

**USAID/GHANA
ENVIRONMENTAL THREATS AND
OPPORTUNITIES ASSESSMENT
(FAA 118/9 Assessment)**

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Table of Contents

1.0 Executive Summary	6
1.1 Overview	6
1.2 Summary of Threats	6
1.3 Summary of Recommendations	7
2.0 Introduction to the ETOA	8
2.1 Legal Requirements	8
2.2 Purpose and Objectives of the ETOA	8
2.3 Methods Used in Conducting the ETOA	10
3.0 Ghana: Physical, Biological, Socio-economic, and Cultural Characteristics	11
3.1 Biophysical Characteristics	11
3.2 Governance, Socio-Economic, and Cultural Characteristics	15
4.0 Biodiversity and Tropical Forest Conservation	20
4.1 Ecosystem Diversity and Status	20
4.2 Species Diversity and Status	23
4.3 Economic Value of Biodiversity	30
4.4 Cultural Importance of Biodiversity	30
4.5 Sources of Biodiversity Information	31
5.0 Institutional and Political Context for Biodiversity Conservation and Tropical Forests	33
5.1 Institutions, Policies, and Laws Affecting Biodiversity Conservation	33
5.2 Legal Framework: Protect Areas System	38
5.3 Legal Framework: Forestry	40
5.4 Legal Framework: Endangered Species Protection	43
5.5 Participation in International Treaties	44
6.0 NGO and Donor Programs: Biodiversity Conservation and Tropical Forests	46
6.1 NGO Programs and Activities	46
6.2 Donor Programs and Activities	47
6.3 Brief Description of the USAID/Ghana Strategy/Program	48
7.0 Assessment of the Threats to Biodiversity and Tropical Forests and Actions Needed to Reduce Threats	51
7.1 Direct Threats	51
7.2 Indirect Threats	56
8.0 Role of USAID's Program in Addressing Biodiversity Conservation and Extent to which Programs Meet Needs	57
8.1 USAID Programs: Threats and Opportunities	59
9.0 Recommendations to Strengthen Biodiversity and Tropical Forest Conservation	63
9.1 Opportunities for Ongoing USAID Programs	63
9.2 New Opportunities	65
List of Tables	
Table 1: Ghana's Faunal Biodiversity	23

Table 2: Ghana's Plant Diversity	25
Table 3: Summary of Threatened Species	27
Table 4: Protected Areas, Ramsar Wetlands, & Ex-situ Biodiversity Sites	38
Table 5: Forest Resources	40
Table 6: NGO Programs and Activities	46
Table 7: Main Donors involved in Biodiversity and Tropical Forest Conservation	47
Table 8: Threats, Actions, and USAID Response	57

List of Figures

Figure 1: Geology	11
Figure 2: Locations of Major Gold Deposits (in Annex 11)	
Figure 3: Ecological Zones	13
Figure 4: Administrative Units	15
Figure 5: Upper Guinean Biodiversity Hotspot (in Annex 11)	
Figure 6: Ghana's Protected Area System (in Annex 11)	

Annexes

Annex 1: ETOA Team Bios	
Annex 2: ETOA SOW	
Annex 3: List of Contacts	
Annex 4: Field Trip Itineraries	
Annex 5: List of Endemic Species	
Annex 6: IUCN Red List Species in Ghana	
Annex 7: Ghana's Medicinal Plants	
Annex 8: GOG Institutions and NGOs	
Annex 9: Donor Programs	
Annex 10: Detailed Threats Analysis: Unsustainable and Inappropriate Practices	
Annex 11: Figures 2, 5, and 6 (figures placed in Annex, separate from document, for ease of electronic transfer of ETOA)	

Acronyms

AAC	annual allowable cut
CBO	community-based organizations
CEA	Country Environmental Analysis
CEPF	Critical Ecosystem Partnership Fund
CFM	Collaborative Forest Management
CI	Conservation International
CIDA	Canadian International Development Agency
CPW	Conservation Priority-Setting Workshop
CREMA	Community Resource Management Area
CRMU	Collaborative Resource Management Unit
CSIR	Council for Scientific and Industrial Research
CSO	Civil Society Organization
CSP	Country Strategic Plan
DA	District Assembly
DSD	dry semi-deciduous
ENRM	environment and natural resources management
ESW	Economic and Sector Work
EPA	Environmental Protection Agency
ETOA	Environmental Threats and Opportunities Assessment
EU	European Union
FAA	Foreign Assistance Act
FC	Forestry Commission
FDMP	Forestry Development Master Plan
FR	Forest Reserves
FY	fiscal year
GDA	Global Development Alliance
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFTN	Global Forest Trade Network
GOG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
GSBA	Globally Significant Biodiversity Areas
GTZ	Gesellschaft Technische Zusammenarbeit (German International development agency)
GWS	Ghana Wildlife Society
IBA	Important Bird Areas
IEE	Initial Environmental Examination
IPM	integrated pest management
IUCN	International Union for the Conservation of Nature
JICA	Japan international development agency
ME	moist evergreen
MEO	Mission Environmental Officer
MLFM	Ministry of Lands, Forestry and Mines
MSD	moist semi-deciduous

NAP	National Action Programme
NDPC	National Development Planning Commission
NGO	Non-Governmental Organization
NCRC	Nature Conservation Research Centre
NRM	natural resources management
NTFP	non-timber forest products
PA	protected area
PAMSCP	Protected Areas Management and Wildlife Conservation Project
PGRC	Plant Genetic Resources Centre
RCC	Regional Coordinating Council
SARI	Savanna Agricultural Research Institute
SEA	Strategic Environmental Assessment
SEIA	Social Environmental Impact Assessment
SM	southern marginal
SNV	Netherlands development agency
SO	southeast outlier
SO	Strategic Objective
SOW	Scope of Work
SRA	Social Responsibility Agreement
TES	threatened and endangered species
UE	upland evergreen
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
USAID	U.S. Agency for International Development
VPA	Voluntary Partnership Agreement
WAPCA	West African Primate Conservation Action
WD	Wildlife Division
WE	wet evergreen
WRC	Water Resources Commission
WWF	World Wildlife Fund

1.0. Executive Summary

The Environmental Threats and Opportunities Assessment (ETOA) is intended to provide USAID/Ghana with:

- 1) An analysis of the actions needed in Ghana to conserve tropical forests and biodiversity; and
- 2) an assessment of the extent to which current or proposed USAID/Ghana actions meet the identified needs.

The ETOA also provides USAID/Ghana with a set of recommendations to 1) strengthen ongoing mission programs and cross-sectoral links to help maximize biodiversity conservation; and 2) support opportunities that can provide greatest impact in the biodiversity and forest conservation.

1.1 Overview

About 18,000 years ago, during the world's last dry period, African forests retreated to a few small refugia, one of which was in Ghana's southwest. When moister conditions returned, surviving species were able to expand. This, along with Ghana's location on the coast, and its span of forest and savanna zones has resulted in rich biodiversity resources. While Ghana is 31st in size among African countries, it ranks 17th in the number of plant species, 13th in the number of mammal species, and 11th in the number of bird species (Environment and Development Group, 1998).

Some of Ghana's significant landscapes for biodiversity conservation include: (1) the Guinean Forest Hotspot, considered one of the world's priority biodiversity conservation areas, is found in Ghana. With 551 species, it ranks first in mammalian diversity among the 25 hotspots (CEPF, 2000). It is one of the two highest priority regions in the world for primate conservation (CEPF, 2000). (2) Ghana's savanna ecosystems include the coastal savanna, which occurs along a narrow strip of the country, and Guinea and Sudan savanna, found in the northern half of Ghana. While the inland savanna systems provide about 70 percent of Ghana's fuel wood and charcoal, they still contain rich biodiversity, some of it yet to be categorized. (3) Ghana has about 90 coastal lagoons, five of which have been designated as Ramsar sites, and ten are designated as Important Bird Areas by Birdlife International. The five marine sea turtles, all endangered, are found along Ghana's coast. (4) Although Ghana's forest resources are highly degraded, they still contribute about US \$100 million in foreign exchange, and four percent of the national tax revenue. Ghana has set aside certain Forest Reserves as Globally Significant Biodiversity Areas, to be managed in partnership with communities to conserve, and where appropriate, sustainably use, biodiversity.

Ghana's rich biodiversity resources face many threats, as described in the ETOA, and summarized below.

1.2 Summary of Threats

The ETOA Team identified the following direct threats to Ghana's biodiversity and forests:

1) **Gap between policy and action.** It is widely recognized that Ghana’s legal framework is adequate, but implementation is deficient. As described in Section 7, this is largely an issue of environmental governance.

2) **A system—or a cycle—of unsustainable exploitation of resources prevails.**

Inappropriate practices are used; landscapes and natural resources are degraded; and resource users may move on to new locations, where they continue to unsustainably exploit resources. Inappropriate and unsustainable practices include:

- a) Unsustainable agriculture including slash and burn
- b) Charcoal making and fuel wood collection
- c) Illegal hunting for bush meat
- d) Over-exploitation of fisheries resources
- e) Extractive industries, especially those operating outside the law
- f) Setting bush fires
- g) Filling wetlands for development

3) **Little value is placed on biodiversity** because of the limited awareness/consideration of the link between biodiversity and economic growth; and limited knowledge of biodiversity conservation measures in rural communities.

4) **Unsustainable harvesting of timber** is resulting in deforestation and forests that are economically unproductive.

5) **A land tenure system that lacks transparency and security**, and that fails to allow for widespread ownership of land; and **migration, within Ghana and international migrants to Ghana** (fleeing conflict and/or poverty) contribute to over-exploitation and unsustainable practices.

The ETOA Team identified the following indirect threats to biodiversity and tropical forests:

- 1) **Political commitment to conservation is lacking.**
- 2) **Funding and logistical resources are inadequate** for biodiversity conservation.
- 3) **There is limited biodiversity information** on which to base management decisions.
- 4) **Poverty and population growth** result in over-exploitation and unsustainable use.

1.3 Summary of Recommendations

The following are the ETOA’s key recommendations:

- 1) Provide support for Ghana’s efforts in collaborative management of natural resources, including: Community Resource Management Areas, collaborative forest management, collaborative fisheries management, collaborative wetland management, and equitable distribution and management of the Mining Development Fund.
- 2) Support efforts to promote shade-grown rather than full sun cocoa production.
- 3) Help Ghana close the biodiversity information gap.
- 4) Assist NR public sector organizations to develop sustainable funding mechanisms.

Along with recommendations for strengthening cross-sectoral links within USAID/Ghana’s current program, the above recommendations are described in detail in Sections 9.1 and 9.2.

2.0 Introduction to the ETOA

The purpose of the USAID/Ghana ETOA is to: 1) conduct an assessment of biodiversity and tropical forest conservation needs in Ghana; and 2) evaluate the Mission’s contribution to those needs. The report is meant to serve as a planning tool to assist USAID/Ghana to better integrate environmental concerns into their overall program. The ETOA is being conducted to comply with sections 117, 118, and 119 of the Foreign Assistance Act (FAA) of 1961, as amended; and country strategy guidelines under ADS 201.3.4.11 and ADS 204.5. As described in FAA 118/119 Best Practices (Byers, 2005), some missions have chosen to combine the mandatory FAA 118/9 analyses with an early, strategy level review—a preview into the potential environmental impacts at the strategy level—which can provide guidance to Strategic Objective (SO) Teams in preparing Initial Environmental Examinations (IEE), in compliance with FAA 117 and 22 CFR 216, at the activity level; and in supporting cross-sectoral linkages.

USAID/Ghana has chosen to prepare an ETOA, in accordance with FAAs 117-119. Therefore, in addition to responding to #1 and #2 above, the ETOA will describe potential environmental impacts of the USAID/Ghana strategy/programs and make recommendations for integrating environmental concerns into the program.

2.1 Legal Requirements (FAA 118/9 and FAA 117)

FAA Sections 118 “Tropical Forests” and 119 “Endangered Species” codify U.S. interests in these topics. These provisions require that all country plans include:

- An analysis of the actions necessary to conserve tropical forests and biodiversity (discussed in Section 7); and
- the extent to which current or proposed USAID actions meet the needs (discussed in Section 8).

According to FAA Section 117 “Environment and Natural Resources,” it is mandatory for operating units to implement their programs with an aim to maintain (and restore) natural resources upon which economic growth depends, and to consider the impact of their activities on the environment. The legal requirements of FAA 117 are reflected in USAID’s ADS Chapter 204 and in 22 CFR 216, USAID Environmental Procedures, which is meant to “ensure that environmental factors and values are integrated in A.I.D. decision making processes.”

FAA Sections 118 and 119 are specific legal requirements of all USAID operating unit strategic plans. FAA 117, as codified in USAID’s Environmental Procedures, is also a legal requirement, which, when implemented during strategy preparation, allows USAID operating units to consider environmental impacts and cross-sectoral linkages with the environment sector at the planning stage.

2.2 Purpose and Objectives of the ETOA

According to the Scope of Work (SOW), this analysis is meant to advance implementation of USAID/Ghana’s strategic framework by providing and ensuring:

- An overall assessment of the status and trends in key components of Ghana's biodiversity and tropical forest resources;
- An overall understanding of developmental threats (as well as legal and regulatory framework) to environment, biodiversity and tropical forests; and
- An understanding of actions that must be taken to maintain biodiversity, tropical forests, and ensure sustainable environmental management given the documentation and analysis of threats.

2.2.1 The Country Environmental Analysis

The World Bank, the French development agency, and the Royal Netherlands embassy, in cooperation with other development partners, are currently conducting a Country Environmental Analysis (CEA) focusing on policy and institutional issues in four sectors: land, mining, forestry and wildlife, and urban environmental issues, such as water, sanitation, and solid waste management. The CEA is meant to be a vehicle to open up Environment/Natural Resource Management (E/NRM) policy dialogue by identifying policy and investment opportunities in land degradation and forest (including wildlife) depletion, and environmental degradation in the mining sector and in urban areas. The GOG sees the CEA exercise as an opportunity to engage donors and civil society groups in a policy dialogue, to bring support for the implementation of its environmental sustainability reform agenda. The ETOA Team collaborated with CEA authors, and used the draft CEA in the preparation of the ETOA.

The CEA builds from the premise that forest and wildlife resources are major contributors to Ghana's economic development; however, long-held assumptions about Ghana's forest wealth are no longer valid. For example, off-reserve forest has largely disappeared, and what is left is fragmented and small. In southern Ghana the forest reserves (FRs) and protected areas (PAs) are surrounded by "off-reserve" areas, where policy is conversion to agriculture, and where highly fragmented forests are threatened by a variety of practices (described in the ETOA). In the dry transition zone above Kumasi, several FRs have almost disappeared due to bushfires and overexploitation.

The CEA (in draft, 2006) states that the cost to the nation of natural resources depletion, from the "degradation of only five types of natural assets (agricultural soils, forests and savanna woodlands, coastal fisheries, wildlife resources, and Lake Volta's environment) is at least US \$520 million annually (6.0% of Ghana's annual GDP)...the vast majority of this cost results from the unsustainable overexploitation of natural resources. The forestry sector in particular has contributed the most to this degradation cost and this trend is highly unsustainable."

While this may paint a bleak picture, the CEA describes how improved governance, greater transparency, improved financial management and budgetary policies, and restructuring, especially in forestry, can turn the tide for the forest and wildlife sectors. These findings are taken into account in the ETOA Section 9.2, Recommendations.

2.2.1. Status of Previous ETOAs

As an annex to the mission Strategy Statement (November 2005), USAID/Ghana submitted an update to the most recent full-scale ETOA, which had been conducted in May 2003, concurrent with preparation of the USAID/Ghana Country Strategic Plan (CSP) 2004-2010. In the ETOA update, USAID/Ghana stated that the Mission will conduct a full Environmental Analysis [ETOA] during Fiscal Year (FY) 2006. This ETOA refers to and uses the original ETOA and update, where applicable; and the 2005 Strategy Statement and USAID/Ghana CSP, 2004-2010.

2.2.2 Timing of the ETOA

While the current ETOA is being prepared after the Mission submitted its 2005 Strategy Statement, nonetheless, the ETOA will help the mission contribute to strategic planning and activity design. For example, programming for the mission's Congressional biodiversity earmark has yet to be fully identified, and therefore, findings from the ETOA can help the mission evaluate possible actions to conserve biodiversity and tropical forests.

2.3 Methods used in Conducting the ETOA

The ETOA Team consisted of two consultants, Team Leader, Ms. Karen Menczer and Senior Environmental Specialist, Professor Eric Quaye. Their "bios" are in Annex 1. The SOW for the ETOA is in Annex 2. The Team used "Biodiversity and Tropical Forestry (FAA 118 and 119) Analyses: Lessons Learned from Recent USAID Field Experience and Practical Guidelines for USAID Staff" (Byers, 2005) as guidance in the preparation of the ETOA.

The ETOA Team held meetings with a range of E/NR professionals, as well as those in related fields. The list of individuals contacted for the ETOA is in Annex 3.

The Team held two roundtables in Accra, and Annex 3 lists the participants. The purpose of the first roundtable was to build consensus among a group of E/NR professionals about the most significant biodiversity threats facing Ghana; and actions needed to minimize those threats. The ETOA Team sent the description of threats and actions needed to the E/NR Development Partner (DP) Working Group for comment. The threats and actions contained in this report are a result of this collaborative process. The second roundtable focused on the institutional and policy framework for biodiversity conservation, opportunities and constraints.

Ms. Menczer went on one field trip, accompanied by USAID/Mission Environmental Officer (MEO), Adeline Ofori-Bah, to Volta and Eastern regions. The itinerary is in Annex 4. The itinerary for Professor Quaye's field trip to Brong Ahafo and Ashanti regions is also in Annex 4. Quaye also visited Western region to meet with CARE, and Menczer visited Western region to attend a CREMA community meeting.

3.0 Ghana: Physical, Biological, Socio-Economic, and Cultural Characteristics

3.1 Biophysical Characteristics

3.1.2 Physical Characteristics

Including inland water bodies, Ghana covers 238,539 square kilometers and is located on the south central coast of West Africa. The country lies between latitude 4 ° 35' to 11° N and longitude 1 ° 10' E to 3° 5' W, and it shares borders in the east with Togo; in the north with Burkina Faso; and in the west with Cote d'Ivoire. Ghana's coastline is about 550 kilometers in length.

Most of Ghana lies below 600 meters; less than ten percent of the land is above 300 meters, and very few places reach elevations above 1000 meters (http://www.fao.org/ag/agL/swlwpnr/reports/rc_codes.htm). The lowest areas are the middle Volta Basin and along the coast.

The distribution of the major biomes of West Africa suggests a strong climatic influence. Generally, rainfall decreases and temperature increases from the rain forest zone in the south to the Sahara desert in the north. By far the most important climatic factor influencing vegetation in Ghana is rainfall. The wet evergreen (WE) forest lies within the wettest part of the country and receives a mean annual rainfall over 2,000 mm. The drier forest areas receive between 1,000 and 1,500 mm, whereas in the northern savanna annual rainfall ranges between 800 and 1,000 mm. The amount of rainfall however, varies within the vegetation zones owing to the local effect of relief. The driest area of the country is the coastal savanna, where the total annual rainfall ranges between 600 and 800 mm.

Over the whole country the mean monthly temperature is about 25°C. Although temperatures are uniformly moderate, there are important variations over different parts of the country as a result of altitudinal variations in the landscape and distance from the sea. In the coastal areas, due to the modifying influence of the sea, the annual difference between the maximum and the minimum monthly temperature is about 5°-6°C. On the other hand, much farther inland, the difference is between 7°-9°C. Diurnal temperature

ranges are more significant than the monthly ranges. In the forested zones of the south the mean diurnal range is still moderate, but in the northern savannas the difference may be as much as 14°-20°C, especially during the harmattan season.

There are six broad physiographic regions: the coastal plains, the Buem-Togo ranges, the forest dissected plateau, the southern Voltaian plateau, the savanna high plains, and the Gambaga escarpment. Figure 1 shows Ghana's main geological features.

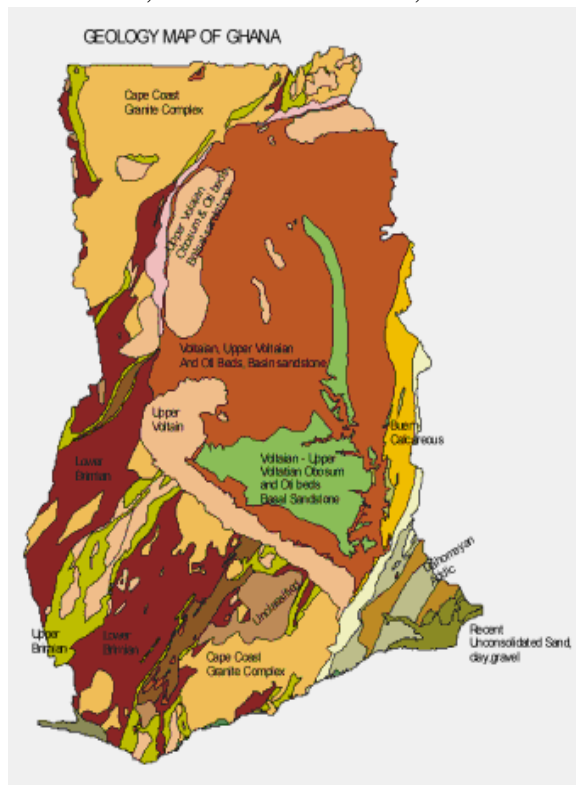


Figure 1 (<http://www.fao.org>)

Figure 2 (Annex 11) shows the location of Ghana's major gold deposits, which are primarily in the west-southwest, an area not only rich in mineral deposits, but also containing significant biodiversity resources (described in Section 4). Annex 11 also contains maps showing Ghana's protected areas and forest reserves, which can be compared to the location of major gold deposits.

Most soils in Ghana are old, have been leached over long periods, and are developed on thoroughly weathered parent materials. The soils found in the lowland evergreen forests (Section 4.2.3) are mainly forest oxysols (or oxisol in the USDA soil classification system) or forest oxysol-ochrosol integrate. The soils are generally porous, well-drained and loamy. They have developed from a wide range of highly weathered materials including granite, Tarkwaian and Birrimian rocks. The heavy and copious rainfall in this vegetation zone leads to a high degree of leaching resulting in acidic soils with pH ranges between 4.0 and 6.5. The leaching has also reduced the amounts of nutrients in the soil, especially Mg^{++} and Ca^{++} ions. These soils support only a few tree crops, e.g. rubber, oil palm and to some extent cocoa in the mildly acidic soil types.

The principal soils which cover nearly the whole area of moist semi-deciduous (MSD) forests (forest types are described in Section 4.2.3) are the forest ochrosols (mainly Ultisols in the USDA system). They differ from the forest oxysols by being slightly alkaline in nature, richer in nutrients and not highly leached. They support many tree crops including cocoa citrus and coffee. The most extensive soils in the northern savannas are the groundwater lateritic soils developed over the Voltaian shales and granites (Figure 1). Their principal characteristic is the presence of an iron pan at a shallow depth through which rainwater does not penetrate easily. Thus, the silty or sandy loam soils are prone to waterlogging during the rainy season. They are generally poor in organic matter and nutrients and can be quite acidic. The other soil type found in this zone is the savanna ochrosols, which differ from the forest ochrosols in being less rich in organic matter and nutrients. However, there are also porous, well-drained loamy soils developed over granite, Birrimian rocks and sandstone. They are mildly acidic or mildly alkaline in nature. Most food crops grow in these two soil types.

