on the environment and human welfare. To the extent that USAID/Zambia will continue to support coffee production and marketing, one possible threat to the environment resides in the washing of coffee, which is a critical feature for maintaining quality to the final drying and roasting phases.

- **The environmental aspects of coffee washing** involve high water requirements for the mechanics of washing and fermentation, generation of substantial quantities of pulp waste, and discharge of washing and fermentation water, which are all accentuated when production is concentrated at washing stations.

This can however be mitigated by screening pulp from entering receiving waters and enhance oxygenation of receiving waters. Perking fields for fermentation water should be established on permeable and well-drained soils outside of floodplains if possible. The use of “reconstructed” wetlands for rapid uptake of nutrients and carbohydrates is an option that could be investigated by USAID.

- **Natural Products:** Environmental concerns could arise from unsustainable harvesting of forest products like honey, mushroom, medicinal plants and essential oils.
- **Private sector commercial trading expansion and business development** that will be promoted under EGFO could lead to environmentally destructive and unsustainable expansion of services, and activities into previously pristine natural forests and woodland areas.

This can be mitigated by supporting environmentally friendly national, provincial, and district level development planning institutions and build their capacity to help avoid such negative outcomes. Eco-labeling and “green” sourcing requirements may provide incentives for Zambian exporters to build environmental management capability and to “green” their production processes to increase and maintain their level of access to western markets.

Activities under the Health sub-sector interventions, have the potential to negatively affect the environment if Best management Practices are not implemented. For example:

- Immunization programs and some HIV/AIDS treatments interventions will need to address potential for biohazards and proper disposal of hazardous waste;
- Direct funding or provision of Insecticide Treated Bednets (ITN) will need to comply with the recommendations made under a Programmatic Environmental Assessment (PEA) conducted in 2002 for USAID Africa Bureau ITN programs
- The IRS programme that USAID is supporting requires close monitoring so that both the PEA and SEA provisions are followed to minimize environment damage and ensure Reg 216 compliance.
- For activities under the FOs,, that are not fully developed, an Environmental Screening Form can be used to determine the appropriate extent and type of

Conclusion

Zambia, as a developing nation, is faced with a serious environmental threat- the destruction of forests, soil degradation, disappearance of wetlands, drying up of aquifers and general biodiversity loss. The danger is emanating from a combination of degradation of local ecosystems and habitat depletion. Massive injection of resources in the preservation of these natural resources is an objective necessity. In addition involvement of communities in which these are found in concentration marks the importance of ensuring that resource conservation takes place within the normal rhythm day-to-day life of the communities. This also ensures internalization of ownership and commitment to ensuring that the resources are secured against any adversity.

With the scarcity of true environmental funding, USAID/Zambia strives to do its utmost to incorporate activities across its strategic objectives that address the threats to tropical forestry and biodiversity as outlined in the analysis. To the extent that additional funding become available, USAID/Zambia would consider supporting additional programs that are consistent with the GRZ's objectives.