Within the coastal savanna (Figure 3) several soil types occur, including the coastal savanna ochrosols, lateritic sandy soils, and the tropical black clays, also locally referred to as Akuse soils. The ochrosols are developed mainly on gently undulating land over the loose Tertiary deposits and are similar to the northern savanna ochrosols except that they are usually not as acidic in nature. The lateritic sandy soils also have several similar characteristics to the northern savanna groundwater lateritic soils. One major difference between the two is that the former soil types are developed over acid gneiss and granite and consist of sandy soils overlaying a hardened layer of clay, which is also able to impede the drainage of water thereby causing waterlogged conditions in the rainy season. The tropical black clays (equivalent to the USDA vertisols) are unique in the country. They are developed over basic gneiss and therefore, are alkaline in nature. These soils are well supplied with Ca^{++} and Mg^{++} ions and may contain lime deposits in their lower horizons. During the rainy season they absorb moisture and become heavy and sticky but

in the dry season they lose water, become dry and hard and develop cracks; they are difficult soils to cultivate.

3.1.2 Ecological Zones

Ghana is divided into six agro-ecological zones: coastal savanna; forest; forest-savanna transition; Guinea savanna; Sudan savanna; and semi-deciduous forest zone (forest zones are described in Section 4.2.3). The following is adapted from EPA 2002:



Figure 3 (<http://www.fao.org>)

The *coastal savanna* is a low-lying area that covers approximately 16,000 km², about seven percent of the total area of Ghana. Rainfall ranges from 600 to 1150 mm/year. The eastern part of this zone includes the area with the lowest rainfall in the country. The vegetation is mainly grass and scrub with relatively poor soils. Maize, cassava, and vegetables are typically produced in this zone; and the area is used for livestock production, including cattle. The southern part of the zone is home to a shallot-growing industry. A significant amount of Ghana's tourism revenue is generated in this area.

The *forest zone-or the high forest zone* covers five regions of the country and extends over 84,000 km², approximately 36 percent of the country. It

includes the deciduous forest, moist evergreen (ME) and WE forests. FRs (216 of the 266 FRs are in the high forest zone) cover about 32,000 km² of this zone and the rest is agricultural land and bush-fallow. This zone has the highest rainfall in the country, which annually ranges from 1150 to over 2000 mm. Soils are not highly fertile and are generally not suitable for continuous cultivation under mechanization. This zone supports cocoa and also the starches, cassava, plantain, and cocoyam and tree crops such as rubber, coconut, and oil palm. The *deciduous forest zone* forms about 80 percent of the forest zone and supports most of the food crop and cocoa cultivation in Ghana, and most of the timber for local use and export. While the forest in this zone is highly fragmented in many areas, it still contains significant biodiversity resources, which are under threat (see below). This zone, as well as the transitional zone, is rich in minerals and mining is a major land use.

Most of the *forest-savanna transitional zone* (derived savanna zone, see description, Section 4.2.3) is between 120 and 275 meters above sea level and rainfall averages 1450 mm per year. In this zone, the natural forest vegetation has given way to derived savanna. Most of the tree species are similar to those in the forest zone, and occur in association with tall to medium tall grasses. The soils are fairly fertile and support a wide variety of crops. Maize, yam, and tobacco are important crops grown here; staples such as cassava and plantains are also found; and large-scale commercial farming is widespread. This is

largely a peri-urban area, and the high population density in this zone exerts significant pressure on remaining natural resources.

The *Guinea savanna zone* covers about 152,000 km², approximately 57 percent of Ghana. Unlike other areas of Ghana, this zone has only one rainy season, late April or early May to October, followed by a long dry period. Soils are generally poor, but better soils are found in the zone's floodplains and along river banks. The vegetation is typically a ground cover of grasses of varying heights, interspersed with fire resistant, deciduous, broad leaved trees at forest margins. Rice is the most important cash crop and is produced in the valley bottoms. Cotton, another important cash crop, is mostly grown by small-scale farmers. Millet, sorghum, and yam are principal food crops in the zone, and maize, groundnuts, and vegetables are also widely produced. Livestock production is an important activity with over 70 percent of Ghana's cattle, sheep and goats found here.

The *Sudan savanna zone* consists of short drought and fire-resistant deciduous trees interspersed with open savanna grassland. Grass cover is very sparse and in most areas the land is bare and severely eroded.

The savanna zones are prone to desertification, have the highest incidence of poverty, provide most of the charcoal and fuel wood used in Ghana, and are rich in biodiversity that is typical of savanna wildlife (see below).

3.1.3 Water Resources

Ghana's water resources are found in rivers, lakes, reservoirs, lagoons and groundwater. The main water bodies are shown in Figure 6 (Annex 11).

A number of important rivers exist in the country, the most important of which, is the Volta. The Volta is a complex river system made up of the black, red and white Volta, all originating from Burkina Faso. In Ghana, these are joined by River Oti and other smaller rivers to form the Volta river system. Thus, the Volta basin covers a very large area of about 400,000 km² in six countries, Burkina Faso, Ghana, Togo, Benin, Mali and Cote d'Ivoire. About 42.9 percent of the basin is in Ghana, which is about 73 percent of the total land area of the country. Other important rivers that have their sources in forest areas of the country include Tano, Ankobra, and Pra.

Ghana has only one natural lake, Lake Bosomtwe, which is a crater lake found in the MSD rain forest zone in the Ashanti region. It has a diameter of 8.0 km, an area of 49 km² and a maximum depth of about 78 mm. No river flows into the lake; rather it is an enclosed basin with a radial drainage pattern involving over 37 streams, some of which dry up during the dry season. The largest man-made lake in Africa, the Volta Lake, was formed when the Volta River was dammed in the Akosombo Gorge in 1964 to generate hydropower. The lake is also used for transportation, fishing, irrigation, and as a water supply for domestic and industrial purposes.

The Water Resources Commission (WRC) was set up in Ghana to coordinate and to monitor all water resources activities in the country. Until the WRC Act was passed in

1996, water agencies and institutions in the country were set up by legal instruments that only provided the legal framework, but there was little management of the resource. Ghana is now practicing integrated water resources management and development that addresses conflicting demands on fresh water resources.

3.2 Governance, Socio-Economic, and Cultural Characteristics

3.2.1 Governance

Ghana has a five-tier public administration system: Central government is the top level; Regional Coordinating Councils (RCC) are the second level, and serve as coordinating bodies between central government and local systems; District Assemblies (DA) are the highest political entities at district level; sub-district authorities include Sub-Metropolitan, Sub-District, Urban, Zonal, and Town/Area Council. The fifth level is a network of Unit Committees. Ghana's administrative units are shown on Figure 4.

Administrative Regions



Figure 4 (<http://www.fao.org>)

Throughout Ghana there are two parallel governance systems: the modern system of DAs, sub-district organizations, etc.; and the traditional chieftaincy structure. According to EPA (2002), consultation between the two systems is frequent and respectful. Modern leadership generally defers to traditional authorities on land matters; and traditional authorities, if unable to resolve cases, transfers them to the courts and to the DA.

Ghana is on the path towards decentralization. The 1993 Local Government Act, Act 462, gives local authorities the responsibility for overall development of their areas of jurisdiction, including improvement and management of human settlements, management of solid waste, and other environmental issues. District Planning

Committees and District Environmental Management Committees have been established to oversee environmental and other development issues. Community Environmental Committees are at the most local levels, serving as focal points for environmental concerns (initiatives that support decentralization of NRM are described below).

The Constitution of Ghana (1992) lays the foundation for sound NRM and environmental legislation. The Constitution requires the establishment of a Lands Commission, Minerals Commission, Forestry, and Fisheries Commissions and other relevant commissions to be “responsible for the regulation and management of the utilization of the natural resources concerned and the coordination of the policies in relation to them.”

Ghana's Vision 2020 (1994) aims to achieve a balanced economy and middle-income country status and living standard by 2020. It offers a broad vision of long-term development goals, which the country's strategies, such as the Ghana Poverty Reduction Strategy (GPRS), are to help achieve.

The National Development Planning Commission (NDPC) formulated the GPRS; however, the environment sector received limited attention during its preparation. At the time, this was seen as an indication of the lack of attention that government in general pays to environmental concerns (Gadzekpo and Waldman, 2005). According to professionals in the E/NRM sector, the GPRS authors failed to mainstream environment in the GPRS; and because of this, consultations with the E/NR community during production of the GPRS were limited.

Subsequently, EPA produced (with encouragement from World Bank and other donors) a Strategic Environmental Assessment (SEA) of the GPRS to refine it and incorporate environmental considerations. The SEA established the EPA as the main government organization concerned with environmental affairs, and "deepened the GOG's commitment to addressing environmental issues and rectified the ad-hoc nature of the environmental issues as addressed in the GPRS, but did not substantially change the environmental narratives contained in the PRSP" (Gadzekpo and Waldman 2005).

The GPRS was recently updated, and this time environmental concerns were included; environment was mainstreamed, and EPA is now evaluating whether a separate EIA will be necessary or if environmental concerns were adequately covered. The process of incorporating environmental concerns into the updated GPRS reflects a new way of doing business and GOG's intention to mainstream environment throughout the sectors.

3.2.2 Overview of Socio-economic Characteristics

Ghana's 2005 population was approximately 22,113,000 (www.oecd.org/publications/africanoutlook). The population growth rate was 3.3 percent in 1980, 2.8 percent in 1995, and 2.7 percent in 1996 (http://www.fao.org/ag/agL/swlwpnr/reports/rc_codes.htm). Ghana's current population growth rate of 2.7 percent/year (USAID Strategy Statement, 2004) will result in the doubling of the population in 26 years. In 1994, the urban population was 6.1 million out of a total population of 17 million, with a growth rate of 20 percent (http://www.fao.org/ag/agL/swlwpnr/reports/rc_codes.htm). The trend is towards greater urbanization, with rural people migrating into cities and towns for work.

About 60 percent of the total population of Ghana is rural (World Bank, 2002). Poverty is concentrated in rural areas, and is especially high among small farmers in savanna zones. The incidence of poverty in rural areas is 36 percent, and accounts for 84 percent of total poverty in Ghana (World Bank, 2002).

About 40 percent of total income is derived from agriculture, including fisheries (http://www.fao.org/ag/agL/swlwpnr/reports/rc_codes.htm); forestry, including logging and timber processing constitute six percent of GDP. About 120,000 people are

employed in the forestry sector, in the timber industry and public institutions; and many more are employed in the informal forestry sector (Gari, 2005).

Except where otherwise noted, the below information on Ghana's economy is adapted from www.oecd.org/publications/africanoutlook:

Ghana's real GDP growth reached 5.9 percent in 2005, up from an average annual rate of 5.5 percent during 2000-4. Growth is projected to increase to about 6.1 percent in 2007. Economic growth has been led by agriculture, notably three consecutive bumper cocoa crops resulting from favorable weather and improved policies.

The agricultural sector (including forestry and fisheries) is the largest sector of the economy, accounting for nearly half of total GDP and about 60 per cent of total employment. Mining and quarrying account for 5.7 percent of GDP; manufacturing for 9.9 percent; other industry, 11.6 percent; wholesale and restaurants, 7.6 percent; government services, 11.1 percent; and other services, 13.1 percent.

The agricultural sector faces significant constraints to growth. For example, only five percent of irrigable land in Ghana is actually irrigated; and extension services are very limited—each technical officer covers nearly 2,000 farmers. About 40 percent of all agricultural output is wasted annually due to inadequate storage facilities, marketing chains and poor infrastructure.

Although the industrial sector has continued to show signs of recovery, industrial production is not growing rapidly enough to attain the government's objective of an industrial sector that accounts for about 37 percent of GDP by 2010.

Tourism is the fourth largest foreign exchange earner, after foreign remittances, gold, and cocoa; and is one of the highest growth sectors, averaging approximately 12 percent/year in recent years and contributing 4.5 percent of GDP (NCRC, 2005). Since 2000, there has been an upward trend in the number of visitors to Ghana with an increase in arrivals of 11 per cent in 2004 and an estimated increase of 10 per cent in 2005. Tourism arrivals stood at 482,000 in 2002 and 531,000 in 2003 (NCRC, 2005). Tourism receipts reached US \$520 million in 2002 and US \$602 million in 2003 (NCRC, 2005).

The GOG has prioritized the tourism sector as the premier foreign exchange earner for the national economy by 2007. The recent increases in tourism have largely been driven by the promotion of individual and conference tourism, by improved security, and the increased number of flights into Ghana. Nonetheless, the majority of tourists continue to be Ghanaian expatriates. Ghana faces significant constraints in its efforts to further increase tourism, such as limited infrastructure, mainly roads and hotels, to support international tourists and lack of well-developed tourist destinations that meet international standards.

Interest in developing the ecotourism sub-sector in Ghana started around 1990, and was largely encouraged and activities implemented by NGOs with funding from international development agencies, including USAID. Conservation International (CI), Nature

Conservation Research Centre (NCRC), Georgia State University, Winrock International, Ghana Wildlife Society (GWS), Wildlife Division (WD), and the Netherlands development agency (SNV) were the primary actors involved in these efforts.

Wildlife-based tourism in Ghana is still considered minor with revenues of around \$2.5 million (World Bank, 2006). However, there are opportunities for growth in ecotourism: adding value to existing tourism packages (Kakum National Park's aerial walkway), and attracting additional visitors to little visited areas; both strategies are being pursued in ongoing ecotourism initiatives. USAID supports NCRC's efforts to develop and strengthen nature-based and cultural tourism; this initiative is discussed in Section 6.3.

Gold is the country's largest foreign exchange earner, and its production has increased about 700 percent since 1980 (Hilson and Potter, 2003). While large, mostly international companies dominate the sector, Ghana has a strong artisanal and small-scale mining sub-sector, representing about eight percent of gold mined. Small-scale gold mining operations are defined as occurring on an area no larger than 25 acres, and which can only be carried out by Ghanaian nationals. From 1989-2000, small-scale gold miners produced over US \$300 million worth of gold. From 1989-1994, 30,000 small-scale miners produced and sold to government offices US \$68.56 million in gold (Hilson and Potter, 2003). A small-scale gold miner can earn as much as US \$7/day. Threats to biodiversity from mining activities are discussed in Section 7 and Annex 10.

As stated in USAID/Ghana's 2005 Strategy Statement, "Ghana's key development trends are generally positive: the poverty incidence is 35%, down from 52% in 1992; life expectancy increased to 57 years; HIV/AIDS overall adult prevalence remains under 4%; and the national primary school enrollment level is nearly 80%. Yet, the nation still faces major development challenges. [For example,] Ghana ranked 138 out of 177 countries on the 2005 United Nation's Human Development Index which measures life expectancy, adult literacy and per capita income."

3.2.3 Overview of Cultural Characteristics

The following is adapted from Ghana: a Country Study edited by LaVerle Berry and www.Culture of Ghana - Wikipedia.htm:

There are over 60 ethnic groups in Ghana, and 52 major languages and hundreds of dialects are spoken. On the basis of language and culture, the indigenous people of Ghana are classified into five major groups: the Akan, Ewe, MoleDagbane, Guan, and the Ga-Adangbe.

The Ashanti tribe of the Akan, from which nearly half of the Ghanaian population is descended, is the largest tribe in Ghana and one of the few matrilineal societies in West Africa. The matrilineal system of the Akan is economically and politically important in Ghana. The Akan tribes speak various dialects of Twi, a language rich in proverbs, and the use of proverbs is considered to be a sign of wisdom.

The coastal Akan are part of the Fanti group, the first to develop relationships with Europeans. As a result of this long association, the Fanti absorbed aspects of British culture and language. For example, it became customary to accept British names as family names.

The Ewe live in southeastern Ghana and parts of Togo and Benin. They are patrilineal—the founder of a community became the chief and was usually succeeded by his paternal relatives. Coastal Ewe depend on the fishing trade, while inland Ewe are farmers and keep livestock.

MoleDagbane is spoken by about 15 percent of the nation's population, and its speakers are culturally the most varied ethnic group. For centuries, the area inhabited by MoleDagbane tribes has seen great movements of people, and therefore, a considerable degree of heterogeneity has resulted.

The Guan tribe is believed to have migrated from the Mossi region of what is now Burkina Faso around A.D. 1000. They created settlements along the Black Volta, the Afram Plains, in the Volta Gorge, and in the Kawapim Hills before moving onto the coastal plains.

The Ga-Adangbe people inhabit the Accra Plains. The Adangbe inhabit the eastern plain, while the Ga groups, occupy the western portions of the Accra coastlands. The modern Ga reside in what used to be fishing communities, and more than 75 percent of the Ga live in urban centers.

No part of Ghana is ethnically homogeneous. Urban centers are ethnically mixed due to migration to towns and cities in search of employment. Rural areas, with the exception of cocoa-producing areas that have attracted migrant labor, tend to have retained more traditional population distributions.

Most of the indigenous people, especially in rural areas, have close ties to the land and to their resources. Among the various tribes and ethnic groups, there is a wide range of governance systems and beliefs that affect natural resources, covering land tenure, ownership and access to natural resources, as well as certain actions involving nature and resources that are considered taboo. For example, in northern Ghana the chief of a village, elders, and earth priests make up the Traditional Authority. The earth priest (or tindana) holds communal lands, rivers, and resources in trust, and ensures equitable distribution of natural resources. Adjewodah and Beier (2004) state that conservationists have often failed to understand—and often undermined—the potential of Traditional Authority to help in efforts to conserve natural resources and protect the environment. “Where Traditional Authority commands respect, it can be a powerful ally of nature conservation” (Adjewodah and Beier, 2004).

The different tribes and clans hold a variety of different attitudes about nature, and to a degree, this is reflected in their totems (discussed, along with other cultural ties to biodiversity, in Section 4).

4.0 Biodiversity and Tropical Forest Conservation

Definitions: The ETOA Team used the definition of biodiversity in “Biodiversity Conservation: A Guide for USAID Staff and Partners” (USAID, 2005): “the variety and variability of living organisms....The Earth’s biodiversity consists of genes, species, and ecological processes making up terrestrial, marine and other aquatic ecosystems that both support and result from this diversity. All of these elements of living systems interact with each other to produce the web of life on Earth—the biosphere—a whole much greater than the sum of its parts.”

Tropical forests are found between the Tropic of Cancer and the Tropic of Capricorn. http://glossary.eea.europa.eu/EEAGlossary/T/tropical_forest defines tropical forests as: natural and semi-natural tropical or subtropical forest ecosystems, whether primary or secondary, whether closed or open forests, in both dry and humid areas. The areas concerned are those found within the tropics and subtropics delimited by the 30th northern and southern parallels

Environment is defined as, “the complex set of physical, geographic, biological, social, cultural and political conditions that surround an individual or organism and that ultimately determines its form and nature of its survival”

www.unesco.org/education/tlsf/theme_c/mod13/www.worldbank.org/depweb/english/modules/glossary.htm.

4.1 Ecosystem Diversity and Status

4.1.1 Significant Landscapes and Ecosystems

About 18,000 years ago, during the world’s last dry period, African forests retreated to a few small refugia, one of which was in Ghana’s southwest. When moister conditions returned, the surviving species were able to expand. This, along with Ghana’s location on the coast, and its span of forest and savanna zones has resulted in rich biodiversity resources. While Ghana is 31st in size among African countries, it ranks 17th in the number of plant species, 13th in the number of mammal species, and 11th in the number of bird species (Environment and Development Group, 1998).

Below is a description of the key biodiverse landscapes and ecosystems in Ghana:

The Upper Guinean Forest in Ghana

Organized by CI and funded by the Global Environment Facility (GEF), 140 experts from 30 countries attended a five-day Conservation Priority-Setting Workshop (CPW) in December 1999, entitled, “From the Forest to the Sea: Biodiversity Connections from Guinea to Togo.” The outcome of the CPW was a comprehensive picture of conservation in the six countries that are part of the Upper Guinean Forest Ecosystem, which extends from Guinea into eastern Sierra Leone, eastward through Liberia, Cote D’Ivoire, along the lower 1/2 to 2/3 of Ghana and into Western Togo. The following discussion is from the workshop report, “Ecosystem Profile: Upper Guinean Forest Ecosystem of the Guinean Forests of West Africa Biodiversity Hotspot” (CEPF, 2000).

The Guinean Forest Hotspot (Figure 5, Annex 11), a belt of fragmented forests and associated vegetation, running parallel to the coast of West Africa, is one of eight African biodiversity “hotspots.” CI categorizes a “hotspot” based on its biodiversity significance and degree of threat. This hotspot is considered one of the world’s priority biodiversity conservation areas because of its high species endemism. Of CI’s 25 hotspots worldwide, this one ranks fifth worldwide in biodiversity importance; but when taking only the intact area into consideration, it ranks fourth after the Brazilian Cerrado, Tropical Andes, and Mesoamerica. With 551 species, it ranks first in mammalian diversity among the 25 hotspots. It provides habitat for half the mammal species on the continent; and it is one of the two highest priority regions in the world for primate conservation.

The Upper Guinean Forest Ecosystem was closed canopy tropical rainforest that extended approximately 1,265,000 km². It is now reduced to forest fragments interspersed with blocks of agriculture and degraded lands. Currently, the portion of this ecosystem complex, with closed canopy forest, extends only 141,000 km², about 15 percent of the original area of closed forest. Of the intact forest remaining in this hotspot, Ghana has 16 percent. The three largest complexes of forest in this ecosystem complex are in Sierra Leone and Liberia; Liberia and Cote D’Ivoire; and eastern Cote d’Ivoire and western Ghana, although these are highly fragmented.

About 20,000 km² of the forest complex are in PAs. National parks (see Figure 6, Annex 11) in Ghana that are part of this complex are Bia, Ankasa, and Kakum. This is the region where Miss Waldron’s red colobus occurred, but is now extinct.

The ecosystem faces many threats; the CPW workshop participants identified slash and burn agriculture, mining, hunting, and civil conflict, as the most significant. The Critical Ecosystem Partnership Fund (CEPF, 2000) report flags Ghana’s initiative to develop Globally Significant Biodiversity Areas (GSBA—see Section 5.4) as a significant move for conservation of this biodiverse forest region.

Northern Savanna and Southern Coastal Savanna

Northern savanna vegetation provides a critical refuge for biodiversity; protects soil and water against degradation; and moderates climate. The northern and the coastal savanna zones support about 20 percent of the national population and supply about 70 percent of Ghana’s firewood and charcoal, about 16 million cubic meters/year (World Bank, 2002). These areas provide medicinal plants, roofing grasses, fencing poles, and fruits, such as shea nut, important for export and local use. Savanna wildlife, many which form part of the bush meat trade, include indigenous rodents, antelopes, reptiles, and gastropods. Savanna woodlands have a positive effect on local climate by providing a barrier to harmattan winds, thereby helping to maintain more favorable climate for agriculture, especially in the south.

Very little attention has been paid to the management of savanna forest and its wildlife. In general, as compared to the high forest zone, the northern savanna’s biodiversity resources are much less known; it has received fewer donor and GOG resources than the

forest zone (rich in biodiversity, timber, and mineral wealth); has been less significantly impacted by human activities; and has the greatest incidence of poverty in the country.

Waters and Wetlands

Coastal Ghana: Ghana has 550 kilometers of shoreline, and its coastal zone extends inland from the shoreline to the 30 meter contour and offshore to the 75 meter depth contour. Wetland ecosystems in Ghana constitute about 10 percent of the country's total land surface and they are characterized as marine/coastal, inland, and man-made. Coastal wetlands include lagoons, lagoon depressions, swamps and marshes, and the intervening interfluves within the coastal catchments.

Along the coast, there are about 90 lagoon systems (some of which are shown in Figure 6). The surface area of the lagoons ranges from the 0.010 km² - Apantse lagoon near Apam to the 250 km² - Keta lagoon complex (Ofori-Bah, 2005). Most of the coastal wetlands harbor important bird life, resident and migratory (70 species), and ten of the wetlands are considered Important Bird Areas (IBA), a designation given by Birdlife International for critical bird habitat. The Keta and Songaw Lagoons are of particular biodiversity importance because they serve as nesting grounds for globally endangered marine turtles. Most of the coastal lagoons are heavily exploited by artisanal and inshore fishers and by industrial trawlers (Gari, 2005).

Five of the 90 lagoons are designated as Ramsar sites. Gari (2005) states, for the five Ramsar wetlands, over a ten year period (decade of 1990), there was a loss of 30 percent of the surface area and "ecosystem condition" and extrapolates to 6,000 hectares/year average loss for the entire coastal wetland system. This estimate of annual loss is a crude one, but it is probably on the low side since only Ramsar sites were used, and these would have higher visibility and more protection mechanisms. Wetlands are considered common property resources and are inadequately controlled and managed (Gari, 2005).

Mangroves: The Central African mangrove ecoregion is located in western Africa, and encompasses mangrove areas along the coastlines of Ghana, Nigeria, Cameroon, Equatorial Guinea, Gabon, Democratic Republic of Congo, and Angola. While these mangrove areas contain no endemic species, they are important for their pelagic fish populations, including some narrowly distributed species, abundant avifauna, and the presence of some rare mammals and turtles (http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at1401_full.html).

The mangroves provide habitat to the threatened West African manatee (*Trichechus senegalensis*) (Hughes and Hughes, 1993) and the soft-skinned turtle (*Trionyx triunguis*). Summer visitors include at least five species of marine turtle, all of which are considered by IUCN to be endangered: the leatherback (*Dermochelys coricea*), loggerhead (*Caretta caretta*), olive ridley (*Lepidochelys olivacea*), hawksbill (*Eretomychelys imbricata*), and green turtles (*Chelonia mydas*) (Hughes et al., 1973 in Huntley, 1974a, Sackey et al., 1993).

Ghana's mangroves occupy a very narrow, non-continuous coastal area, occurring along the lagoons, extending from the eastern to the western parts of the country. Conversion of mangroves into other land uses, notably agriculture, salt ponds, and roads, and use of wood for construction material has accelerated the destruction of Ghana's mangroves (Ofori-Bah, 2005). For instance, about half of the area once occupied by mangroves near the mouth of the Densu River near Accra has been destroyed by conversion to salt ponds.

Inland Wetlands: There are also non-coastal wetlands, usually topographic depressions or valley bottoms. The wetland complex near Kumasi, Owabi, Ghana's sixth Ramsar site, is the only non-coastal Ramsar site. There is very little biodiversity information available on this site (see Annex 4, site visit). Inland wetlands are affected by pollution and development.

The Volta Basin and Lake Volta: The Volta Basin covers 398,000 km² and is shared by six countries, Ghana, Burkina Faso, Cote d'Ivoire, Mali, Benin, and Togo. The competing demands, mainly from the industrial, agricultural, and energy sectors, can result in conflicts among the countries (van Edig et al., 2003).

Lake Volta's shoreline is about 5,500 km; the lake covers 3.5 percent of the country's surface area. Lake Volta supports a large fishing industry for export and local consumption, hydropower production, drinking and irrigation water, and lake transport. The lake provides 75 percent of the national electric power and 16 percent of the national fish output (Gari, 2005). About two million people live along the lake and 300,000 people directly depend upon it for their livelihoods.

There are approximately 138 species of fish in the Volta, distributed among 67 genera and 27 families ((Entsu-Mensah, 2006). The top species landed are tilapia (38.1 percent), *Ccryssichthys* spp. (34.4 percent), a catfish-*Synodontis* spp. (11.4 percent), *Mormyrids* (2 percent), and *Labeo* spp.-a carp (3.3 percent) (Entsua-Mensah 2006). Other species of commercial importance are the catfish: *Clarias* spp., *Bagrus* spp. and *Schilbeids*; and *Odoxathrissa* spp. (Entsu-Mensah, 2006).

The dominant fishing gear of artisanal and small-scale fishers in the Volta and in the coastal lagoons is the gill net. Cast nets, hook and lines, and traps are also used. Recently, more efficient and illegal gear has been introduced, such as purse seines, beach seines, and bamboo pipes.

4.2 Species Diversity and Status

4.2.1. Wildlife Diversity

Table 1 gives an indication of the rich biodiversity found in Ghana.

Table 1: Ghana's Faunal Biodiversity (adapted from <http://rainforests.mongabay.com/deforestation/2000/Ghana.htm>); where appropriate, these numbers have been revised by information in Ghana's National Biodiversity Strategy (2002)

Amphibians	Numbers
Total # of species	74 (revised in accordance with Box 1 findings)

Endemic species	3
Threatened species*	10
Birds	
Total species	729
Number of breeding birds	206
Endemic species	0
Threatened species*	8
Mammals	
Total species	249
Endemic species	0
Threatened species*	15
Reptiles	
Total species	135
Endemic species	1
Threatened species*	2
Fish	
Total species	90
Endemic species	Unknown
Threatened species*	Unknown
Wildlife diversity (totals from above)	
Total species	1275
Endemic species	4
Threatened species	35

*The number of threatened species is from IUCN red list categories: Critically Endangered; Endangered; Vulnerable; and Near Threatened.

The ETOA Team compiled a list of Ghana’s endemic species with information from Hall and Swaine, 1981, and the National Biodiversity Strategy, 2002 (Annex 5). The list does not include endemic butterflies—of more than 850 butterfly species that occur in Ghana, 23 are classified as endemic or “near-endemic” (MES, 2002).

Box 1: Even as late as 2004, new species are still being discovered in Ghana.

A recent rapid assessment of four of southwest Ghana's Globally Significant Biodiversity Areas yielded exciting results, including the discovery of a new frog species and the observation of chimpanzees, duikers, and endangered forest elephants.

Conducted by a team of 14 international scientists, the survey organized by the Rapid Assessment Program of the Center for Applied Biodiversity Science at CI took place in the forest reserves of Boi-Tano, Tano Nimiri, Draw River and Krokosua Hills. The goal of the expedition was to collect scientific data on animal and plant diversity and the status of unique species for later recommendations to the Ghanaian government regarding protection and management efforts.

Significant findings include a new species of frog from the family *Arthroleptidae* and the first record of a frog of the genus *Acanthixalus* in Ghana, as well as the presence of the rare *Hypoleucis sophia* butterfly of which there are probably fewer than 20 in collections worldwide. The team also saw the West African chimpanzee and both the Black and Bay duiker. In Draw River, scientists documented the presence of the endangered forest elephant, a particularly significant find, since it is uncommon and wary of humans.

4.2.2 Plant Diversity

Ghana is home to 3,725 species of vascular plants, of which about 1.2 percent are endemic and approximately three percent are threatened (www.earthtrends.wri.org, 2003). Table 2 illustrates plant diversity in Ghana.

Table 2: Ghana's Plant Diversity

Native Tree Species	Numbers
Total species	680
Number of tree species on IUCN red list	
Critically endangered	3
Endangered	19
Vulnerable	94
Vascular Plant Species (2004)	
Total species	3725
Endemic species	43
Threatened species	117

4.2.3 Forest Species Diversity

According to <http://rainforests.mongabay.com/deforestation/2000/Ghana.htm>, of Ghana's land area that is forested, about 6.4 percent, roughly 353,000 hectares, is classified as primary forest, the most biodiverse form of forest. The closed forest zone occupies the southwestern third of the country.

The forest classification system developed by Hall and Swaine (1981) is the most widely used in Ghana. They classified forest vegetation into seven major formation types based mainly on mean annual rainfall data and degree of species diversity (see Figure 2 for location of forest zones):

Wet Evergreen (WE): The wet evergreen forest is restricted to the highest rainfall (1500-2100 mm) areas and contains the highest concentration of rare and endemic species in the country (Hawthorne and Abu-Juam, 1993). It is the least disturbed forest type in Ghana, probably because there are fewer commercial timber species than the other forest types. The WE is reasonably well represented within the PAs, Nini-Suhien National Park and Ankasa Resource Reserve. The latter is considered to have the highest Genetic Heat Index (GHI) of all the reserves measured in the forest zone (Hawthorne and Abu-Juam, 1993). The GHI is a conservation score based on the rarity of the species found in the reserve. Ankasa is also known to be one of the only two locations where the only endemic forest genus, *Monocyclanthus* (Annonaceae), is found.

Moist Evergreen (ME): This forest type is located in areas that receive 1500 to 1750 mm of rainfall and is usually found between the WE to the south and the MSD forest to the north. Floristically, the ME is slightly less diverse than the WE but it contains more species of commercial timber trees and has, therefore, been more heavily impacted by logging. The commercial timber trees include *Khaya ivorensis* (African mahogany), *Triplochiton scleroxylon* (African white wood), and *Terminalia ivorensis* (Ivory Coast almond). The Bonsa River FR in the Western region and the Opon Mansi FR in the Central region are typical examples of the ME forest type.

Moist Semi-Deciduous: This forest type is found in areas with annual mean rainfall between 1250 and 1700 mm. It is the most productive, although species diversity is relatively lower than the ME and it represents about 40 percent of the closed forest zone. Two subtypes are recognized; the drier northwest subtype, which harbors forest elephant populations, and the southeast subtype. The Bia National Park typifies the northwest subtype and Ajenjua Bepo FR is an example of the southeast subtype.

Dry Semi-Deciduous (DSD): The DSD forest occurs as a narrow strip to the north and east of the MSD subtypes separating the closed forest from the northern savanna. Rainfall varies between 1250 and 1500 mm. Species diversity is low and there are fewer economic timber trees. Like the MSD, the DSD also has two subtypes based mainly on amount of rainfall and occurrence of fire; a wetter Inner Zone and a drier Fire Zone characterized by periodic fires. In this zone, the opening of the forest canopy for farming, the subsequent invasion of grass, and the effect of fire has destroyed the original high forest and allowed the invasion of savanna trees resulting in a mosaic of forest and savanna vegetation often referred to as derived savanna. This zone, along with the northern savanna, supplies much of Ghana's fuel wood and charcoal.

Upland Evergreen (UE): Within the MSD forest zone, there are two patches of UE forest which cover only 292 km² or 0.12 percent of the land area of Ghana. The Tano Ofin and Atewa FRs are the two well known UE forests in the country but Apedwa FR has been included by a more recent classification (Hawthorne and Abu-Juam, 1995). The UE forests have floristic similarity to the ME forest type but also contain several rare species, such as *Hymenocoleus multinervis* (an herb). The palm-like tree fern, *Cyathea manniana*, for instance, can only be found in the Atewa FR.

South-east Outlier (SO): This is a distinctive forest type, located in the southeast of Ghana, characterized by low species diversity but with a relatively high proportion of endemic and disjunct species. Because of its limited distribution and species-unique assemblage it is of high conservation value (Hall and Swaine, 1981, Schmitt and Adu-Nsiah, 1993).

Southern Marginal (SM): This forest type is restricted to a narrow strip from Cape Coast to Akosombo and within the vegetation zone normally classified as coastal savanna. This area is also densely populated and human disturbances have reduced the SM forests to fragments and mosaics of forest mainly found on rocky hills. Tree species are characteristically of short stature and include the endemic species *Talbotiella gentii*, also known as the charcoal tree, considered the most endangered tree in Ghana, *Dalbergia setifera*, also endangered, and *Turraea ghanensis*, which can form mono-specific stands.

4.2.4 Threatened Species

Table 3 describes some of the better known threatened species in Ghana. Ghana has a list of threatened species, but the more complete list is the IUCN—International Union for the Conservation of Nature—Red List (Annex 6).

Table 3: Summary of Threatened Species (Adapted from World Bank PAD 2002)

Species	Description
LARGE MAMMALS	
Elephant	Classified as vulnerable except elephants in the forest zone, which are classified as endangered. The entire elephant population in Ghana is estimated at 1500 to 3500.
Leopard	Occurs in all vegetation zones and has been recorded in 12 PAs.
Manatee	Classified as vulnerable. Threatened by hunting and incidental capture in fishing nets.
Ogilby's duiker	Classified as vulnerable and has a restricted distribution.
Red-fronted gazelle	Classified as vulnerable. Recorded in northern Ghana, the southern limit of its range.
Bongo	Globally endangered. The Nini-Suhien National Park and Ankasa Resource Reserve support strong populations.
Western Sitatunga	The world's only amphibious antelope. Considered extirpated from Ghana for over 50 years, the species was re-discovered in August 1997 in the inland fresh water lagoons of the Lower Volta River system. Habitat destruction, burning and draining of wetlands are the major threats.
PRIMATES	
Diana monkey	Vulnerable. Considered a highly threatened species; hunting and habitat destruction are main threats.
Red colobus	Vulnerable. Threatened by habitat loss, logging, and intensive hunting.
Olive colobus	Classified as rare
Chimpanzee	Internationally vulnerable. One or two relict populations are found in SW Ghana in Bia and Ankasa. Populations are very low, with possibly fewer than 400 individuals, including only 90 breeding females. Chimpanzees are highly vulnerable to habitat disturbance and disease.
Collared Mangabey	Vulnerable. Found in high canopy primary forest, also in gallery forest and inland swamp forest. There may only be a few troops surviving due to logging of the closed forest.
BIRDS	
White-breasted Guineafowl	Endemic to the Upper Guinea forest and is considered endangered. It is one of the most threatened birds in Africa and until recently it was thought to be extinct in Ghana. Confined to primary forest and highly vulnerable to logging—it often disappears from the habitat once a forest is logged. It is hunted for food in Ghana.
Yellow-footed Honeyguide	Status is uncertain, but occurs at very low densities.
Olive Greenbul	Vulnerable. Endemic to the Upper Guinea forest. Logging is a serious threat to this bird, which occupies a very specialized niche.
White-necked Picathartes	Vulnerable; little is known of its distribution.
Rufous Fishing owl	Rare, with only four sightings in Ghana. Its habitat is along large rivers in western regions of the country.
REPTILES/AMPHIBIANS	
Marine turtles	There are five species in Ghana's coastal waters: loggerhead turtle, green turtle, Atlantic Ridley, hawksbill, and leatherback. All are globally endangered. There is very little information available on turtle populations in Ghana, especially along the eastern coast (see Section 4.5).

While much of Ghana's wildlife is found in PAs, including FRs and GSBAs (PA system is described in Section 5.2), important wildlife resources still exist outside of the PA system. The Wildlife Division has jurisdiction over wildlife in and outside of PAs, but

“...wildlife outside reserves, is to all intents and purposes, treated as a free resource. Traditional controls have broken down and roving groups of hunters operate wherever they please, often against the wishes of local communities” (The Environment and Development Group, 1998). Wildlife populations have declined dramatically in most areas outside PAs; in particular, populations of large mammals have been significantly reduced outside PAs (The Environment and Development Group, 1998).

4.2.5 Agricultural and Genetic Diversity and Status

Wild Species and Wild Relatives of Crop Plants (adapted from PGRC 1995):

Some of Ghana’s wild forest species are of great economic importance, for example *Thaumatococcus daniellii* and *Dioscoreophyllum cumminsii*, the fruits of both have sweetening characteristics several times greater than sucrose. Since the active ingredient of *T. daniellii* is a protein, the sweetener obtained from it is good for diabetic patients. The leaves of the *T. daniellii* are used as wrappers for market foods, and therefore, are of commercial importance; and the plant also is used to make mats. *T. daniellii* and *D. cumminsii* thrive in the high forest zone, but with rampant deforestation, these species are at risk.

There are several widely used indigenous forest species which are harvested from the wild, such as *Piper guineense*, used as a spice and as an ingredient for herbal medicine; *Tetrapleura tetraptera*, (prekese), the fruits are commonly used in flavoring; *Xylopia aethiopica* or Ethiopia pepper (hwentea), the seeds are used as spice and a substitute for pepper; *Monodora myristica* (Calabash nutmeg), the seeds are used as condiment in soup or as seasoning; *Aframomum melegueta* (grain of paradise); and *Parkia clappertoniana* (Dawadawa), the leaves have several uses, used mainly to season food.

Several of Ghana’s wild species are potentially useful in plant breeding programs, for example, wild cowpea species, such as *Vigna reticulata*; wild yam, wild oil palm, most medicinal plants, and mahogany. Many of these are in danger of being lost due to bush-fires, forest clearing for agriculture, deforestation due to illegal logging and legal extraction, and overgrazing by livestock. While some wild species have been collected for preservation, many have not. Ghana’s medicinal plants, found in the wild, are listed in Annex 7.

Landraces and Old Cultivars

Landraces are the main sources of planting material available to most farmers; very few farmers have access to improved varieties.

Ghana is the center of origin for several crops; for example, *Dioscorea cayenensis*, (yellow yam), *D. dumetorum* (bitter yam), and *D. rotundata* (white yam). The germplasm of these has been conserved *ex situ* in the crop garden at the Plant Genetic Resources Center (PGRC) at Bunso. Germplasm of certain local pulses has also been conserved at PGRC. Among the cereals, the most popular landraces are maize, rice, millet and sorghum. Hungry rice (*Digitaria exilis*) is found in Ghana and endemic to the Bimbila area.

Ghana has many indigenous vegetables: *Amaranthus* spp, *Celosia argentea* (Lagos spinach), *Cucumeropsis edulis* (Egusi), *Telfairia occidentalis* (Fluted pumpkin), *Trichosanthes cucumeropsis* (Snake gourd), *Abelmoschus esculentus* (Okra), *Solanum* spp, *Corchorus olitorius* (Jew's mallow), and *Vernonia amygdalina* (Bitterleaf). Additional information on these and many others can be obtained from PROTA 2 (Grubben and Denton 2004)

Ghana has some indigenous crops that are commercially important: oil palm, which grows mainly in the forest zone, is the source of red palm oil used in soap-making, is used by Ghanaians to make palm-nut soup, and has many other uses; shea nut (*Vitellaria paradoxa*) is the source of shea butter used in many skin creams locally and for export; cashew (*Anacardium occidentale*) is an important non-traditional export good; and kola (*Cola nitida*), the fruits are eaten and it has special significance to Muslims. Apart from oil palm and cashew, which are grown on plantations in Ghana, the shea nut and kola are harvested from the wild and therefore are at risk. Kola, for instance, grows in the tropical rainforest and shea nut grows in the Guinea savanna and both vegetation types are affected by human disturbances and bushfires.

Institutions involved in Genetic Resource Conservation

(1) Aburi Botanical Gardens conserves wild varieties of native plants and introduced species.

(2) The Kumasi and Accra Zoos, although funding is extremely limited, are sources for ex-situ conservation, especially in breeding threatened Ghanaian species. They also provide educational resources for urban populations, whose only opportunity to see wildlife may be at the zoo or in markets, where they are sold as bush meat.

(3) Council for Scientific and Industrial Research Centers (CSIR): The following are affiliated with CSIR and are important for genetic biodiversity conservation:

- Established in 1964, the main institution in Ghana mandated to carry out plant genetic resources activities is the PGRC, based at Bunso in the Eastern region. The PGRC collects plant genetic resources throughout the country and sometimes in neighboring countries, and characterizes, evaluates, conserves, distributes, and documents plant genetic resources.
- Crop Research Institute, Horticulture Division, Kumasi: Research on fruit, cashew, vegetables, cereals, and legumes. The Horticulture Division is responsible for the development of new varieties and promoting appropriate technologies to farmers.
- Savanna Agricultural Research Institute (SARI), Tamale: Conducts research on cereals, legumes, vegetables, etc. with a focus on the northern region of Ghana.

(4) The Cocoa Research Institute of Ghana, New Tafo: Research on cocoa productivity

(5) Forestry Research Institute of Ghana, UST Campus, Kumasi: Research on forest species, timber production, timber tree entomology, etc.

(6) International Institute of Tropical Agriculture, Kumasi: A CGIAR organization

(7) Palm Research Institute, Kade. Ghana Ministry of Agriculture, Coconut Disease Project, research on oil palm, coconuts, entomology

4.3 Economic Value of Biodiversity

Biodiversity has economic value as a source of bush meat; tourist attractions (including zoo and park visits); use in traditional medicine and cultural practices; as live animals exported for the international pet trade; as plant and animal products exported for the pharmaceutical industry; as a source of food, craft, and building materials, and other items used in rural households (The Environment and Development Group, 1998).

For the preparation of the Wildlife Development Plan, these uses were quantified, and a value of US \$292 million annually was placed on the contribution of biodiversity to the economy. Bush meat accounted for 94 percent of the entire value.

The value of biodiversity established for the Wildlife Development Plan did not take into account environmental services, such as erosion control, sustainable water supplies, regulation of climate/carbon sinks, and flooding; and it did not take into account the value of timber in standing forests. The costs associated with wildlife and PAs were also not calculated. In addition, environmental services and other inherent costs and benefits of biodiversity are not considered in the country's national accounts.

4.4 Cultural Importance of Biodiversity

Nature is important in Ghanaian culture, and this is reflected in a variety of ways. The status of chiefs is guaranteed under the 1992 Constitution and traditional leaders are a significant force in Ghanaian society. Traditional authorities have often imposed “traditional closed seasons” to give respite to resources and allow them to recover from hunting or collecting pressure. In some areas, hunting or fishing is taboo for certain periods prior to the celebration of annual festivals or sacrifices. The role of traditional leaders is key for wildlife conservation, especially since wildlife is considered communal property.

Traditional beliefs also protect sacred groves, royal burial grounds, sacred rivers, and totem and taboo species. For example, communities have established about 2,000 sacred groves in Ghana, small patches of forest or woodland, usually located near human settlements, declared sacred based on religious and traditional beliefs. For all sacred groves, it is prohibited to cut trees, but many of the groves have shrunk in size due to human interference. Many of the remaining sacred groves contain key biodiversity, and can be used as entry points for biodiversity conservation (EPA, 2002).

A report by CI Ghana (undated) identified over 200 totems, and found that about 98 percent are endangered, threatened, or extinct. This report describes totemism in Ghana as follows: almost every traditional ruler, Chief, or King, members of a clan or tribe and even the entire nation has a totem—the tawny eagle. In the totem system, a relationship exists between the group and certain animals or plants, which are regarded as totems, and members of the group do not eat, kill, or trap these animals. When a totem animal or plant dies, members of the group it represents mourn and bury it as if it were human. If the animal totem is captured alive, a ransom is offered to secure its release back into the wild. “The totem system protected the totem species and those associated with them. Thus it was an early and very effective form of conservation” (CI, undated).

Box 2: Significance of Some of Ghana's Totem Species

In the Agona Traditional Area, the fruit bat is the main totem because it symbolizes diplomacy, an attribute that is highly regarded among the Agona people. In the Abura Traditional Area, the elephant is the main totem. The Abura people were great warriors and they equate their strength to the elephant's. The Anombao Traditional Area has the gray parrot as the totem because they believe the parrot introduced their ancestors to the palm nut as an edible food. In the Dorimon Traditional Area, the leopard is the only totem of the Dorimon people, and is a symbol of unity, bravery, and courage, and protected their ancestors. Leopards are endangered but can still be found in this area, in the Upper West Region (CI, undated).

Traditional institutions—chiefs, religious leaders, and lords of the land, oversee the physical and spiritual protection of water bodies, often in collaboration with unit committees and DAs (van Edig et. al., 2003). Management measures mainly cover waste disposal, animal watering upstream, washing of cars, and fishing practices. Traditional authorities exert even more control over water rights. In some villages, chiefs “own” the water as custodians for the people (van Edig et. al., 2003), and directly or indirectly administer the rights to water and to fishing.

4.5 Sources of Biodiversity Information

Ghana has prepared several national reports describing biodiversity resources and status of biodiversity conservation. Some of Ghana's national level reports are:

National Level Documents prepared by EPA: State of the Environment Report-2002, 2004; National Environmental Action Plan; EPA's Annual Reports 2001 to 2004; National Action Programme to Combat Drought & Desertification; First Initial National Report on Climate Change; SEA of the GPRS

Documents prepared by the Ministry of Environment and Science: National Biodiversity Strategy (2002); First, Second, and Third National Reports (in accordance with the CBD)

National Level Documents prepared by Forest Commission: Forest Inventories (various); Forestry Development Master Plan, 1996

National Level Documents prepared by the Wildlife Division: Wildlife Development Plan

World Bank Country Environmental Analysis

While for certain topics there is a wealth of information, for others, up-to-date information is deficient. For example, while there is data on wildlife populations for most wildlife PAs, many surveys were conducted in the 1980s and 1990s, and now much of it is dated. Quantitative data on wildlife populations outside of PAs is scanty (pers. comms., WD staff, Sept. 2006). There are no regularly scheduled wildlife censuses carried out in the wildlife PAs.

According to the CEA (draft, 2006): the FC produces no annual reports on the state of forests or on the loss of biodiversity in FRs; the FC website offers limited information on

the state of the resource and publications and reports are difficult to come by; GIS and satellite imaging tools are not used to their full potential; and the most plentiful and available data is on timber trade statistics, reflecting FC priorities.

There is little monitoring information available on the state of forests in Ghana, and according to an individual interviewed, the FC removed a document from the FC website which indicated the rapid rate of forest degradation. However, civil society, led by a coalition of NGOs (Forest Watch-Ghana), is lobbying for greater transparency in the FC.

In 2001-2002, FC conducted a forest wildlife survey, which, for the first time, quantitatively surveyed wildlife used as bush meat. Previously the status of wildlife used for bush meat had been derived from qualitative records from the early 1960s to 2001, and these allowed biologists to assume that numbers had been much higher (Tutu et. al., 1996). Information passed along from generation to generation also has allowed qualitative judgments about the decline in wildlife abundance.

GWS conducts annual censuses of marine turtles, as funding allows. Along the coast in the western part of Ghana (Western and Central regions), census information is collected by local people, and information is available through 2006; however along the coast in the eastern part of Ghana (Eastern region), GWS had to discontinue the annual census because of a shortage of funds (pers comms, GWS, Sept, 2006).

Other quantitative wildlife surveys are the 1989 elephant census by the IUCN African Elephant Specialist Group; and 1995 hunter interviews by the Ghana Association for the Conservation of Nature.

From the experience of the ETOA Team, published information is readily shared in Ghana, however many reports that are supposed to be on the Worldwide Web are not actually found there; and hard copy reports—even relatively recent ones—are often rare and unavailable.

5.0 Institutional and Political Context for Biodiversity Conservation and Tropical Forests

5.1 Institutions, Policies, and Laws Affecting Biodiversity Conservation

5.1.1 Institutional Landscape

The following are the key GOG institutions involved in biodiversity and forest management and conservation (see Section 4.2.5 for institutions that work in the area of agricultural diversity). Annex 8 contains descriptions of GOG institutions that are indirectly involved in biodiversity and forest conservation.

a) Fisheries Commission: regulates and manages fishery resources and coordinates policies; ensures conservation of the resource by preventing over-fishing; minimizes fishing gear conflict among users; monitors fishery waters; promotes sub-regional, regional, and international cooperation in fisheries management; carries out research and surveys; correlates fisheries with other water uses and environmental protection; and enforces fishery laws in collaboration with DAs. Funds to support the Commission come from fees for licenses and permits for fishing; damages and costs granted by courts; fines received for offences; proceeds of sale of forfeited items; Government budget; and loans and grants.

b) Forestry Commission: Part of the Ministry of Lands, Forestry and Mines (MLFM), it was established by Act 405 (The Ghana Forestry Commission Act, 1980). With a staff of about 2,000, reduced from 2,600 in 2003, the FC oversees sustainable development and management of Ghana's forests and wildlife. The FC has the following operational divisions: 1) Forest Services Division implements forest policy, forest management strategies, and compliance with forest regulations. It ensures sustainable harvesting plans for private sector logging in Ghana's FRs (including fuel wood plantations). The FSD is divided into the Collaborative Forest Management (CFM) Unit, see below; Plantation Development; Resource Utilization; and Forest Protection. 2) Timber Industry Development Division provides support to the timber industry, including road checks of vehicles carrying timber to ensure it has been harvested legally. 3) Wildlife Division (WD), see below; 4) Wood Industry Training Centre offers training to improve operations of wood processing mills; 5) College of Renewable Natural Resources; 6) Resources Management Support Centre; and 7) Forestry Commission Secretariat.

b.1) CFM Unit, FC: formed in 1993 to develop and institutionalize CFM. The CFMU implemented a three-year International Tropical Timber Organization (ITTO) sponsored project, "Piloting Collaborative Systems in Off-Reserve Forest Areas in Southern Ghana" (1997-2000). One outcome of this project is the Community Forest Committees, which help ensure equitable partnerships between communities and other stakeholders. These community level committees have spurred other similar committees at community level: Sacred Grove Management Committees and Community Biodiversity Advisory Groups. The CFMU is the focal point for Ghana's participatory forest management initiatives.

b.2) Wildlife Division: Manages PAs, wetlands (Ramsar sites), Accra and Kumasi Zoos, and also has responsibility for wildlife outside PAs. WD areas of focus are: 1) Community Participation, which includes the Collaborative Resources Management Unit

of the WD, responsible for overseeing Community Resource Management Areas (CREMAs), the key wildlife management system outside PAs. The CREMA approach started with two pilots, at Ankasa and Bia. 2) Economic Development of Wildlife Resources with the goal of maximizing the contribution of wildlife to Ghana's economic development; 3) PA Management aims at ensuring effective management of PAs. 4) Public Awareness and Education to gain universal support for wildlife conservation.

Box 3: Benefits and Drawbacks of the CREMA

(From CRMU, 2004): **Benefits** of a CREMA: Improved environmental security and land use practices by farmers; improved incomes for farmers; improved security for PAs; greater participation by all sectors in the community in decision making process, promoting good governance; greater understanding by farmers of the importance of natural resources in farm management; strengthening local decision making structures and the ability of communities to make collective decisions; empowerment of communities to control access to resources; improved linkages among communities, the WD, District Assemblies, and Traditional Authorities; opportunity for WD to initiate a process where wildlife and natural resource management develop into a significant industry; opportunities for development of secondary and tertiary industries at local level such as tourism and tourism support services. **Drawbacks**: Failure to correctly identify local decision making structures could result in a powerless CREMA; communities that are deeply divided over issues may not be able to develop sufficient consensus to form a CREMA; and the CREMA approach is a process and especially in the early stages requires time, technical support, and funding.

c) Ghana Environmental Protection Agency (EPA): Among other responsibilities, EPA ensures compliance with EIAs; prescribes standards for pollution of air, water, land, and other environmental pollution; promotes studies, research, surveys, and analyses for the improvement and protection of the environment and maintenance of sound ecological systems; and regulates pesticide registration, sales and disposal.

d) Forestry Research Institute: The mission of the Institute is to conduct high quality, user-focused research that generates scientific knowledge and appropriate technologies which enhance the sustainable development, conservation and efficient utilization of Ghana's forest resources; and also to disseminate the information for the improvement of the social, economic and environmental well-being of the Ghanaian people. Among its objectives are the following which are of direct relevance to biodiversity conservation: to develop technologies for sustainable management of natural forests and biodiversity conservation; and to enhance sustainable management and use of NTFPs.

5.1.2 Legal-Policy Landscape. The following are the most important policies and legislation governing biodiversity conservation and NRM:

Wildlife and Forests

1) Timber Resources Management Act, No. 547 of 1997; Timber Resources Management Regulations, 1998 (LI 1649), as amended by the Timber Resources Management Amendment Regulations, 2003 (LI 1721). The most recent attempt at legislative reform in the forest sector, aims to ensure that harvesting is consistent with the sustainable management and use of timber resources. This Act and its regulations describe marking of trees, logs, and timber products; registration of chainsaws; and introduced timber utilization permits (TUP) and timber utilization contracts (TUC).

2) 1996 Forestry Development Master Plan: guides execution of the forestry policy to 2020.

3) Forest and Wildlife Policy, 1994: The overall aim is the “conservation and sustainable development of the nation’s forest and wildlife resources for the maintenance of environmental quality and perpetual flow of benefits to all segments of society.” The policy recognizes the role of local communities and indigenous knowledge in the conservation of forest and wildlife resources, and gave the FC responsibility for control of off-reserve cutting of trees.

4) Collaborative Community-Based Wildlife Management Policy, 2000: aims to devolve management authority to user communities and encourage participation of stakeholders in conservation and sustainable use of wildlife to provide a flow of benefits to society. This policy introduced the CREMA concept and strategy.

5) Wildlife Conservation Policy, 1974: Formal conservation of wildlife began in the colonial era (1909) when the first game reserves were established within the Forestry Division. The first wildlife laws were promulgated in 1901. In 1961, the Wild Animal Preservation Act (Act 43) was passed to protect wildlife by conserving representative samples of Ghana’s ecosystems. The 1974 policy recognizes the socioeconomic and cultural importance of wildlife, the need to meet the demand for bush meat, and the importance of engaging local communities in PA management.

6) Wildlife Conservation Regulation, 1971 (LI 685) provides a system of permits and certificates for regulating international trade in TES, in line with CITES. It is the main instrument under which endangered species can be legally protected.

Fisheries, Wetlands, Coastal, Marine

1) Fisheries Act, 2002 (Act 625): Provides for the regulation and management of fisheries, the development of the fishing industry, and the sustainable exploitation of fishery resources.

2) National Wetlands Conservation Strategy, 1999 comprises 12 program areas, covering conservation and sustainable use, for which action plans still need to be developed.

3) There are numerous laws and regulations covering protection of coastal and marine resources: Maritime Zones Law, 1986; Town and Country Planning Ordinance; The Towns Ordinance; National Building Regulations, 1996; EPA Act and regulations; Local Government Act, 1999; and Oil in Navigable Water Act, 1964.

Land

1) National Land Policy, 1999 aims to protect a variety of habitat types, and states that all lands declared as FRs, strict game reserves, national parks, wildlife reserves, and similar land categories are fully protected for ecosystem maintenance and biodiversity conservation.

Decentralization

1) 1993 Local Government Act, Act 462 gives local authorities the responsibility for overall development of their areas of jurisdiction, including improvement and management of human settlements, management of solid waste, and other environmental issues.

Environmental Impact Assessment/Environmental Issues

1) Environmental Protection Agency Act, 1994 (Act 490), regulations and amendments: describe the responsibilities of the EPA, the creation of the National Environment Fund, and includes enforcement of regulations.

2) National Environmental Action Plan, 1991: The NEAP was the first coordinated approach to the management of the environment (EPA, 2002). The Ghana Environmental Resources Management Project was the implementation mechanism for the NEAP, and was supported by the World Bank, DANIDA, ODA, and the GOG, coordinated by EPA.

Desertification

1) National Action Plan to Combat Drought and Desertification covers the following areas, and stresses integration among the different fields: land use and soil management; management of vegetation cover; wildlife and biodiversity management; water resources management; rural infrastructure development; energy resources management; and improved socio-economic environment for poverty reduction. A National Desertification Committee is responsible for implementing the NAP.

Mining

There are 13 laws and ten subsidiary legislations governing mining activities. According to Article (6) of the Constitution of the Republic of Ghana and Section 1 of the Minerals and Mining Law (PNDC 153), every mineral in its natural state in, under, or upon any land in Ghana, rivers, streams, water courses throughout Ghana, the exclusive economic zone and any area covered by territorial waters or continental shelf is the property of the Republic of Ghana and is vested in the Government for and on behalf of the people of Ghana. No person can conduct reconnaissance of, prospect for, or mine any mineral in Ghana unless he has been granted a mineral right by the Minister of Lands, Forestry and Mines on the advice of the Minerals Commission in the form of a license or lease.

Genetic Resources

1) Traditional Medicines Practices Act (Act 575 of 2000): The first of its kind in Africa, it legitimizes traditional medicines and healers but also may place more pressure on medicinal plants; most of the plants are harvested from the wild, and sustainable harvesting and cultivation have not been a significant focus.

2) ACT 307 of 1965 regulates the importation and exportation of plant genetic resources. This law established the Plant Protection and Regulatory Services Department within the Ministry of Food and Agriculture, which enforces quarantine regulations.

Tourism

1) Tourism Policy: The aim is to develop tourism as a leading socio-economic sector and make Ghana a competitive tourism destination within the framework of respect for the country's cultural, historical, and environmental heritage. The policy states that the socio-economic benefits of tourism must be distributed widely across the country.

5.1.3 Assessment of Effectiveness of Institutions and Legislation Governing Biodiversity

Most of the conservation professionals the ETOA Team interviewed and the reports reviewed agree that the legal framework for conservation is adequate, but that enforcement is limited. Most also agreed that enforcement is constrained mainly by funding, staff, and other logistical resources. Many of those interviewed also stated that when there is a conflict between development and conservation, development usually wins, a sentiment most often expressed in relation to EIA effectiveness (EPA mandate), which cuts across sectors. While logistics and the economics of development versus conservation play a role, the situation is more complex, and it is described further in Section 7.1, Threat #1.

WD's management of wildlife resources outside PAs had been mainly geared to regulating hunting and even in that role, their effectiveness has been limited because of lack of staff presence. The CREMA concept stems from the ineffectiveness of "command and control" type operations, especially outside PAs. WD has therefore come to view civil society as partners in their effort to conserve wildlife, and through the CREMA, offers opportunities for communities to receive benefits from the resource.

There is little coordination among the many acts governing the coastal and marine zones for effective conservation to take place. The lack of effective EIA, lack of commitment by politicians to conservation, and the pressure to develop versus to conserve are the main reasons why legislation has been ineffective. .

Fisheries regulations are difficult to enforce because of Ghana's long coastal zone and the limited number of fisheries professionals and logistical resources. The fisheries sector is also moving towards a co-management approach so that civil society can share in the enforcement of regulations since "command and control" has largely been ineffective.

Wetlands are managed collaboratively with local communities, and sustainable use is allowed. However, the most significant impacts to wetlands are from development and pollution. Therefore, while communities may be trying to protect their wetland resources—where there is potential for them to benefit from sustainable use of the resource, impacts of pollution and inappropriate development continue to erode the coastal and inland wetland resource. These impacts are mostly the result of medium and large-scale enterprises, many with political influence, and communities are usually powerless in the face of this influence.

Regulating the mining industry poses significant problems since small-scale and artisanal operators are so numerous and mobile, and are often in areas that are difficult to reach. Large-scale mining concerns are highly visible, and in recent years have moved towards

greater compliance with environmental regulations and also include social responsibility packages. However, due to the location of many of the mineral resources, in forests and in other biodiverse areas, significant impacts of large-scale mining may be impossible to avoid.

The PA system and its legal framework are described in Section 5.2, and the legal framework covering forestry is discussed in Section 5.3.

5.2 Legal Framework: Protected Area (PA) System

5.2.1 Description of Ghana's PA System

Figure 6 (Annex 11) contains a map of Ghana's PA System.

Ghana's *Wildlife* PA system is managed by WD and is comprised of: National Parks (7), Resource Reserves (6), Wildlife Sanctuaries (2), Community Sanctuaries (2), a Strict Nature Reserve (1), and a Biosphere Reserve (1). Wildlife PAs (see list in Table below) cover 14,695 km² (five percent of Ghana's land area). In wildlife PAs, the capture, hunting, or destruction of any animal is prohibited. The chief game and wildlife officer can grant authority to collect flora and fauna from reserves, but this is usually only granted for scientific purposes.

Mole is usually considered the flagship park and has 93 species of mammals and over 300 species of birds (World Bank, 2002). The only Biosphere Reserve in Ghana, Bia National Park and Bia Resource Reserve, make up a twin conservation area located in the transitional zone between moist-evergreen and moist semi-deciduous forest types. Sixty-two species of mammals have been recorded: ten primates, including the Black and White Colobus, the Olive Colobus, Red Colobus monkeys and chimpanzees; the forest elephant and the highly threatened bongo are present; and over 160 species of birds have been recorded, including the internationally endangered white-breasted guinea fowl (http://www.fcghana.com/eco_tourism/bia.htm).

Protected Area Management Advisory Units/Boards serve as the link between WD and communities and have input into PA management—this initiative by WD has established a communication link between WD and communities, and has helped to improve attitudes of local people to PAs.

Ghana is privatizing certain activities in national parks, for example, in 2002 RHS Associates produced a Tourism Development Plan for Mole National Park that describes increasing and improving tourism facilities, such as accommodation, road infrastructure and attractions. The Plan includes the privatization of the motel and construction of new lodges; a concessionaire has been chosen, through a transparent, competitive process, to undertake the upgrade and to manage the accommodations.

Table 4: Protected Areas, Ramsar Wetlands, and Ex-situ Biodiversity Sites (adapted from Pleydell 2005):

Protected Area	Ecosystem type	Gazetted	Size (km ²)
Mole National Park	Woodland savannah	1971	4840
Digya NP	Transition zone	1971	3478

Bui NP	Woodland savannah	1971	1821
Gbele Resource Reserve	Woodland savannah	1975	565
Ankasa Nini Suhien NP	Moist forest	1976	490
Kogyae Strict Nature Reserve	Moist forest	1971	360
Kyabobo NP	Woodland savannah	2005/6	360
Kakum NP/Assin Attandanso Reserve	Moist forest	1991	350
Kalakpa Resource Reserve	Woodland savannah	1975	320
Bia National Park and Bia Resource Reserve	Moist forest	1974/1977	300
Bomfobiri Wildlife Sanctuary	Forest	1975	53
Shai Hills Resource Reserve	Coastal savannah	1971	49
Owabi Wildlife Sanctuary	Inland Ramsar wetland	1971	13
Boabeng-Fiema community forest			4
Agumatsa Wli community forest			3
Ramsar coastal wetlands (not part of the PA estate)			
Densu Delta		1999	
Keta Lagoon Complex		1999	
Muni-Pomadze		1999	
Sakumo		1999	
Songor		1999	
Owabi (inland wetland)			
In-situ conservation			
Aburi Botanical Gardens and Arboretum (administered by Department of Parks & Gardens)		1890	65 hectares
Accra Zoo (houses the Centre for Endangered Species, supported by the West African Primate Conservation Action Group) Zoo to be closed and animals moved to Kumasi Zoo			
Kumasi Zoo			

Ghana's PA estate (the entire PA system versus *wildlife* PAs) also encompasses GSBAs, jointly managed by FC and WD. Ramsar-designated wetlands are not formally considered PAs.

Wetlands covered by the International Convention on Wetlands (Ramsar sites) are managed for conservation within a multiple land use framework. Ghana's Ramsar sites are managed in collaboration with the WD and a local Site Management Committee consisting of local stakeholders including chiefs, DAs, community-based organizations (CBO), and other interested parties. Ramsar sites allow human activities that can be undertaken in harmony with conservation.

There are 34 GSBAs, covering over 120,000 hectares. These are areas designated as FRs, but excluded from timber harvesting and other extractive uses, due to their importance for biodiversity conservation. Certain activities are allowed in some of the forests, while

others are purely for protection. GSBAs are found in the high forest zone and in the southern dry forest. Community participation is a key component of management of GSBAs and Community Biodiversity Advisory Groups have been formed in some of the adjacent communities as local representation in GSBA management.

5.2.2 Assessment of the Effectiveness of Ghana's PA System for Biodiversity Conservation

Wildlife PAs are found throughout Ghana, in coastal and northern savanna, forest, and transition zones. Including wetlands, the PA estate overlaps with much of the CI biodiversity hotspot area. One of the only significant gaps in coverage of the "hotspot" was in the Togo Highlands, but Kyabobo was established during 2005/6 and filled this gap. However, there are still ecosystems that are under-represented: inland wetlands, mangrove forests, peat swamps, and freshwater swamps (MES, 2002). Importantly, marine resources receive only minimal protection—there are no marine reserves, and protection is only through fisheries and endangered species (CITES) legislation.

While certain ecosystems may be under-represented, there may be greater cost than conservation benefit in retaining some PAs. Some stakeholders mentioned that the PA system should be evaluated and possibly restructured based on WD's capacity to manage sites. This could have political and conservation ramifications, and to date, no one is seriously proposing this.

Management of wildlife PAs is primarily constrained by limited data and logistical resources—human and financial. A constraint often mentioned by those interviewed is that while conservation is a long-term effort, budgets do not allow WD to plan on a long-term basis since the budgets are derived annually. In addition, wildlife does not get the political attention that other sectors get, and it is not held in high regard among decision makers.

Ramsar status confers a degree of visibility on those wetlands, but they remain threatened, as described, by unsustainable use, inappropriate development, and pollution. Undesignated inland and coastal water bodies are often in poor condition. The 2002 National Biodiversity Strategy makes note of Chemu and Korle lagoons, and their "near lifeless water systems whose biological composition is currently questionable."

GSBAs and CREMAs are innovations that could provide improved protection and conservation of Ghana's areas of high biodiversity importance. The participatory management approach in the GSBA and CREMA schemes can provide benefits to adjacent communities most affected by wildlife and/or the PA, and help build advocates for conservation and models for sustainable use.

5.3 Legal Framework: Forestry

From the national forest inventory in 1986, FRs were classified into distinct areas based on their condition. Table 5 shows the amount of land in each FR category (does not include GSBAs). The FR permanent protection areas consist of hill and swamp sanctuaries, shelterbelts, special protection areas, intact forest sanctuaries, and fire

protection areas (these areas are sometimes included in the overall PA estate). Convalescence areas have reduced stocking, but are considered capable of rehabilitation within one felling cycle. Conversion areas require planting. Timber production areas are forests that are being harvested. Intact closed canopy forest outside the permanent forest estate, and available for timber production, is about 374,000 hectares; plantation forests cover about 50,000 hectares (FAO, 2003).

Table 5: Forest Resources

Forest type	Area (ha)	%
Timber Production Area	762,400	41
Permanent Protection	352,500	17
Convalescence	122,000	5.5
Conversion	127,200	6
Not inventoried (conversion)	270,000	12
Intact closed forest, available for timber production	374,000	16
Plantation forests	50,000	2.5
Total Reserve Area	1,634,100	100

Source: Revised from FAO, Introduction and Status of the Forestry Sector in Ghana, 2003

Harvest levels are regulated by an annual allowable (AAC) cut set each year by the Forest Services Division. Since 2002, the AAC has been set at 1.4 million m³, an increase of 400,000 m³, which will mainly come from off-reserve areas (Oliver and Fripp, 2005).

The 1996 Forestry Development Master Plan (FDMP) introduced TUCs, an auction process for allocating concessions which ensures transparent, competitive bidding, replacing the old system of concession allocation, which was largely viewed as supporting vested interests in the timber industry. Technical and political problems delayed the introduction of TUCs, and finally in late 2003, bidding began for TUCs in plantations, and in 2004 in natural forests. However, most concessions have yet to be transformed to TUCs.

Besides the more transparent process, there are other positive elements to the TUC: they require that a forest management plan is developed; plans for minimizing impacts must

be included; and Social Responsibility Agreements (SRA) are required which aim to expand the benefits of forestry.

Ghana's off-reserve timber resources were estimated at 400,000 hectares in 1993 (Oliver and Fripp, 2005). TUPs were to be used for harvesting off-reserve, on areas that were identified in consultation with landowners, and the timber was to be used for community development. However, due to misuse of TUPs, for example, selling the permit to timber companies, and selling the wood for purposes other than community development, the FC stopped issuing TUPs.

About 50 species of wood are exported. Wawa is the dominant export species, and ceiba is the second largest export. Plantation timber species, such as teak, Cedrella, Gmelina, and Rose Wood, have become more important in the export trade in recent years.

In 1995 the Ministry of Lands and Forestry suspended export of logs with the intention of encouraging value-added processing in Ghana and a more sustainable off-take. The ban remains in force, although there is fierce lobbying from the timber industry to remove it. The ban has been successful in that Ghana has been able to develop value-added industries. Secondary products include sawn lumber, plywood, and veneers, and earned almost US\$100 million in 2003. Tertiary products include moldings, flooring, furniture parts, profile boards, dowels, and broomsticks.

Currently, there are no certified forests or timber operations in Ghana. The World Wildlife Fund (WWF) is working with the Global Forest Trade Network (GFTN) to move two companies (Samartex and JCM) towards certification, and although the companies have progressed in their attempt to become certified, very few in the forest sector believe certification is imminent. In this regard, the EU initiated a program, the Voluntary Partnership Agreement (VPA) wherein timber producing countries that have illegal logging problems can get assistance from the EU through the VPA if the country shows that it is addressing these problems. The VPA can especially assist with governance issues and trade. According to Forest Watch-Ghana, Ghana is among the few countries expected to enter into negotiations for a VPA: In October 2003, the GOG made a public commitment to negotiate a VPA with the EU to ensure the sustainability and legality of timber being exported to the EU. However, nothing happened until 2005, when DfID was authorized by the EU to assist Ghana's preparations towards negotiations. This effort is ongoing.

The forestry sector (like the mining sector) is impacted by a dual land tenure system—the traditional and the modern systems (Section 7). In general, benefits that might accrue to communities from the use of their forests often end up in the hands of the traditional authorities, and this can derail CBNRM initiatives, which rely on equitable benefit sharing.

5.3.1 Deforestation Rate

Degradation and loss of the forest resource takes place on and off-reserve. Off-reserve, loss is mainly due to expansion of farming (especially cocoa) and demand for timber.

On-reserve, degradation has accelerated dramatically in the last decade, and is mainly due to over-logging by timber companies, encroachment for alternative uses, illegal logging, and bushfires. Deforestation largely stems from inadequate implementation of the legal framework: the FC has, in large part, been unsuccessful in addressing over-exploitation and other threats to forest resources.

The most widely cited and used deforestation rate comes from the U.N. Food and Agriculture Organization model. The MLFM provides the data for the model. The 2005 rate according to the FAO estimate was 1.7 percent; for several years prior to 2005, the deforestation rate was 1.3 percent. Currently, Ghana loses about 22,000 hectares of forest/year (MES, 2002) in the forest zone of the country, while for the entire country, the deforestation rate is 65,000 hectares/year (GFC, 2002). According to <http://rainforests.mongabay.com/deforestation/2000/Ghana.htm> (which derives forest sector information from the FAO's Global Forest Resources Assessment, 2005 and the State of the World's Forests, 2005, 2003, 2001), between 1990 and 2005, Ghana lost 25.9 percent of its forest cover, around 1,931,000 hectares.

The CEA (in draft, 2006) states that the deforestation rate of 65,000 hectares/year plus the resulting habitat loss and species extinctions, translates to an annual cost of degradation of about 3.5 percent of Ghana's GDP.

5.3.2 Assessment of Effectiveness of Forestry Legal Framework

The legal and institutional framework covering the forestry sector is considered to be good. As in other NR sectors, implementation is deficient. However, the reality may be more complex; the commercial forest sub-sector has a history of being led by vested interests and industry lobbying, and has been known to wield significant political influence.

The picture for commercial forestry may be changing with implementation of the TUC, increased stumpage fees, which will provide a more sustainable funding mechanism for FC, a new log tracking system, and improved benefit sharing. Constraints still exist: TUC conversion has been slow, but the GOG recently committed once again to support TUCs. Insufficient capacity and staff incentives also limit the effectiveness of legislation, but a new human resources policy based on performance may alleviate this constraint. Illegal chainsawing has remained a problem, and the FC is still grappling with this.

Civil society has become more involved in the forestry sector, and this is helping to move the FC to greater accountability and transparency. A new FC Board was recently elected, and Forest Watch-Ghana, an advocacy-umbrella group, was invited to one of the first meetings. .

5.4 Legal Framework: Endangered Species Protection

5.4.1 Laws Protecting Threatened and Endangered Species (TES)

A list of Ghana's species on the IUCN Red List is included in Annex 6.

Ghana is a party to CITES, and as stated in Section 5.3.2, Wildlife Conservation Regulation, 1971 provides a system of permits and certificates for regulating international trade in endangered and threatened species.

Over 50 animal species are exported from Ghana. The most common are the royal python, Bosc's monitor lizard (*Varanus exanthematicus*), the scorpion (*Pandinus imperator*), chameleons (*Chamaeleo senegalensis* and *Chamaeleo gracilis*), and the red-headed agama (*Agama agama*). Twenty-one wildlife exporters are registered in Ghana.

5.4.2 Assessment of CITES implementation and effectiveness

According to WD, implementation of CITES is considered adequate: in interviews, WD staff claimed that there is insignificant illegal trade in TES originating inside or from outside Ghana, and WD has sound regulatory controls using CITES permits. While this holds true for wildlife that passes through the Accra airport and major sea ports, there is much less known about overland trade at Ghana's borders. Customs officers at the borders with Togo, Cote d'Ivoire, and Burkina Faso are largely unaware of CITES requirements (pers comms., Sept. 2006). Data is inadequate to determine the extent of illegal trade that occurs at the borders of Ghana, especially with Cote d'Ivoire and Togo.

5.5 Participation in International Treaties

Ghana is a party to the following international treaties and conventions:

- Convention on Biological Diversity (CBD), Rio de Janeiro, 1992
- Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979
- Convention for International Trade in Endangered Species of Fauna and Flora (CITES), Washington, 1973
- Convention of Wetlands of International Importance, especially as waterfowl habitat (Ramsar)
- Convention to Combat Desertification (UNCCD)
- African Convention of Wildlife Conservation
- International Tropical Timber Agreement (ITTO), Geneva, 1983
- The African Convention on the Conservation of Nature and Natural Resources, Algiers, 1968
- Convention concerning the Protection of the World Cultural and Natural Heritage, 1972
- Member of FAO Commission on Plant Genetic Resources and adheres to the International Undertaking on Plant Genetic Resources
- African Regional Seas Conventions: Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region
- Montreal Protocol/Global Warming: Ghana became a signatory in July 1987 and subsequently a signatory to the Framework Convention on Climate Change in June 1992.

5.5.1 Overview of Ghana's Capacity to Implement Obligations

CBD: Ghana has prepared a National Biodiversity Strategy (2002) to determine priorities and the direction of biodiversity management in the country. The Plan focuses on improving scientific knowledge in Ghana and the identification of potential threats and how these could be controlled. Ghana submits their Biodiversity National Reports, as required by the CBD; and has begun a review of the status of implementation of the CBD at the national level.

UNCCD: A National Committee on Desertification has been formed and a National Action Plan on Desertification has been prepared. Funding has been raised for some of the activities, but for many, lack of finances is a significant constraint.

Ramsar Convention: Ghana has been signatory to the Ramsar Convention since 1988. Under the Convention, Ghana has an obligation to ensure that wetlands resources are sustainably used “for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem.” In fulfillment of this obligation, Ghana has integrated wetland issues into the National Land Use Policy. The Government of Ghana sees its role in wetlands management as best performed through partnerships and cooperation with local people, NGOs, and the private sector.

CITES: See Section 5.5.2

In general, implementation of international treaties suffers from the same constraints as implementation of national conservation initiatives, limited funding and limited logistical resources. In some cases, there is also limited political commitment to implement. However, many of the conventions have been the basis for Ghana’s own legal framework covering conservation.

6.0 NGO and Donor Programs: Biodiversity Conservation and Tropical Forests

Detailed descriptions of the main NGOs working on biodiversity and tropical forest conservation in Ghana are in Annex 8. Table 6 contains brief descriptions of the issues and locations where these NGOs concentrate.

6.1 NGO (International and Local) Programs and Activities

Table 6

NGO	Geographic Focus	Subject Focus	Type of Organization
International			
Conservation International	Upper Guinea Hotspot, Western Region, mines at Ahafo, Akyem, Atewa, and Nyinehin	Biodiversity conservation, mitigation of mining impacts, encouraging shade cocoa rather than full sun.	Implementation
Nature Conservation Research Centre	Volta and Eastern Regions; nature-based tourism sites throughout Ghana	Nature-based and cultural tourism; shade grown cocoa and cocoa tourism	Implementation
CARE	Western Region		Implementation
World Conservation Union (IUCN)		Sustainable forestry, good governance	Implementation, umbrella organization
National			
Ghana Wildlife Society	Ramsar sites, coastal lagoons	CBNRM, Important Birds Areas, Ramsar sites, marine turtles, shorebirds	Implementation, membership organization
Forest Watch –Ghana	Nationwide	Coalition of environmental NGOs	Umbrella organization, advocacy
League of Environmental Journalists	Nationwide	Coalition of journalists	Umbrella organization, membership organization
Ghana Wildlife Clubs	Nationwide	School-based	Education, membership organization
Friends of the Rivers and Waterbodies	Kumasi	Tree planting, erosion control	Implementation
Ghana Heritage Conservation Trust	Ghana's slave forts and Kakum National Park	Conservation of cultural and natural sites	Trust, capitalized by USAID, implementer
The Green Earth Organization	Nationwide	Wetland conservation and reclamation	Advocacy and education
Friends of the Earth-Ghana	Nationwide	Sustainable forestry, gender equity, population	Advocacy, education, implementation
Ghana Association for the Conservation of Nature	Kumasi	Tree planting, Sacred Groves	Implementation
West African Primate Conservation Action	Upper Guinean rainforest	Primate conservation	Implementation
Wasa Communities Affected by Mining	Communities affected by mining	Watch dog on mining issues; education	Advocacy

(WACAM)			
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6.1.1 Assessment of NGO Capacity

Some estimates state that there are 1,000 environmental NGOs in Ghana. While they may be registered as an environmental NGO, many are social, cultural, and community organizations as much as, or more than they can be considered environmental. Tree planting, woodlot creation, nursery establishment, soil conservation, are some of the typical small, community-based activities they may implement.

Most individuals interviewed for the ETOA stated that environmental NGOs are not highly effective in Ghana, and that civil society has yet to fully mature when it comes to conservation. CI's conservation priority setting workshop found that there is a low level of institutional capacity at NGOs in the region covering the Upper Guinea forest complex. A comment often heard is that NGOs may have loud voices, but they don't produce results.

Most civil society success stories seem to be coming from the NGO coalitions that focus on advocacy. These can garner the strength of many NGOs and CBOs. Recently, WACAM and Forest Watch-Ghana have been successful in bringing more attention to the mining and forestry sectors, and they now seem to be taken most seriously by government institutions.

6.2 Donor Programs and Activities

6.2.1 Main Biodiversity/Tropical Forest Donors

Annex 9 contains a list of donors and the E/NRM and biodiversity conservation activities they support. The main donors to biodiversity and tropical forest conservation and their general focus areas are shown in Table 7, a snapshot of donor focus areas; some of the focus areas overlap, and for more information and clarification on the programs, see Annex 9.

Table 7: Main Donors Involved in Biodiversity and Tropical Forest Conservation

	CBNRM-decentralization-environmental governance	Protected Areas Management	Desertification	Forest Sector	Land	Water IWRM	Mining
AFD (French development agency)	X						
EU	X	X		X		X	X
CIDA			X				
DfID	X			X (ending 12/06)	X		
French Embassy	X						
GTZ				X			
Netherlands	X	X		X			
UNDP	X		X	X	X		
JICA				X			

World Bank	X	X			X		
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6.2.2 Assessment of Donor Programs

About 75 percent of WD’s funding comes from donor support. World Bank, the Netherlands, and the EU have been instrumental in policy development and strengthening and in supporting CREMAs, and the French development agency has also supported CREMAs. Some donors have supported specific national parks and reserves, for example, USAID-Kakum; GTZ-Bia Biosphere Reserve; the EU-Ankasa/Nini-Suhien.

In the forestry sector, DfID has been highly effective, with long-term support to FC through the Forestry Support Development Programme I and II. However, with the move by many donors away from project assistance to budget support, DfID direct assistance to FC is coming to an end, with the exception of support to restructure the FC’s financial management systems.

The move to budget support is a concern across all NR sectors, especially since they are so dependent on donors. WD and FC realize that it is risky to rely on donors to such a great extent, and FC’s increase in stumpage fee may help alleviate some of their reliance on donors. Public sector conservation professionals also mentioned that when working with donors, agencies must work within the confines and the short timeframes of projects. Also, donors want to be able to show results in the short-and medium-term, whereas conservation results can take a long time. Gaps between projects, when one project is over, and the next is not yet ready to begin, which can be one to two years has hindered strategic, long-term planning in the forestry and wildlife sectors. Whereas wildlife, forestry, lands, and environment have attracted reasonable donor support, the fisheries sector gets little support from donors.

6.3 Brief Description of the USAID/Ghana Strategy/Program

6.3.1 USAID/Ghana Strategy Statement

USAID/Ghana’s program, “Empowering Ghanaians through Partnerships to Build a Prosperous Nation,” directly supports the two transformational development goals articulated in the USAID Strategic Framework for Africa: (a) Foster a healthier, better educated, and more productive population (Goal 1); and (b) Increase the effectiveness of African institutions in promoting a vibrant private sector and democratic governance (Goal 2). From 2006-2010, USAID/Ghana will achieve these goals through four strategic objectives: Democracy and Governance, Economic Growth, Health, and Basic Education; and the Food for Peace Program.

The Mission supports the GPRS by strengthening decentralized governance systems; promoting private sector competitiveness; improving health care delivery; and enhancing access to quality basic education.

The USAID/Ghana program incorporates Presidential Initiatives to addresses Ghana’s key development challenges by fostering a healthier, better educated, and more productive population (Framework Goal 1); and increasing the effectiveness of African institutions in promoting a vibrant private sector and democratic governance (Framework Goal 2). U.S. Presidential Initiatives that are integrated into USAID/Ghana’s strategy are

U.S. Presidential Initiative to End Hunger in Africa (IEHA); U.S. Presidential African Education Initiative; and U.S. Presidential Anti-Corruption Initiative.

In Africa Bureau's Strategic Framework, Ghana is considered a Transformational Country. It is ranked medium for biodiversity conservation importance.

6.3.2 USAID/Ghana's Contribution to Biodiversity and Tropical Forest Conservation
In USAID's new framework, biodiversity conservation falls under, "Investing in People," defined as: "helping nations achieve sustainable impacts on the well-being and productivity of their populations through effective and accountable investments in the environment, and in education, health and other social services."

Support for "Environment" programs falls under Program Area 2; under which there are three Program Elements: Program Element 2.1: Natural Resources and Biodiversity; Program Element 2.2: Clean Human Environment; and Program Element 2.3: Clean Water and Sanitation. Ghana's biodiversity conservation activities and the biodiversity earmark falls under Program Element 2.1, Natural Resources and Biodiversity.

Previous USAID support to the E/NR sector includes the Community Outreach Program, 1989-99, in selected communities around Kakum National Park, implemented by CI; and USAID support to the Ghana Heritage Conservation Trust, who in partnership with the WD, manages Kakum National Park.

USAID/Ghana supported NCRC's Community-based Ecotourism Project (CBEP), Phase I, which created opportunities for rural communities to earn income, increase private sector growth and create tourism-related jobs through the conservation of natural resources, biodiversity and local cultural attractions. CBEP I contributed to improvements in facilities, improved marketing, and increased human resource capacity to manage 14 destinations. Phase II (two years of USAID funding, from 2006-2008) will expand the number of partners and sites at which the project is working. CBEP works by building public-private partnerships between private corporations and specific ecotourism sites in Ghana.

The strategic goal of CBEP II is to impact rural poverty and biodiversity conservation through the development of a sustainable ecotourism sub-sector in Ghana within five years. The specific goals of CBEP II are to: increase visitor numbers and revenue at the project destinations; secure sustainable natural resource management and biodiversity conservation at the destinations; develop ecotourism experiences which are financially self-sustaining and competitive in the global marketplace; and encourage increased private sector participation in the ecotourism sub-sector.

Although mining results in significant environmental impacts, including impacts to biodiversity, USAID can play a role in limiting impacts, at least on a small-scale, through its support for responsible mining as part of the mining Global Development Alliance, GDA (Section 8). Indirectly, USAID can contribute to biodiversity conservation in its support to the Institute for Social Science and Economic Research (ISSER) to assess

institutional and legal issues that affect land tenure and sustainable land use (SO 6's Land Policy Reform—LPR--activity, see Section 8); by promoting the intensification of agriculture on land appropriate for agricultural production (Trade and Investment Project for a Competitive Export Economy--TIPCEE and Title II activities, using food aid resources); promoting safer pesticide use and EurepGAP initiatives that support conservation of habitat and use of safer pesticides (TIPCEE and Title II); by promoting family planning (Health SO); and through the GAIT project under the D & G SO, which supports improved capacity of civil society organizations (CSOs) and local government (DAs) to manage resources, including their natural resources.

7.0 Assessment of the Threats to Biodiversity and Tropical Forests and Actions Needed to Reduce Threats

The GOG has a range of strategies and action plans that cover biodiversity and tropical forest conservation; many of these include a set of threats, opportunities, and actions needed to conserve biodiversity. Conservation and development NGOs have also identified threats to and opportunities for conservation, and priority areas for interventions. The ETOA Team used available documents, and convened a roundtable with local experts to discuss the most significant threats to biodiversity and tropical forests, and the actions needed to reduce the threats. The resulting threat and action summary was distributed to the ENRM Sector Donor Working Group for comment. The following direct and indirect threats are the result of the ETOA Team's collaborative efforts.

7.1 Direct Threats to Biodiversity and Actions Needed

The threats identified below are linked to one another in a type of spider web—they are interconnected at many points; and at the center point, from which the rest of the threats radiate, is threat #1:

1) *Gap between policy and action:* While Ghana's legal framework for biodiversity conservation and NRM embraces community participation and decision-making at local levels, policies and regulations are not translated into action on the ground. Ghana's legal/policy framework for biodiversity highlights the importance of using resources wisely to generate income and to alleviate rural poverty, especially for those living near important biodiversity resources. However, those who rely on natural resources for income generation and for cultural and medicinal purposes, and those who are most impacted by the existence of PAs, are not benefiting from conserving resources and have little input into management decisions.

While this “threat” is about policies that are not implemented, it gets to a deeper level—it reflects the gap between central government expectations and skills (NRM staff may be highly technical, but often have limited expertise in collaborative/participatory approaches; central government authorities may appear to be devolving authority, but in reality they still keep a hold on decision making) and local peoples' limited technical, organizing, and negotiation skills, especially in terms of conservation (for example, District Environmental Management Committees are the weakest district level committee, and local people often fail to understand concepts of environmental conservation, most often pointing to sanitation and water when asked about environmental issues that affect them).

About 85 percent of land in Ghana is administered through traditional, customary land management (World Bank, et. al. draft, 2006). Co-management/participatory management legislation emphasizes that NR benefits should be equitably shared among community members; however, benefits may be directed towards chiefs and other traditional authorities and community members may not get their share. This can de-rail CBNRM initiatives, as well as poverty alleviation initiatives.

In the forestry sector, the SRA, which amounts to five percent of the total stumpage value, is paid by timber companies to be used for community benefit, such as schools, clinics or other projects. However, traditional authorities have been known to use this money for their own benefit (pers comms, 2006). On the positive side, some chiefs have a strong sense of community development, and have used the fund for schools, clinics, and roads, and other community benefit projects. Co-management/CBNRM can only work where there is transparency in benefit sharing and where communities actually do receive benefit from the resources.

A Mineral Development Fund has been set up in the mining sector, whereby 20 percent of mineral royalties (from government taxation of mining companies) is to be used to mitigate adverse effects of mining within mining communities. A portion of this is to be disbursed among DAs, stools, and traditional authorities. Between 1994 and 2003, over 100 billion cedis were paid to stools and traditional authorities (Botchie et. al., 2006). Yet there have been reports that this money has been more often used for the personal development of chiefs rather than development of the community.

Traditional authorities can be roadblocks to implementing participatory management/CBNRM and to equitable natural resource benefit sharing among community members. Transparent processes in negotiating SRAs and in using the Mineral Development Fund could facilitate more widespread benefit from revenue generated by natural resources, and could improve implementation of the legal framework covering conservation.

Ghana's legal framework for conserving biodiversity is adequate, but the challenge is to translate the framework into actions on the ground. This is the underlying cause of the subsequent threats.

ACTIONS NEEDED TO REDUCE THREAT: 1) Support for mechanisms that devolve authority and decision making over natural resources to local levels, with adequate checks and balances in place at central level to ensure biodiversity is being conserved. FC, WD, and Fisheries have developed processes/mechanisms—CREMAs, Collaborative Forestry Management, and Community-Based Fisheries Management, which aim to involve local communities in decision-making and enable people to earn incomes from sustainable use of natural resources. 2) Improved governance and transparency in negotiating and disbursing monies derived from natural resource based enterprises; 3) Capacity strengthening at local levels to allow communities living near important biodiversity resources to implement sustainable use activities that generate income, to take over management responsibilities, when appropriate, and to build a broad support base for conservation. 4) NR staff with appropriate skills needed to devolve authority and act as an oversight rather than an implementing body, and to provide adequate monitoring of activities.

2) A system—or a cycle—of unsustainable exploitation of resources prevails: Inappropriate practices are used; landscapes and natural resources are degraded; and

resource users may move on to new locations, where they continue to unsustainably exploit resources. Inappropriate and unsustainable practices include:

- a) Unsustainable agriculture including slash and burn
- b) Charcoal making and fuel wood collection
- c) Illegal hunting for bush meat
- d) Over-exploitation of fisheries resources
- e) Extractive industries operating outside the law
- f) Setting bush fires
- g) Filling wetlands for development

A full analysis of these threats is contained in Annex 10.

Some of the areas most threatened by unsustainable practices include:

1) Coastal wetlands and mangrove swamps: Mangroves serve as nurseries for fisheries, and provide habitat for birds and some wildlife species. They also protect the shoreline against erosion. While fragmentation is not a significant threat to mangrove biodiversity, since mangroves are naturally fragmented, and are dispersed over long distances, the greater concern is the total amount of mangrove area that has been lost.

2) Desertification-prone zones--the Sudan savanna, Guinea savanna, coastal savanna, and forest-savanna transitional zone. The estimated land area prone to desertification is 35 percent of Ghana's land area, about 83,489 km². The Upper West and eastern part of the Northern region (78,718 km²) face the greatest risk (EPA, 2002). With the effects of climate change considered, rain-fed agriculture, especially in Northern Ghana, will likely become more insecure than it currently is (van Edig et al 2003).

3) Forests: Forest loss is attributed to two main sources: conversion to alternative land uses such as agriculture, industrial development, over-grazing; and the demand for forest products, mainly fuel wood and commercial logging (Botchie et. al., 2006). An area significant for its biodiversity resources, along the Ghana-Cote d'Ivoire border, is particularly susceptible to threats: in this area, shade grown cocoa is giving way to full-sun (discussed below), forests are fragmented, there are well-organized but illegal commercial surface mining operations, and significant extraction of non-timber forest products is occurring in FRs and PAs (CEPF, 2000).

ACTION NEEDED TO REDUCE THREATS

a) Unsustainable agricultural practices, including slash and burn agriculture:

1) Intensification of agriculture and promotion of sustainable practices that allows efficient use of agricultural land, such as appropriate use of fertilizers and pesticides, improved crop varieties, improved planting and weeding, irrigation, where appropriate, and growing on land suitable for the specific crop; 2) encourage shade-grown cocoa and discourage the full-sun regime.

b) Charcoal making and fuel wood collection:

1) as part of collaborative forestry activities, register and certify fuel wood collectors and transform into a legal, sustainable enterprise; 2) promote sustainable fuels

c) Illegal hunting for bush meat:

1) More information on the underlying context that drives the bush meat trade prior to designing and implementing programs; 2) Sustainable use of wildlife for bush meat that generates income while encouraging conservation, for example, the CREMA; 3)

domestic raised sources of bush meat; and 4) adequate enforcement of regulations (community, District and Central levels)

d) Over-exploitation of fisheries resources:

1) Strengthen the Monitoring Control, Surveillance and Enforcement Unit of the Ministry of Fisheries by providing adequate resources/logistics and personnel to be able to check the activities of trawlers and other poor practices of fishermen; 2) Co-management and sustainable use that generates local income—Community-based Fisheries Management; 3) encourage fish farming to reduce pressure and the resulting over-exploitation of fisheries resources

e) Extractive industries operating outside the law:

1) Illegal small-scale/artisanal operators transformed into legal operators that must meet requirements for environmental protection; 2) enforcement of this system; 3) promotion of good practices in the mining sector

f) Setting bush fires:

1) Train community-based fire management teams/committees (Ghana National Fire Service and U.S. Forest Service) in controlling bush fires; 2) alternative practices introduced (raising animals for bush meat, raising bees rather than gathering honey from the wild, which requires setting fires, community-level management and control of charcoal production)

g) Filling wetlands for development:

1) identify ways to garner increased community benefits from wetland resources; 2) EIA process for development in wetlands

3) Little value is placed on biodiversity because of the limited awareness/consideration of the link between biodiversity and economic growth; and limited knowledge of biodiversity conservation measures in rural communities.

This lack of awareness is widespread among the general population, Parliamentarians, attorneys, and journalists. Because of limited awareness and understanding of the benefits of biodiversity, there is little public support for conservation. Sensitization on biodiversity conservation is already a part of the CREMA process, and the Social Environmental Impact Assessment (SEIA) is intended to help increase awareness, as well.

ACTIONS NEEDED TO REDUCE THREAT: 1) Support sensitization in the CREMA process; 2) encourage the use of SEIA in NRM.

4) Unsustainable harvesting of timber is resulting in deforestation and forests that are economically unproductive.

The CEA found that policy failures and weak institutional capacities have encouraged over-exploitation of Ghana's forests. The FC has been unable to effectively control

exploitation of reserve forests, and there is concern that industrial logging will further damage the remaining forest.

The CEA continues: much of the value of forests has been captured by industry, but in an inefficient way (average conversion rates for sawmilling are around 30-35 percent). Too little processing for high-value export markets occurs and estimates indicate that the primary processing is value-subtracting if timber were priced at world market prices. The CEA states that installed sawmilling capacity of the wood industry in 2001 was estimated at 3.4 million m³, which is about ten times the level of probable sustainable yield from FRs.

The forestry sector is required to comply with EPA regulations which require logging to be undertaken only after an environmental permit or license is issued by the EPA. According to EPA, by law, an EIA must be conducted on a forest management plan or timber harvest plan/operational plan, however, timber companies have yet to incorporate this requirement into the way they do business—in Ghana, as yet, no EIA has been prepared for a timber harvesting operation.

ACTIONS NEEDED TO REDUCE THREAT: 1) Continued implementation of a more transparent and sustainable method of timber harvesting (the TUC system that is currently in place, yet not widely used); 2) adequate enforcement of timber operations in FRs and off-reserve; 3) CFM to encourage sustainable use and compliance with contracts/regulations; 4) Increased transparency in negotiations and disbursement of the SRA

5) *A land tenure system that lacks transparency and security, and that fails to allow for widespread ownership of land; and migration, within Ghana and international migrants to Ghana (fleeing conflict and/or poverty):* These factors result in a lack of “husbandry” of the land, an introduction of practices that are not conducive to conservation in the specific setting. Some examples: Western region is on the frontier of cocoa expansion, and migrants have moved there in search of land to cultivate. Between 1984 and 2000, in certain cocoa growing areas, population has increased 200 percent/year. Many of these migrant cocoa farmers are used to growing cocoa under full sun and are bringing this practice to the Western region. Migrant pastoralists are another example: they allow livestock to graze and use watering facilities, and they move on when resources are depleted. In the northern regions of Ghana, where pastoralists are most common, lands are prone to desertification, and inappropriate grazing practices can result in degradation of land resources and in desertification. In the mining sector, traditional rulers have been known to allocate land for small-scale mining, although they do not have the authority to do so. The allocation is made with the understanding that they receive land rent and fees from the miners—greater transparency and security in the land tenure system could avert this. The MLFM recently formed a committee to assess land use and management in regard to land tenure, migration, and conflicting uses of land resources.

ACTIONS NEEDED TO REDUCE THREAT: 1) Support the MLFM initiative; 2) CBNRM (CREMA and CFM) implemented, that gives communities ownership/decision-making authority of resources and the ability to benefit from resources so the affected communities will conserve them

7.2 Indirect Threats to Biodiversity Conservation and Actions Needed

1) *Political commitment is lacking:* Although politicians may profess to be concerned about the environment, when decisions must be made about development that impacts the environment, development often wins; when politicians are pressed to deal with encroachment and settlement in PAs, they often fail to act due to possible political fall-out from an unpopular decision.

ACTIONS NEEDED TO REDUCE THREAT: 1) Awareness raising campaign, especially to demonstrate the value of biodiversity, for politicians responsible for decision making and budgets in the biodiversity sector.

2) *Funding and logistical resources are inadequate for biodiversity conservation.*

Budgets for government authorities in the NRM sector usually cover only recurrent costs with little if any funding available for special projects and activities. This does not allow for strategic, long-term planning, and a far-ranging vision—two factors needed when dealing with biodiversity conservation, where implementation of activities should not be constrained by political whim/budget cuts, and where impacts (positive and negative) of activities may not be visible over the short or medium-term. Because budgets are sparse, NR agencies lack supplies and equipment. The lack of resources results in poor working conditions and morale, and high turnover.

ACTIONS NEEDED TO REDUCE THREAT: 1) Improved budgeting system and financial management that allows managers to plan over the long-term for biodiversity conservation and NRM; 2) Trust funds or other dependable, long-term financing mechanism.

3) *Limited biodiversity information on which to base management decisions.*

Limited up-to-date information, as well as inaccurate information, constrains good management decisions and effective conservation. Data on terrestrial ecosystems is better and more complete than the information available on marine and other aquatic ecosystems (MES, 2002). A considerable amount of information is available on the vegetation and ecology of the forest zone; however, the savanna zone, which covers two-thirds of the country, has received much less attention (The Environment and Development Group, 1998), and there are significant data gaps on the ecology and diversity in the savanna zone. There are no systematic censuses of wildlife inside PAs or outside, and the information gaps on wildlife populations outside PAs is much greater than inside since it has been impossible for WD and their partners to effectively survey and monitor given the limited resources.

ACTIONS NEEDED TO REDUCE THREAT: 1) Support regular monitoring/surveying of wildlife populations; 2) support a central clearinghouse where data is kept and where it will be available to researchers and to the public (a WD initiative).

4) Poverty and Population Growth: Poverty—and lack of choices—underlies many of the decisions made on how to use natural resources, and helps to explain the “mining” of natural resources, rather than wise, sustainable use. Poverty is intimately linked to population growth—Ghana’s population growth rate of 2.7 percent/year (USAID Strategy Statement, 2004) will result in the doubling of the population in 26 years. This population growth rate is placing enormous pressure on the economy and the environment, most visible in the migration to urban areas.

ACTIONS NEEDED TO REDUCE THREAT: From the “National Population Policy” Under Ghana Vision 2020 the following policy targets have been set: Reduction of the annual rate of population growth of about 3.0 percent (1998) to 1.5 percent by 2020, as well as reducing the total fertility rate from 5.5 to 4.0 by 2010 and 3.0 by 2020; achieving contraceptive prevalence rate of 15 percent for modern family planning methods by 2000 and 50 percent by 2020. It is assumed if these targets are met, population growth may be manageable. This policy should be supported to alleviate pressures on NRs from population growth.

8.0 Role of USAID’s Program in Addressing Biodiversity Conservation; Extent to Which Programs Meet Needs

This section responds to the requirement in FAAs 118 and 119, *extent to which USAID’s current or proposed actions meet the identified needs:*

Table 8: Threats, Actions, and USAID Response

Threat	Action Needed	USAID Response
DIRECT THREATS		
1. <i>Gap between policy and action</i>	1) Devolve authority and decision making over natural resources to local levels-- CREMAs, Collaborative Forestry Management, and Community-Based Fisheries Management; 2) Governance and transparency strengthened in use of funds from natural resources-based enterprises; 3) Capacity strengthening at local levels; 4) NR staff with appropriate skills needed to devolve authority	NCRC, CBEP I and II: Community-based ecotourism, including capacity building at community level and spin-off nature-based enterprises at community level; GAIT, strengthening CSOs; and Mining GDA. (responds to #3)
a) Inappropriate agricultural practices	1) Intensification of agriculture, appropriate use of fertilizers and pesticides, improved crop varieties, improved planting and weeding, irrigation, where appropriate, and growing on land suitable for the specific crop; 2) encourage shade-grown cocoa and discourage the full-sun regime.	TIPCCEE and Title II (respond to #1)
b) Charcoal making and fuel	1) as part of collaborative forestry program,	None

wood collection	register/certify charcoal producers, i.e., transform the enterprise into a legal, sustainable; 2) promote alternative fuels	
c) Over-exploitation of wildlife for the bush meat trade	1) Information on drivers/preferences in the bush meat trade; 2) Sustainable use that generates income while encouraging conservation—CREMA and CFM; 3) domestic raised sources of bush meat; and 4) adequate enforcement of regulations	GAIT (could respond to #s 3 and 4) and Mining GDA (#4)
d) Inappropriate fishing practices result in overexploitation of the resource and destruction of habitat.	1) Strengthen Ministry of Fisheries to monitor and enforce; 2) Sustainable use that generates local income and can provide community-based regulation of fishing—Community-based Fisheries Management; and 3) encourage fish farming	Title II programs provide TA in aquaculture (responds to #2 and 3).
e) Extractive industries, especially illegal operators, pollute waters and destroy landscapes.	1) Illegal small-scale/artisanal operators transformed; 2) enforcement of regulations; and 3) promotion of good practices in the mining sector.	Mining GDA promotes good environmental practices and helps to bring operators into the legal system (responds to #s1, 2, and 3).
f) Setting bush fires to clear land	1) Community-based fire management with training from Ghana National Fire Service and/or USFS; 2) alternative practices introduced	TIPCEE and Title II promote alternative agricultural practices (not slash and burn). (responds to # 2).
g) Filling wetlands for development	1) Identify ways to garner increased community benefits from wetland resources; 2) EIA process for development in wetlands	None
3) <i>Limited awareness/consideration of biodiversity</i>	1) Support sensitization in the CREMA process; 2) encourage the use of SEIA in NRM.	None
4) <i>Unsustainable harvesting of timber results in deforestation and forests that are economically unproductive.</i>	1) Implementation of TUC system; 2) adequate enforcement in FRs and off-reserve; 3) CFM to encourage sustainable use; and 4) increased transparency in negotiations and disbursement of the Social Responsibility Agreement.	None
5) <i>A land tenure system that lacks transparency and security, and that fails to allow for widespread ownership of land; and migration(internal and from outside)</i>	1) Support the MLFM initiative; 2) CBNRM (CREMA and CFM) implemented, that gives communities ownership/decision-making authority of resources and the ability to benefit from resources so the affected communities will conserve them.	Land Policy Reform activity (SO 6) (responds to #1).
INDIRECT THREATS		
1) <i>Political commitment is lacking</i>	1) Awareness raising campaign for politicians responsible for decision making and budgets in the biodiversity sector.	None
2) <i>Funding and logistical resources are inadequate</i>	1) Budgeting system that allows managers to plan for biodiversity conservation and NRM; 2) Trust funds or other dependable, long-term financing mechanism.	None

3) <i>Limited biodiversity information on which to base management decisions</i>	1) Support regular monitoring and surveying of wildlife populations; 2) a central clearinghouse where data is kept and where it will be available to researchers and to the public	None
4) <i>Poverty and Population Growth</i>	1) National Population Policy targets	Health SO promotes family planning.

8.1 USAID Programs: Threats and Opportunities (FAA 117)

The following is an analysis of potential environmental threats posed by USAID/Ghana’s strategy/activities, by SO and IR; and opportunities to minimize the threats, including possible cross-sectoral links for biodiversity/tropical forest/environmental conservation. Section 9.1 contains the specific recommendations for each SO.

1. Strategic Objective 5: *Strengthened Democratic and Decentralized Governance through Civic Involvement* (Democracy and Governance SO): This SO supports Ghana’s efforts to consolidate democracy by enhancing civic participation in democratic processes and ensuring that local and national governments are responsive to the interests of citizens. SO 5 is supporting decentralization to strengthen local government capacity to function effectively, and to help local government respond to citizens’ demands and engage civil society particularly in development planning. SO 5’s GAIT is strengthening CSOs (including those involved in NRM) and local government (DAs), especially in relation to negotiation, leadership, technical and lobbying skills and mobilizing resources.

IR 5.1 Strengthen Civil Society

IR 5.2 Strengthen Democratic National Governance Institutions

IR 5.3 Support Democratic Local Government and Decentralization

Potential Environmental Threats: SO 5 poses no direct or indirect threats to biodiversity, tropical forests, or the environment.

Opportunities:

- SO 5 could expand support for capacity strengthening of CSOs involved in the E/NR/biodiversity sector.
- SO 5 could expand support for local government institutions involved in the E/NR sector (for example, District Environmental Management Committees, Protected Area Management Committees).

2. Strategic Objective 6: *Competitiveness of Ghanaian Private Sector in World Markets Increased* (Economic Growth SO): SO 6 is increasing employment opportunities and incomes for poor Ghanaians by accelerating economic growth through private sector investment and expansion. The SO supports GOG efforts to improve the enabling environment through better macroeconomic management and financial intermediation, removal of barriers to entry/exit in the marketplace, an enhanced trade regime, and a rationalized regulatory framework in electricity, gas, and telecommunications that encourages competition. SO 6’s flagship project is TIPCEE. SO 6 also promotes eco-

tourism development (CBEP II); the Land Policy Reform activity, Program for Biosafety Systems; and the Business Association Policy Advocacy Challenge Fund. The following IRs contribute to the SO; IRs 6.1 and 6.2 are the main focus of the SO:

IR 6.1: Enabling Environment for Private Sector Competitiveness Improved

IR 6.2: Private Sector Capacity to Compete in World Markets for Selected Industries and Sub-sectors Strengthened

IR 6.3: Construction and Maintenance of Economic Infrastructure Improved

IR 6.4: Integration of Ghana into Regional Systems Increased

Potential Environmental Threats: SO 6's Initial Environmental Examination (IEE) and Pesticide Evaluation Report-Safer Use Action Plan (PERSUAP) describe potential threats and require mitigation measures for the TIPCEE activity and for the Biosafety Program. SO 6 poses no additional threats; however, there are opportunities for cross-sectoral links within SO 6 to increase the positive effect on the environment.

Opportunities:

- TIPCEE's support to EPA in pesticide regulation and control measures could be extended and expanded over TIPCEE's LOP.
- TIPCEE supports Geographic Information Systems to implement traceability standards, as part of EurepGAP. This could be used to strengthen Ghana's land management/use system.
- TIPCEE could support export of wood products by providing assistance to wood industry operations that comply with sound forest management, environmental regulations, and best practices in social responsibility and transparency; thereby TIPCEE could provide incentives for other wood industry operations to improve practices.
- The Land Policy Reform activity could be extended and could focus on filling gaps in land policy that have been identified which threaten biodiversity and tropical forest conservation.

3. Strategic Objective 7: *Improved Health Status of Ghanaians* (Health SO): To achieve this goal, SO 7, in collaboration with the GOG, is taking an innovative approach, focusing on behavior change for key health interventions at the individual, community health system and policy level. The SO focuses on efforts that reduce the under-five (especially newborn) mortality rates, reduce the total fertility rate, and stabilize and reduce HIV/AIDS prevalence among adults and most at-risk groups. The following IRs contribute to achievement of SO 7:

IR 7.1: Individuals and Communities Empowered to Adopt Appropriate Health Practices

IR 7.2: Access to Health Services Expanded

IR 7.3: Quality of Health Services Improved

IR 7.4: Institutional Capacity to Plan for and Manage Health Program Needs Strengthened

Potential Environmental Threats: USAID supports the GOG's Roll Back Malaria strategy and social marketing of insecticide treated nets. This is implemented in conformance with the Insecticide Treated Net IEE for Africa, and in accordance with that IEE, should pose no environmental threats. SO 7's support to reduce the fertility rate will decrease population growth rate, and thereby have a positive effect on the environment. There are no potential environmental threats.

Opportunities:

- SO 7's support for decreasing the fertility rate could be directed towards environmentally sensitive areas, where population increases will further exacerbate environmental degradation and conflicts over natural resources, for example in the western part of Ghana, where population growth is high and resources are under pressure.

4. Strategic Objective 8: *Improve Quality of Access to Basic Education* (Education SO) 2006-2010: This SO expands access to basic education, particularly for girls, improves reading and numeracy skills, increases teacher accountability, increases community participation in schools, and prevents the spread of HIV/AIDS within the education system. The following IRs contribute to the SO:

- IR 8.1: Increased Educational Opportunities for Girls in Underserved Areas
- IR 8.2: Improved Instructional System
- IR 8.3: Improved Management Accountability

Potential Environmental Threats: There are no potential threats.

Opportunities:

- SO 8 could encourage the incorporation of environmental topics in Ghana's curriculum.

5. Improve Food Security: USAID/Washington's Food for Peace (FFP) Title II Program is integrated into the USAID/Ghana strategy. FFP provides credit to farmers to purchase agricultural inputs; helps farmers increase crop yields; works in collaboration with the Ghana Health Service, to promote good health and nutrition practices in rural communities and in people living with HIV/AIDS (PLWHA) and orphans and vulnerable children (OVC); and provides meals to primary school children.

Ghana's Title II Program supports four programs: 1) Adventist Development and Relief Agency working in the Northern Savanna, Coastal Plains, and the Transitional Zone, and rural forest areas to increase agricultural production and incomes, to improve water sanitation and increase awareness of STI/HIV and malaria. 2) Catholic Relief Services focuses on health, nutrition, quality basic education, and general relief to other vulnerable populations. 3) Opportunities Industrialization Centers International works in ten

vulnerable districts, training in post-harvest measures, increasing women’s potential to earn income, and provision of potable water and care and support for PLWHAs and OVCs. 4) TechnoServe enhances agricultural productivity, increases access to food, and strengthens capacity of local organizations to carry out food security interventions.

Potential Environmental Threats: Each Title II partner has a current IEE, and where applicable, a PERSUAP, which describes potential threats and mitigation measures. There are no additional environmental threats resulting from Title II activities; however there are opportunities to have a positive impact on the environment.

Opportunities:

- Where Title II works in environmentally sensitive environments, technical assistance—to CBOs and at local government level—could include capacity strengthening in environmental conservation/biodiversity conservation measures.

6) GDA, Responsible Mining Alliance: Newmont Ghana Gold Ltd. and Gold Fields Ghana Ltd. (GFG), in collaboration with USAID and the Ghana Chamber of Mines, have entered into a GDA, whose goal is to establish prosperous, healthy, lasting communities in the mining areas of Asutifi and Wassa West Districts. The objectives of the GDA are to identify and establish viable economic opportunities for the residents of the two Districts, to leave vibrant, beneficial, interactive relationships between civil society and local government, and to share the lessons learned and best practices of mining operations among rural communities with others facing similar challenges. The purpose of the GDA is to bring together the expertise of the three members to maximize the impact of the social development programs while extracting the mineral resource in an ecologically sound manner. The GDA will generate social and environmental “best practices” that can be shared with a wider audience in Ghana and the West Africa region.

Potential Environmental Threats: The GDA supports environmental best practices in the mining sector, such as preparation and implementation of Closure Plans; land access/use rights; integration of closure plans to District land use/development plans; management of sites after closure. As such, the GDA will have no negative impacts, and may have a positive environmental effect.

Opportunities:

- The Responsible Mining GDA could focus on issues critical to biodiversity conservation and be scaled up to include other mine operators.

9.0 Recommendations to Strengthen Biodiversity and Tropical Forest Conservation

The following are the ETOA Team's recommendations based on the foregoing 117/118/119 analysis. We present two types of recommendations. Section 9.1 recommendations emerge from Section 8.1, USAID's Threats and Opportunities. These are recommendations for minimizing threats and maximizing impact on biodiversity conservation in USAID's ongoing activities. Cross-sectoral linkages of biodiversity conservation with economic growth, D&G, health, and education are emphasized.

Section 9.2 recommendations emerge from Sections 7 and 8, the threats analysis. As part of this analysis, we identified the extent to which USAID programs meet Ghana's biodiversity conservation needs. Recommendations in Section 9.2 consider the gaps in USAID's program for meeting the identified needs, the contribution of other donor, NGO, and GOG programs in meeting the needs, and USAID's comparative advantage, and take into consideration CEA recommendations.

9.1 Opportunities for Ongoing USAID Programs

1) SO 5 (GAIT) could expand support for capacity strengthening of CSOs involved in the E/NR/biodiversity sector. The ETOA notes that while environmental CSOs are still weak, advocacy-coalition organizations such as WACAM and Forest Watch-Ghana have had high profile successes recently. Advocacy coalitions may provide the best vehicle to move the NRM sector towards greater transparency, improved equity, and ultimately, improved conservation of biodiversity resources.

2) In SO 5's efforts to strengthen civil society, the SO could support environmental CBOs to improve skills that would allow them to more actively and effectively participate in NRM, including negotiate for equitable shares of resources (Mining Development Fund and forestry sector's SRA, described in the ETOA).

3) SO 5 could expand support for local government institutions involved in the E/NR sector (for example, DAs, District Environmental Management Committees, Protected Area Management Committees) to improve environmental governance. To help target appropriate local government entities, this support could be undertaken in collaboration with the FC, WD, and/or Fisheries Commission, and with NGOs that are involved in decentralization of NRM, for example, GWS and CARE. Geographic locations could also be chosen in collaboration with GOG and NGOs, to support promising CREMA, CFM, and fisheries community management initiatives.

4) TIPCEE's support to EPA in pesticide regulation and control measures could be extended and expanded over TIPCEE's LOP. This would help EPA to protect water resources and wetlands, which the ETOA notes have been significantly affected by pollutants.

5) TIPCEE's support for Geographic Information Systems (GIS) to implement traceability standards, as part of EurepGAP helps promote appropriate agricultural practices. As described in the ETOA, inappropriate practices are among the main threats

to biodiversity conservation. SO 5's support for GIS and EurepGAP traceability should continue and could be implemented in partnership with environmental NGOs/CSOs to give them a tool to help in promotion of sound agricultural practices. .

6) TIPCEE could support export of wood products by providing assistance to wood industry operations that comply with sound forest management, environmental regulations, and best practices in social responsibility and transparency. In this way, TIPCEE could provide incentives for other wood industry operations to improve practices. As described in the ETOA, the forestry sector is fraught with difficulties, but there are also opportunities to improve the situation. With TIPCEE's support to link sustainably harvested wood products to markets, SO 6 could provide the impetus for a shift in industry operating mode.

7) SO 6's Land Policy Reform activity could be extended and expanded to focus on filling gaps and resolving conflicts in land policy, especially where these gaps and conflicts affect biodiversity conservation and improved NRM. Mining and forestry are particular sectors described in the ETOA, where insecure tenure can result in inappropriate and unsustainable practices.

8) SO 7's support for decreasing the fertility rate could be directed towards environmentally sensitive areas, where population increases will further exacerbate environmental degradation and conflicts over natural resources. The ETOA in particular notes that the Western region has been experiencing high migration, and along with inappropriate and unsustainable practices, the significant biodiversity is being degraded. Family planning measures in Western region could help safeguard that area's critical biodiversity. As mentioned in the ETOA, the forest transitional zone has important natural resources, yet due to population growth has largely been transformed into a peri-urban area; family planning efforts could also be directed there.

9) SO 8 could encourage the incorporation of environmental topics in Ghana's curriculum. As the ETOA notes, biodiversity awareness is low, and this would help fill the knowledge gap.

10) Title II activities to assist farmers to increase agricultural productivity and incomes could include strengthening capacity and awareness of environmental conservation and biodiversity conservation measures. This is especially important since Title II programs are concentrated in areas prone to desertification (savanna zones) and Title II programs aim to increase agricultural production and incomes from agricultural products. In areas that are less suited to agriculture, Title II activities may consider encouraging alternative livelihoods. As the ETOA notes, inappropriate agricultural practices are a significant threat to biodiversity conservation, and in water deficient areas, agricultural production and biodiversity conservation may compete for the limited water. In these areas, identifying alternatives to agricultural production may be appropriate (see Section 9.2, recommendation #1).

11) Besides the environmental measures the Responsible Mining GDA is promoting, the GDA could discourage the unsustainable and often illegal practice of hunting wildlife for

bush meat. As mentioned in the ETOA, because they are mobile and usually working under somewhat isolated conditions, small-scale and artisanal miners are likely to hunt wildlife for bush meat. The Mining GDA could identify other means of supplying protein for miners, and other ways to discourage bush meat hunting. Successful initiatives could be scaled up to include other mine operators.

9.2 Recommendations: New Opportunities

The gaps noted in Table 8 are largely related to environmental governance, including equitable benefit sharing of biodiversity resources. Recommendations # 1, 2, 3, 4, and 5 focus on this issue. Roles of traditional authorities, including chiefs and community elders, are important for developing community bylaws and for gaining community trust and support of conservation efforts. The decentralized government system, including metropolitan, municipal, and district assemblies will need to take on roles of oversight for sustainable NRM. Central government will play a role in monitoring and in providing technical assistance. In partnership with communities, NGOs, CSOs, and CBOs, and the private sector, are the implementing entities for these initiatives.

1) Provide support for CREMAs as a means of conserving Ghana’s biodiversity resources. USAID could support GOG’s efforts to devolve authority over natural resources through the CREMA. While similar participatory management and CBNRM activities are being promoted throughout Africa, and even world-wide, the CREMA is a Ghana-born and bred initiative that gives greater local management control and decision making authority over wildlife on community land. Through the CREMA, communities can benefit from their wildlife resources, and—the intention is—they will become better stewards of biodiversity resources, and even advocates of biodiversity conservation. Support to CREMAs can contribute to biodiversity conservation, and also provide alternative income generation opportunities to the rural poor—in line with USAID’s objectives.

Support for CREMAs translates to support for improved environmental governance and transparency in negotiations and benefit sharing. It would involve working closely with traditional authorities, civil society organizations, CBOs, NGOs, and WD. Support for the CREMA process would also include biodiversity awareness raising, which is part of the CREMA methodology (sensitization of local communities).

Recommended regions: Several donors have lined up to support CREMAs, but most of this support is targeted to the Western region. Brong Ahafo region faces significant threats to biodiversity and is rich in resources; the savanna areas (Northern, Upper West and Upper East regions) have the highest incidence of poverty, have limited opportunities for income generation, and are rich in savanna wildlife, and some areas may not be highly suited for agricultural production. These regions could hold greatest promise to produce impact from CREMAs.

2) Support collaborative forest management, including civil society’s role in promoting transparency and equitable benefit sharing in the forestry sector. The SRA is one way for communities to benefit from partnerships with the timber industry. As

discussed in the ETOA, five percent of the stumpage value is to go towards the SRA and be used for community development. Therefore, the SRA is a means of alleviating poverty, and also can generate advocates for sustainable use of forest resources.

The SRA is often misused—it may be used for the benefit of chiefs and other authorities rather than for the community. USAID could support NGOs (possibly at the advocacy-coalition level) and CBOs to improve negotiation skills that would result in more equitable benefit sharing. This would also support the objectives of the Collaborative Forest Management Unit of the FC—benefits from forest resources are to be shared by communities, who would help the FC regulate illegal chain sawing and burning and other illegal activities.

Support for collaborative forestry goes beyond the SRA, and USAID could consider supporting community efforts to develop enterprises based on NTFPs, and possibly legal/certified (from woodlots or plantations) charcoal and fuel wood enterprises that could discourage illegal production and collection. GSBA's encompass critical biodiversity resources, and they are to be managed collaboratively, in partnership with communities and to benefit community members. USAID could support the CFM process that is part of GSBA conservation efforts.

Brong Ahafo and Western regions are major timber producing areas that could benefit from CFM, improved environmental governance, and more equitable benefit sharing in the forestry sector.

3) Support collaborative fisheries management to improve regulation of the fisheries resource and thereby, improve biodiversity conservation of coastal and marine ecosystems. The Fisheries Commission is promoting the concept of community management to regulate illegal and unsustainable fishing activities and methods. By relying on the fishing community to self-police, rather than implement “command and control,” scarce resources can be targeted to other activities, such as monitoring the resource. As the ETOA notes, the bush meat trade may be affected by the availability of fish, and if this is the case, controlling illegal and unsustainable take will have a “knock-on” effect for wildlife conservation. USAID support for the promotion of appropriate fishing practices and for sustainable use could improve conservation status of the fishery resources, of terrestrial wildlife resources, and of marine turtles, keystone and endangered species that are affected by inappropriate fishing practices.

Each fishing village or landing site has a Chief Fisherman who represents local fishers and represents the fishers' association at regional and national levels. The Chief Fisherman works in partnership with a council of elders. This traditional system of regulating fishing and managing the fisheries resource would be a good entry point to promote improved management, and could help control the use of illegal equipment and methods, and help protect coastal and marine resources, including Ramsar and other coastal lagoons.

4) Support NGOs, CBOs and CSOs to help ensure that the Mining Development Fund is equitably distributed in a transparent manner. As noted in the ETOA, the Mining Development Fund is meant to off-set some of the impacts local communities experience from mining activities. However, the fund is often misused (as described in #2 above). Similar to the SRA, USAID could support improved governance, accountability and transparency of this fund, and thereby, could help to discourage illegal small-scale mining operations and the illegal and unsustainable practices that accompany these miners. Equitable distribution of the Mining Development Fund could help build advocates for legal, socially responsible mining.

5) Support improved collaborative management of and income generation opportunities from wetlands. As mentioned in the ETOA, wetlands are rich in biodiversity, yet are seriously threatened. They are managed through collaborative, sustainable use efforts, however, community benefits are often considered inadequate to warrant protection. USAID could support awareness raising among communities of the inherent benefits wetlands provide (environmental services), and could help identify income generating possibilities from wetlands. Given the collaborative management and income generation nature of wetland conservation, the SEIA process is a good entry point for biodiversity awareness raising activities. For income generation options, USAID could look to NCRC and their community ecotourism initiative involving the sitatunga wetland reserve as a model. USAID could support this initiative and other innovative uses of wetlands that would conserve their functions and values, while allowing communities to benefit from their resources.

6) Support initiatives that promote shade-grown cocoa rather than full-sun cocoa in the Western region. As noted in the ETOA, the Western region is on the frontier of cocoa expansion, and it is also an area of significant biodiversity resources that are highly threatened. Shade-grown cocoa can retain ecosystem function and structure; in full-sun regimes, biodiversity resources are largely lost. Cocoa is the most important export crop for Ghana, but cocoa production has increased primarily as a result of area expansion, in particular in the Western region—this is not sustainable. Cocoa in Ghana is produced for the bulk market, yet as has happened with coffee, cocoa products may become more differentiated, and the future of cocoa may be in producing for this more differentiated market. For Ghana to maintain competitiveness in the cocoa sector, it should begin to consider how to attract niche markets, such as shade-grown and bird friendly. USAID could support ongoing efforts to promote shade-grown cocoa in the Western region, led by CI and the Sustainable Tree Crops Program, STCP. This would promote biodiversity conservation and could contribute to economic growth. It could also provide a safety net for farmers in Western region who are so reliant on cocoa production.

7) Help Ghana close the biodiversity information gap. As described in the ETOA, there are significant gaps in biodiversity information, in wildlife PAs, GSBAs, FRs, off-reserve forests, in areas that can be used as CREMAs, in wetlands, including Ramsar sites, and in coastal and marine environments. The lack of data constrains biodiversity conservation initiatives, as described in the threats section of the ETOA. Even when studies have been conducted, it is sometimes difficult to track down the information.

General information on the NRM sector may not be available in the public domain since transparency is not yet the rule—for example, there is no publicly available information from FC on industries that hold concessions and those who have TUCs. USAID can help fill the information gap and strengthen transparency and accountability in the wildlife and forestry sectors by supporting regular monitoring and surveying of wildlife populations in key locations and by creating or strengthening the central clearinghouse (WD activity) where data is kept and where it will be available to researchers and to the public. The WD's efforts to create such a monitoring center, have not yet progressed far due to lack of resources.

Recommended locations for surveys: coastal and marine environments and ensuring marine turtles, because of their global biodiversity importance are surveyed on a regular basis; GSBAs, where significant biodiversity exists, yet much of it has not been categorized; and wetlands, where data is limited.

8) Support efforts to develop sustainable funding mechanisms for public sector agencies involved in NRM. GOG's budget does not cover the costs of WD, FC, and Fisheries Commission to manage the resources in their jurisdiction. As donors move to budget support rather than project support, these organizations are entering more risky times. WD will have to rely on park levy fees from tourism, tourism concessions, and possibly raising funds from environmental services; FC will rely on stumpage fees and other revenue from timber resources; and Fisheries will rely primarily on license fees. These organizations need assistance on raising funds to cover costs on a long-term basis, using trust funds and/or other means. USAID can help support this.

References Used and Cited

- Asare, Alex (June 2000) Operational Guidelines on Community Forest Management Committees. ITTO, Forest Management Support Centre, Kumasi.
- Besley, Timothy (1995) Property Rights and Investment Incentives: Theory and Evidence from Ghana. *Journal of Political Economy*, Volume 103.
- Bird, Neil, Timothee Fomete, and Gene Birikorang (February 2006) Ghana's Experience in Timber Verification System Design. Verifor Case Study 1.
- Birikorang, Gene and Matthias Rhein (March 2005) Reforming Ghana's Forest Fiscal Regime. Forest Sector Development Project. Accra.
- Botchie, George et. al. (July 2006) Land Tenure, Land Use, and Environment in Ghana. Institute of Statistical, Social and Economic Research. Accra, Ghana.
- Brashares, J.S., Arcese, P., Sam, M.K., Coppolillo, P.B., Sinclair, A.R.E. and Balmford, A. (2004) Bushmeat Hunting, Wildlife Declines, and Fish Supply in West Africa. *Science* Vol. 306: 1180-1183.
- Byers, Bruce (2005) Biodiversity & Tropical Forestry Analyses: Lessons Learned from Recent USAID Field Experience & Practical Guidelines for USAID Staff. ARD, Inc. Arlington, VA.
- Care International (November 2005) Proceedings Report: Community Based Natural Resource Management Workshop.
- Collaborative Resource Management Unit (January 2004) A Briefing Document: Collaborative Resource Management in Ghana. Wildlife Division of the Forestry Commission. Accra, Ghana.
- Collaborative Resource Management Unit (September 2005) Evaluation Report on Participatory Forest Management Project of the Forestry Commission. Accra, Ghana.
- Conservation International-Ghana (April 2002) Endangered Bushmeat Species in Ghana. Accra, Ghana.
- Conservation International-Ghana (undated) Handbook of Totems in Ghana: A Traditional Mechanism for Biodiversity Conservation. Accra, Ghana.
- Critical Ecosystem Partnership Fund (December 2000) Ecosystem Profile: Upper Guinean Forest Ecosystem of the Guinean Forests of West Africa Biodiversity Hotspot.
- Crook, Richard (November 2005) The Role of Traditional Institutions in Political Change and Development. CDD/ODI Policy Brief No. 4. Accra, Ghana.
- Crook, Richard C. (undated) State Courts and the Regulation of Land Disputes in Ghana: The Litigants' Perspective. Institute of Commonwealth Studies, University of London.
- Crook, Richard and Robert Addo-Fening (undated) Drivers of Change in Ghana, Case Study 1: Traditional and Religious Institutions and Their Role in Politics: Development and Conflict.
- Deodatus, Floris and Elijah Yaw Danso (January 2005) Wildlife Division Support Project, Ghana: Mid-Term Review. AIDEnvironment. The Netherlands.
- Domfeh, Kwame Ameyaw (2004) Managing the Environment in a Decade of Administrative Reforms in Ghana. *The International Journal of Public Sector Management*. Vol. 17, No. 7.

- Dougan, Henry (2003) *Securing Property Rights in Land: Politics on the land frontier in postcolonial Ghana and Botswana*.
- Entsua-Mensah, M. (2006) *The Importance of Sustainable Fisheries in Rural Economies*. *International Journal of Ecology and Environmental Sciences* 32(1): 119-125
- The Environment and Development Group (1998) *Wildlife Development Plan, 1996-2020 Volume 1: Overview and Summary; Volume 2b: Institutional Reform; Volume 7: Research and Monitoring*. Wildlife Department. Accra.
- Environmental Protection Agency (2003) *National Action Programme to Combat Drought and Desertification*. Accra, Ghana.
- Forestry Commission Corporate Plan, 2004-2006.
- Forestry Commission (undated) *Forestry Laws Simplified, Abridged Version*.
- European Commission (April 2004) *Forest Law Enforcement, Governance & Trade: Voluntary Partnership Agreements*. Briefing Note 07.
- Gari, Josep A. (July 2005) *Natural Resources Management and the Sustainability of Economic Growth*. The World Bank. Ghana.
- Gadzekpo, A. and L. Waldman (2005) *Environmental Considerations in the Ghana Poverty Reduction Strategy: Ghana Country Review*.
- Ghana Forest Management Certification Systems Project. Version 4. (November 2000) EU/FOR and NEDA Project.
- Ghana Forestry Commission (2002) *Ghana's Forests: Reporting Progress*. Timber Industry Development Division. Ghana Forestry Services. Accra, Ghana.
- Ghana Wildlife Society (February 2005) *West Africa Bushmeat Conference: Tackling the Bushmeat Crisis in Africa*. Ghana.
- Grubben, G.J.H. and Denton, O.A. (Editors) (2004) *Plant Resources of Tropical Africa 2 Vegetables*. PROTA Foundation, Wageningen, Netherlands/Backhuys Publishers, Leiden, Netherlands/CTA, Wageningen, Netherlands.
- Hall, J.B. and Swaine, M.D. (1981) *Distribution and Ecology of Vascular Plants in a Tropical Rain Forest Vegetation in Ghana*. W. Junk: The Hague, Boston, London.
- Hawthorne, W.D. and Abu-Juam, M. (1995) *Forest Protection in Ghana*. IUCN, Gland, Switzerland and Cambridge, U.K.
- Hawthorne, W.D. and Abu-Juam M. (1993) *Forest Protection in Ghana*. Report FIMP, Planning Branch, Forestry Department, Kumasi.
- Hilson, Gavin and Clive Potter (2003) *Why is Illegal Gold Mining Activity so Ubiquitous in Rural Ghana?* African Development Bank.
- International Association of Aquatic and Marine Science (September 2005) *Proceedings of the 2nd Africa Regional Group Conference*. Accra, Ghana.
- Kasanga, K. (2006) *Current Land Policy Issues in Ghana*. <http://www.fao.org/docrep/006/y5026e0a.htm>

Ministry of Environment and Science (October 3, 2005) Republic of Ghana Biodiversity Status Report: Third National Report. Accra, Ghana.

Ministry of Environment and Science (2002) National Biodiversity Strategy for Ghana. Accra, Ghana.

Ministry of Food and Agriculture (2004) Information on Fisheries in Ghana. The Directorate of Fisheries, Ministry of Food and Agriculture, Ghana.

Ministry of Lands and Forestry (June 1999) National Land Policy. Accra, Ghana.

Murphree, Michael J. (December 2002) Wildlife Division Support Project: 1st Input Report Community Based Natural Resource Management. Wildlife Division/IUCN.

Murphree, Michael J. (October 2005) Wildlife Division Support Project: CREMA Review. IUCN. Ghana.

Nature Conservation Research Centre (November 2005) Community-Based Ecotourism Project II: Program Description to USAID.

Nature Conservation Research Centre (undated) NCRC Project Report 2005: Cocoa Farming and Biodiversity in Ghana.

Newmont Ghana Gold and Gold Fields Ghana (February 2006) The Ghana Responsible Mining Alliance: GDA proposal to USAID.

Ntiemoa-Baidu, Yaa (May 1998) Wildlife Development Plan, Volume 6: Sustainable Harvesting, Production and Use of Bushmeat. Wildlife Department. Accra.

Oliver, Rupert and Emily Fripp (2005) Changing International Markets for Timber: What African Producers Can Do. African Timber Trade Forums, Timber Trade Federation.

Othene-Gyan, Godfred (2004) Conflicts in Forest Management and Land Use: Assessment on Land Reform Policies on Forest Establishments Towards Sustainable Land Use Development in Ghana, Masters Thesis. Brandeis University.

Pleydell, Geoffrey (2005) Wildlife in Ghana. Forestry Commission, Wildlife Division. Accra, Ghana.

PGRC (March 1995) Country Report to the FAO International Technical Conference on Plant Genetic Resources. Plant Genetic Resources Centre, Bunso, Ghana.

Quaison, Kwamena Essilfie (undated) National Reports on Coastal Tourism: Ghana. Ministry of Environment & Science & Ministry of Tourism and Modernization of the Capital City.

Quaye, E.C. (1994) Biomass Energy and the Fish-Smoking Industry in Ghana. *Journal of Energy Research and Technology*, 6:53-60

Quaye, E.C. (1996) Energy Demand in the 21st Century: The Role of Biofuels in a Developing Country. *Renewable Energy*, 9:1029-1032.

Sarfo-Mensah, Paul, Ernestina Fredua Antoh, and Akwasi Owusu-Bi (February 2004) The Nature and Role of Local Benefits in GEF Programme Areas: Case Study. Natural Resources Management Project, GEF.

Silverman, Joanne (2002). An Evaluation of the Use of Improved Cook Stoves in Africa. Evaluation prepared for UNEP.

Smith, Kofi E. (January 1999) Developments and Setbacks in Forest Conservation: The New Political Economy of Forest Resource Use in Southern Ghana. Natural Resources Management Programme. Ministry of Lands and Forestry. Accra, Ghana.

Smith, Kofi E. (April 1996) A Case Study of Ghana's Forest Policy: The Interim Measures to Control Illegal timber Harvesting Outside Forest Reserves. African Policy Forum Presentation. Nairobi, Kenya.

The Fisheries Act (625) (2002) Accra, Ghana.

Tutu, K.A., Y. Ntiemoa-Baidu, and S. Asuming-Brempong (1996) The Economics of Living with Wildlife in Ghana. University of Ghana. Legon, Ghana.

UNDP (November 2004) Liquefied Petroleum Gas Substitution for Wood Fuel in Ghana: Opportunities and Challenges.

UNDP and CI (2004) Conservation of Globally Significant Biodiversity in Cocoa Production Landscape in West Africa. (approved GEF project proposal).

United Nations FAO (2003) Introduction and Status of the Forestry Sector in Ghana.

USAID/Ghana (2005) USAID/Ghana Strategy Statement (includes ETOA update). Accra, Ghana.

USAID/Ghana (2004) Biodiversity/Tropical Forest 118/9 Update. Accra, Ghana.

USAID/Ghana (July 2003) USAID/Ghana Country Strategic Plan. Accra, Ghana.

Van Edig, Annette, Stefanie Engel, and Wolfram Laube (2003) Ghana's Water Institutions in the Process of Reform: from the International to the Local level.

Wilcock, David et. al. (February 2003) Assessment of the Agriculture Sector and Natural Resources Management in Ghana. USAID/Ghana.

Wildlife Division Policy for Collaborative Community Based Wildlife Management (September 2000) Accra, Ghana.

World Bank (October 2005) Ghana CEA Aide Memoire (unpublished).

World Bank (February 2002) Project Appraisal Document on a Proposed Grant from the GEF: Northern Savanna Biodiversity Conservation Project.

World Bank, et. al. (June 2006) Ghana: Country Environmental Analysis, Final Draft. Country Dept. 10, Africa Region.

www.earthtrends.org

www.iucn.org (IUCN in West Africa: Challenges and Opportunities, undated)

www.....(Ghana national report: land and water)

http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/003/AB567E/AB567E02.htm

http://www.fao.org/ag/agL/swlwpnr/reports/rc_codes.htm

<http://www.ruralpovertyportal.org/english/regions/africa/gha/geography.htm>

[http://ams.allenpress.com/amsonline/?request=get-document&doi=10.1175%2F1087-3562\(2004\)8%3C1:LCAITV%3E2.0.CO%3B2](http://ams.allenpress.com/amsonline/?request=get-document&doi=10.1175%2F1087-3562(2004)8%3C1:LCAITV%3E2.0.CO%3B2)

http://en.wikipedia.org/wiki/Geography_of_Ghana

<http://www.maptown.com/geos/ghana.html>

<http://rainforests.mongabay.com/deforestation/2000/Ghana.htm>

http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at1401_full.html

www.unesco.org/education/tlsf/theme_c/mod13/www.worldbank.org/depweb/english/modules/glossary.htm.

ANNEX 1: ETOA Team Bios

For the past six years, Karen Menczer has worked as an independent consultant covering areas such as natural resources management, biodiversity conservation, and environmental impact assessment. Prior to that, for two years she was Natural Resources Advisor at USAID/Uganda, and from 1991-1997, worked at USAID in Washington in the Latin America and Caribbean Bureau/Environment Team. Her degrees are in Ecology, and she did field work in Galapagos, Ecuador towards a PhD.

Professor Eric Quaye is a Fulbright Scholar and an Associate Professor of Ecology at the University of Cape Coast. He graduated with a B.S. degree in 1972 with a Biology major and Education minor. He was appointed an assistant lecturer in 1975, and in 1978 attended Oregon State University for a Ph.D. He returned to UCC in 1982. Professor Quaye has conducted extensive research and published over 20 articles in journals in the area of tropical forest ecology and conducted several EIAs for SGS Environment (Ghana).

Annex 3: List of Individuals Contacted

Name	Affiliation
Dr. Hederick Dankwa (roundtable participant)	CSIR, Water Research Institute
Kingsley E.G. Sey (roundtable participant)	EPA
Osei-Amakye (roundtable participant)	EPA
Ebenezer Sampong	EPA
Edem Ekpe (roundtable participant)	Ghana Wildlife Society
Oppon Sasu (roundtable participant)	Forestry Commission, Forest Services Division
Mike Adu-Nsiah (roundtable participant)	Forestry Commission, Wildlife Division
A.K. Agyare (roundtable participant)	Wildlife Division, Collaborative Resource Manager
J.Y. Oppong (roundtable participant)	Assistant P.R/Media Communications Manager
Yaw Osei-Owusu (roundtable participant)	Conservation International
John Mason (roundtable participant)	NCRC
Terry Green	FRR
Victoria Wiafe	FRR
Donna Sheppard	NCRC, Xavi Ecotourism site
Hannah Bowen	NCRC Peace Corps Volunteer, Xavi Ecotourism site
Dr. K. Ofori-Frimpong	Cocoa Research Institute-Ghana
Alex Asase	University of Ghana
Roxanne Roberts	CIDA
Wilma van Esch	Embassy of Netherlands
John Dadzie-Mensah	CARE International
Larry Dolan	USAID/Ghana Education SO
Rob Clausen	USAID/West Africa
Sam Ocran	USAID/Ghana D & G SO
Tim Donnay	USAID/Ghana Program Office
Regina Dennis	USAID/Ghana Program Office
Alfred Osei	USAID/Ghana Title II Program
Emanuel Essandoh	USAID/Ghana Health SO
Adeline Ofori-Bah	USAID/Ghana Econ Growth SO & MEO
Jerre Manarolla	USAID/Ghana Economic Growth SO
Ron Stryker	USAID/Ghana Economic Growth SO
Okyeame Oampadu-Agyei	Conservation International
C. Opoku	Forest Watch
Chris Manu	Friends of the Earth
Balertey Gormey	Green Earth
Ama Kudom Agyemang	League of Environmental Journalists
Staff	Fisheries Commission
Dr. J.H. Cobbinah	FORIG
Lucy Amissah	FORIG
Albert Katako	CARE International (Takoradi)
Prof. S.J. Quarshie-Sam	KNUST
Dave Ingle	NEWMONT (Ahafo)
K. Amagashie	ALCOA
Prof. A.A. Oteng-Yeboah	CSIR
Dr. Mamaa Entsua-Mensah	CSIR
Jonathan Allotey	EPA, Executive Director
John Otoo	Forestry Commission

ANNEX 4: Field Trip Itineraries

Volta/Eastern Regions (Karen Menczer)

June 11: Tafi Atome Monkey Sanctuary, Hohoe District, Volta Region

One of NCRC's oldest locations in Ghana. The community has several hundred years of relationship with the True mona monkey. This is the most important population of this sub-species left in Ghana. NCRC started working at Tafi in 1996 when zero tourism occurred and the monkeys were down 28 individuals remaining. The community receives + 3,500 tourists a year now, has several hundred million in tourism related revenue each year and has a monkey population over 150 individuals. It is an interesting case of how a community has been able to grow a tourism enterprise, create local employment and income, enhance biodiversity conservation at the local level, and plow significant tourism moneys into local community projects such as primary school renovation, student scholarships, village lighting, etc.

June 12: Avu Lagoon, Akatsi District, Volta Region

This project site is one of the locations where NCRC is working to establish a community-run sanctuary area for Western Sitatunga along the lines of the highly successful Wechiau Hippo Sanctuary. This is a good site to look at an excellent example of the collaboration between US Peace Corps, NCRC and communities. NCRC is currently undertaking the detailed biological and socio-economic baseline studies for this site and facilitating the community negotiation process with support from IUCN-Netherlands Committee.

June 13: Adjeikrom, Fanteakwa District, Eastern Region

This project site is an example of the collaboration between NCRC, Cocoa Research Institute of Ghana (CRIG), Earthwatch Institute - Europe and private CSR funds from Cadbury-Schweppes plc. The project is a combination research & tourism project where the parties are examining how biodiversity levels change in 5 different cocoa growing conditions.

Field Trip Itinerary: Brong Ahafo/Ashanti Regions (Eric Quaye)

August 4: Bosumkese FR and Amama Shelterbelt FR

The operations of NGGL are supposed to affect one of these FRs in the Ahafo area where mining operations have started. The Yamfo area ore is supposed to be hauled by road to the main plant at Ntortroso. The haulage road is supposed to go through one of the FRs. A discussion with the GM, Dave Ingle, however, revealed that the haulage by road idea has been shelved and the company is now assessing two options for a conveyor belt system. The belts will still have to pass through one of the two reserves, although the degree of damage will reduce considerably compared to a haulage road.

A potential threat to the area close to Bosumkese where the modified taungya system of reforestation is being practiced, is the observation of a gregarious tree species, *Broussonetia papyrifera* (common name: Pulp Mulberry?Yorke) introduced into the country for pulp and paper.

August 5: FORIG, KNUST and Owabi Ramsar Site

Unfortunately, there was no literature whatsoever on any research work done at the wetland site, although I was informed that a student from the IRNR has done some project work in the area but the report could not be found. In view of the foregoing, I decided to take a trip to the site. Just like the coastal Ramsar sites, the Owabi site is also seriously under threat from encroachers.

At FORIG, I had discussions with Mrs. Lucy Amissah, the scientist in charge of their biodiversity program and the Director of FORIG, Dr. Cobbinah. So far as threats are concerned, it was the opinion of Mrs. Amissah that the following are the major threats, with specific reference to the MSD and DSD forests:

Bushfires – there was the need to get local communities involved in protecting the forest from bushfires by constructing fire belts; Invasive Species – The invasive species mentioned in connection with the Bosumkese FR is supposed to be a threat in the Afram Headwaters FR and has the potential to become an alien invasive species if care is not taken to control it at this stage; Logging Operations – Although there is a manual to guide timber concessionaires in their logging operations, these are not followed and the FSD

cannot check the violations because they lack the logistical support; Policies and Strategies – Most stakeholders in the timber industry as well as local communities are simply not aware of certain government policies and strategies regarding biodiversity conservation. For instance, a lot of people do not know about GSBAs or how these should be taken care of to protect biodiversity in some of our forest reserves.

Dr. Cobbinah, on the other hand, identified the following factors as the major threats to biodiversity conservation with specific reference to the forest ecosystem: Management – Management of forest resources has been left in the hands of the FC without much participation of the local people. At the local level, the indigenous people who utilize the resource are ignored. The concept of benefit-sharing is not being applied and only custodians of the stool receive royalties. The local people are even afraid to enter the reserves for NTFPs and whenever they do, they exploit the resource anyhow without recourse to conservation. Typical examples can be found in the exploitation of rattan, cane and bamboo. Poverty will always compel the local people to enter the reserves for one reason or the other.

Governance – The timber merchants have become quite powerful and have direct access to government. Thus, the FC has become ineffective in checking logging operations that are harmful to biodiversity conservation.

Two separate field trips to the Western region by Quaye and Menczer; Menczer to attend a CREMA community meeting; Quaye to visit CARE.

ANNEX 5: Endemic Species in Ghana

Name	Family	Forest Type	Life Form	Neo-or Palaeo-endemic
<i>Alsodeiopsis chippii</i> Hutch	Icanaceae	WE	Pygmy tree	Neo
<i>Bonamia vignei</i> Hoyle	Convolvulaceae	MS	Large climber	Palaeo
<i>Bowringia discolor</i> J.B. Hall	Papilionaceae	WE	“	“
<i>Cola umbractilis</i> Brenan & Keay	Sterculiaceae	WE	Small Tree	Neo
<i>Commiphora dalzielii</i> Hutch	Burseraceae	SO	Shrub	Palaeo
<i>Dalbergia setifera</i> Hutch & Daiz	Papilionaceae	SM	Small tree	Neo
<i>Diaphanthe suborbiculatis</i> Summeth	Orchidaceae	DS	Epiphytic herb	“
<i>Dissotis entii</i> J.B. Hall	Melastomataceae	MS	Ground Herb	“
<i>Grewia megalocarpa</i> Juss	Tiliaceae	SM-SO	Shrub	Palaeo
<i>Hymenostegia bowlingii</i> (J.B. Hall) C.Cusset	Caesalpiniaceae	WE	Medium Tree	Neo
<i>Ledermanniella bowlingii</i> (J.B.Hall) C. Cusset	Podostemaca	DS	Aquatic herb	Palaeo
<i>Monocyclanthus vignei</i> Keay	Annonaceae	WE	Pgmy tree	“
<i>Nephtytis swainei</i> Bogner	Araceae	ME-WE	Ground	
<i>Oleandra ejurana</i> C.D. Adams	Davalliaceae	DS	Epiphytic fern	“
<i>Psychotria ankadensis</i> J.B. Hall	Rubiaceae	WE	Ground herb	“
<i>Talbotiella gentii</i> Hutch & Greenway	Caesalpiniaceae	SO-SM	Medium herb	“
<i>Turraea ghanensis</i> J.B. Hall	Meliaceae	SM	Pygmy tree	“
<i>Uvariopsis globiflora</i> key	Annonaceae	MS	Small tree	Neo
<i>Virectaria tenella</i> J.B Hall	Rubiaceae	DS	Ground tree	Palaeo

Source: Hall and Swaine 1981

WE = Wet Evergreen
 MS = Moist Semi-deciduous
 SO = South-east Outlier
 SM = Southern Marginal
 DS = Dry Semi-deciduous

Other endemic species in Ghana are (National Biodiversity Strategy, 2002):

Frogs: *Hyperolius baumanni*, *H. fusciventris*, and *H. sylvaticus*

Lizards: *Agama sylvanus* (Bia Forest Reserve and the Atwema Range Forest Reserve)

Gymnosperm: *Encephalartos bartei*

(no widely accepted English common names for the above)

List does not include vegetation other than forest trees and gymnosperms nor does it include butterflies, and other insects.

ANNEX 8: GOG Institutions and NGOs

The following institutions are indirectly involved in biodiversity conservation and forest management.

1) Water Resources Commission: Established in 1996, by the Water Resources Act, the WRC oversees the management of the country's water resources, deals with international management issues, and serves as an umbrella institution for national water policy. Government agencies responsible for water use for irrigation, mining, hydropower, etc. must apply to the WRC for a license to use water. The International Waters Committee is part of the WRC and is tasked with identifying international waters and drafting bilateral agreements; establishing mechanisms for informal discussion on a technical level with the riparian countries; and examining the possibility of initiating a multi-national regional agreement for the development of the Volta Basin.

2) Water Directorate, Ministry of Water Resources, Works and Housing: Responsible for setting and monitoring the implementation of policies on water and water-related sanitation, and coordinating activities of water sector agencies. The Strategic Investment Program (SIP) 2005-2015 is designed to rationalize, promote, and improve the delivery of Water Supply and Sanitation (WSS) services in terms of economy, efficiency, effectiveness and satisfaction. Urban water supply has been de-coupled from rural and small town water supply and the Ghana Water Company Ltd. (GWCL) remains the single utility, with a presence in all ten regions of the country. Urban sanitation (sewerage) has been ceded to Local Assemblies, but this remains a formidable challenge. A consolidated National Water Policy is being finalized to guide all sector activities (currently waiting for Cabinet assent). Community Water and Sanitation Agency (CWSA) provides DAs support in the delivery of WSS in rural and small towns.

3) Volta River Authority: Responsible for hydropower production and the management of the Akosombo dam.

4) Ministry of Tourism: Implements the Tourism Policy and Tourism Development Plan for Ghana (1996-2010). See below.

5) Ministry of Food and Agriculture (MOFA) has the responsibility for agricultural production with the exception of cocoa, coffee, shea nut, and kola, which are the responsibility of the Ghana Cocoa Board.

6) Universities: The departments of Botany, Oceanography and Zoology at the University of Ghana; the departments of Environmental Science, Entomology and Wildlife, and Fisheries and Aquatic Sciences and the Center for Coastal Zone Management at the University of Cape Coast; and the Institute for Renewable Natural Resources and the Department for Applied Biology at the Kwame Nkrumah University of Science and Technology are all engaged in teaching and research of issues relating to the environment in general and in some cases to Conservation Biology specifically.

7) Center of Scientific Research into Plant Medicine: Established in 1974, the Centre is located at Mampong in the Eastern Region of Ghana, and carries out systematic research on the efficacy of herbs used by indigenous healers. The Centre also has a clinic where herbal preparations are made and used in treatment of various diseases.

8) ECOWAS, the 16 nation economic community, is involved in governance, peace, and security, and includes environmental degradation and monitoring among its goals. It considers environmental and resource management to be essential strategic components of a strengthened regional economy (CEPF, 2000). ECOWAS has taken steps to develop an Environmental Monitoring Information System (CEPF, 2000).

Descriptions of key NGOs involved in biodiversity and forest conservation follows:
International NGOs

1) Conservation International: CI-Ghana was established in 1991 to protect Upper Guinea Hotspot biodiversity. Since CI's first project in Kakum National Park in 1999, it has expanded its focus to the national level. CI-Ghana focuses on prevention of species extinction, increasing protection, and improving management of forest fragments, and the development of biodiversity corridors, with a special focus on the CI-designated biodiversity hotspot; also works with Newmont and ALCOA mining companies to conduct biodiversity assessments in the vicinities of the mines, at Ahafo, Akyem, Atewa, and Nyinehin; has a GEF grant to implement a project in the Western region to encourage shade grown cocoa rather than full-sun cocoa.

2) Nature Conservation Research Centre (also see description, Section 6.2.1): NCRC activities (other than those funded by USAID) include collaboration with the Cocoa Research Institute of Ghana (CRIG), Earthwatch Institute – Europe, with private Cooperate Social Responsibility funds from Cadbury-Schweppes plc is examining biodiversity levels under five different cocoa growing conditions, and developing the first cocoa farm tourism initiative in Ghana. NCRC is also involved in an activity that is using the innovative conservation approach pioneered by NCRC at the Wechiau Hippo Sanctuary, Upper West Region. The approach will be replicated in the freshwater wetlands of the Avu Lagoon in the Volta Region in order to create a community protected sanctuary for the Western Sitatunga.

3) CARE implements five activities in the E/NR sector: Forest Livelihoods and Rights for Sustainable National Resource Management (FOREST) aims to enhance capacity of forest fringe communities and forest users to access benefits from forest products and forest management. This project supports CREMA development in the Western Region; Civil Society Capacity Support in ANR (CISOCS) builds capacity of civil society organizations in best practice development; Sustainable Farming Systems Extension (FASE) supports effective extension services, such as community-based extension; Security of Land Tenure (SLATE) supports the development of community-based land administration systems; and Bushfire Management Component (BURN) in collaboration with the Danish Embassy, addresses bushfire management in Northern Ghana by developing community bushfire management systems.

4) International Union for the Conservation of Nature (IUCN—aka, the World Conservation Union): As of June 2006, implementing “Strengthening Voices for Better Choices” to improve community access to and benefits from Ghana’s forests.

National NGOs:

1) Ghana Wildlife Society, a local organization working in the following areas: monitoring waterbirds in Ghana’s coastal Ramsar sites; implementing Ghana’s Important Bird Areas (IBA) project which supports habitat inventories; Ghana Bird Ringing Scheme; CBNRM activities; and a Marine Turtle Conservation Initiative to increase public awareness and monitoring and protection of turtle nests.

2) Ghana Wildlife Clubs: support activities in schools throughout Ghana, which serve to increase awareness and appreciation of wildlife and natural areas.

3) Friends of the Rivers and Water Bodies: based in Kumasi, focuses on tree planting programs to protect river banks against erosion.

4) Ghana Heritage Conservation Trust: At its inception, supported by USAID, with US \$2 million, in August 1996 to provide funds for the conservation, protection, and maintenance of the Cape Coast Castle, Elmina Castle, Fort St. Jago (Elmina), Kakum National Park and Assin Attandanso Resource Reserve. The Trust was registered in August 1997. Since September 11, 2001, the trust fund lost a significant amount of money, and performance has declined. Maintenance at the parks and at the castles have suffered, and according to WD, the Trust has been unresponsive to requests, and not transparent about their situation.

5) Forest Watch: A coalition of 34 environmental NGOs, which acts as an advocacy group looking after the interests of communities in terms of exploitation of their natural resources, specifically, forests. Their objectives are to ensure: fair access to forest resources; fair benefit sharing of exploited forest resources; more stakeholder participation in sector governance; and greater civil society involvement in conservation. The group also plays a role in conflict resolution between communities and the FC. Forest Watch received funding from DfID, and has grown into a fairly effective coalition, played a role in government’s decision to stop issuing TUPs, and recently was even invited to a FC human resources workshop, an indication of the group’s growing influence in the forest sector.

6) The Green Earth Organization –This is a local NGO that has focused its activities so far on three major objectives:

- Environmental advocacy and public education mainly through a magazine, the “Green Dove”
- Environmental research, especially in wetlands
- Reclamation of degraded wetland areas

The organization has so far engaged in afforestation and mangrove transplant programs, especially in the Keta and Ada wetlands. In Ada, it was discovered that although the indigenous people did not eat turtles because it was a taboo to do so, they still hunted the

animals to sell in Accra because there was a market there for it. Funding for some of their activities has come from Ramsar (Small Grants) and IUCN.

7) Friends of the Earth-Ghana: Established in 1986 with a vision that Ghana should become “an ecologically and economically sustainable society based on equitable distribution of resources to both men and women and the highest achievable standard of living for all.” FOE’s objectives are: environmental education to help people appreciate the environment; initiate and support local community action to protect their environment; lobby government to consider environment issues in all development programs; promote women’s empowerment and gender equity. FOE emphasizes population increase as the major threat to biodiversity conservation by linking population pressure and land use. In collaboration with World Wide Fund for Nature, FOE signed an agreement with one of the largest timber companies in Ghana, Samartex Timber and Plywood Co. Ltd, to implement activities that may eventually lead to Forest Stewardship Council (FSC) certification.

8) Ghana Association for the Conservation of Nature (based in Kumasi), implemented the Sacred Groves Conservation Project. Significant biodiversity still exists in the over 2000 sacred groves in Ghana (Wildlife Development Plan, Vol 1).

13) The League of Environmental Journalists is an association of professional journalists who bring topical environmental issues to the limelight for discussions and debates by the general public through print and electronic media. The League also organizes training sessions for new journalists including field trips for first-hand information on environmental reporting. Some of the environmental issues that have been focused on include the deforestation threat posed by surface mining and bush burning. The LEJ is a member of the African Network of Environmental Journalists located in Kenya and the current Director is the Vice-President of the Network.

14) West African Primate Conservation Action: The main goal of WAPCA is to promote effective conservation of primate species in the West-African Upper Guinean Rainforest, which are seriously threatened by extinction.

15) WACAM, established in 1998, focuses on mining-related human rights and environmental problems. The group has worked with 70 communities to help improve mobilization, advocacy, and campaigning skills, and educating them about their right to clean water and land.

Annex 7: Ghana's Medicinal Plants

From: Ghana: Country Report to the
FAO International Conference on Plant
Resources, Bunsu 1995.

Group A (Very rare species)

1. *Cnestis ferruginea*
2. *Corynanthe pachyceras*
3. *Croton membranaceus*
4. *Dialium guineensis*
5. *Kigelia africana*
6. *Pachypodanthium staudtii*
7. *Mitragyna stipulosa*
8. *Treulia Africana*

Group B (Not very rare but being threatened)

1. *Albizia ferruginea*
2. *Antiaris africana*
3. *Bosqueia angolensis*
4. *Canthium glabriflorum*
5. *Carapa procera*
6. *Claysena anisata*
7. *Fagara xanthoxyloides*
8. *Khaya ivorensis*
9. *Maytenus senegalensis*
10. *Pseudocedrela kotschy*
11. *Strophanthus gratus*
12. *Terminalia glaucescens*
13. *Trichilia heudelotii*
14. *Trema orientalis*

Group C (Common medicinal plants)

1. *Albizia ferruginea*
2. *Antiaris africana*
3. *Bosqueia angolensis*
4. *Canthium glabriflorum*
5. *Carapa procera*
6. *Capsicum annum*
7. *Capsicum frutescens*
8. *Carica papaya*
9. *Cassia alata*
10. *Cassia occidentalis*
11. *Clausena anisata*

12. *Cnestis ferruginea*
13. *Corynanthe pachyceras*
14. *Croton membranaceus*
15. *Dialium guineensis*
16. *Euphorbia hirta*
17. *Fagara xanthoxyloides*
18. *Justicia flava*
19. *Khaya grandiflora*
20. *Khaya ivorensis*
21. *Khaya senegalensis*
22. *Kigelia africana*
23. *Mangifera indica*
24. *Manihot esculentus*
25. *Maytenus senegalensis*
26. *Mitragyna stipulosa*
27. *Ocimum viride*
28. *Pachypodanthium staudtii*
29. *Parkia clappertoniana*
30. *Pseudocedrela kotschyii*
31. *Rauwolfia vomitoria*
32. *Strophanthus gratus*
33. *Sporobolus pyramidalis*
34. *Trema orientalis*
35. *Terminalia glaucescens*
36. *Treulia africana*
37. *Trichilia heudelotii*

Annex X: Detailed Threat Analysis: Unsustainable Practices

1) Inappropriate agricultural practices threaten land and water resources: The agricultural system most widely used, slash and burn, degrades land, and increases erosion and siltation of water bodies, and fires set to clear land for agriculture spread to areas beyond those intended. Since the agricultural system is unsustainable—soils are depleted of nutrients after a few years, erosion removes the topsoil—farmers move on to new plots, and since vacant land is at a premium, may encroach into PAs. PA land is often viewed as not being used by anyone, not belonging to anyone.

Forests in the Western region are some of the most biodiversity-rich in the country, as described in this report. The Western region has the highest concentration of timber resources and is at the frontier of cocoa expansion. Cocoa is a particular concern because of the export value and the expansive production base. While cocoa was traditionally produced in a shade-grown/low-no chemical regime, farmers are now shifting to full-sun/high input cocoa cultivation, in which tree cover is removed, destroying biodiversity. The former system conserved—and used—biodiversity as part of the farming system; the latter results in wide-spread destruction of biodiversity and as a mono-crop system, requires high levels of chemicals for consistent productivity. Forests in the Western region are at particular risk because, even though some soils are not suitable for cocoa production, it remains the main cocoa growing area in Ghana, contributing to 51 percent of total yields, and at the same time, Western region experiences a high rate of forest destruction. There have also been cases of encroachment into forest reserves by cocoa farmers.

2) Unsustainable production of charcoal and collection of fuel wood:

Ghana relies mainly on wood, oil, and electricity for its energy requirements. Wood fuels, mainly in the form of fuel wood and charcoal, make up 75 percent or more of the national energy consumption. According to the EPA, in 1985 this amounted to 2 million cubic meters of fuel wood and charcoal (EPA, 2002). For the rural and urban poor, fuel wood and charcoal are particularly important sources of energy. Most charcoal and fuel wood comes from northern savanna and the DSD forest zone. After commercial logging, agricultural expansion, and mining, wood fuels are # 4 in contributing to deforestation in Ghana (UNDP, 2003).

In rural areas, fuel wood constitutes a far greater percentage, while charcoal predominates in urban areas. Fuel wood is also the backbone of rural and cottage industries and provides nearly all the household energy used for cooking and heating (Quaye, 1996).

With increasing urbanization, the demand for charcoal will grow, with a concomitant reduction in the demand for fuel wood (Ampadu-Agyei, 1994). Quaye (1994) reports that the fish-smoking industry alone consumes so much fuel wood that the use of fuel wood in cottage industries can only increase based on the current population growth rate. This has serious implications for the rate of deforestation, especially in the DSD forest and northern savanna zones.

In dryer parts of the country (in the northern savanna), charcoal-making from trees grown on fallow agricultural land may provide the only source of household income. Whereas charcoal production and fuel wood collection can have serious environmental consequences, they are important for income generation, especially in Ghana's more impoverished northern regions.

UNDP, in partnership with the GOG, is promoting liquefied petroleum gas (LPG) as a substitute for wood fuels. According to UNDP, LPG is produced in sufficient quantity at the Tema Oil Refinery to meet domestic energy demand (as a replacement for wood fuel uses), with surplus for export.

Improved cook stoves (solar, fuel-efficient, briquette stoves) have been introduced (Enterprise Works, supported by USAID/Ghana), but often these are unappealing—rural populations are slow to make changes, and are more apt to stick to traditional methods. Substituting improved cook stoves has been most successful when health is cited to promote a change in cooking methods (Silverman, 2002).

In light of the contribution of wood fuels (charcoal and fuel wood collection) to incomes of the rural poor, a system of regulating charcoal and fuel wood sellers and certifying the source of their product (from plantation/wood lot) could help bring greater sustainability to the fuel wood-charcoal business.

3) Unsustainable and illegal hunting for the bush meat trade is resulting in decreased numbers of wildlife:

Practices used to hunt wildlife for bush meat involve setting fires, using traps and snares, using dogs, and shooting. Fires and traps kill indiscriminately, without regard for protected status, gender, and reproductive state.

Trade in bush meat is estimated at US \$200-300 million/year (CRMU 2004). Bush meat is an important part of the diet for Ghanaians from all income levels, and for many, it is the preferred protein source (Ntiama-Baidu 1998). According to the World Bank PAD (2002), wildlife exploitation has been largely uncontrolled in the off-reserve areas, and even inside PAs, it is “serious and chronic.”

“Ghana faces a serious species extinction crisis. In essence, the current rate of exploitation of wildlife resources is both economically and environmentally unsustainable” (Gari 2005).

WD staff (with the jurisdiction to control hunting) stated that attitudes and behaviors are not well understood regarding bush meat demand. For example, a recent article (and others previously) found that the decline in mammal populations involved in the bush meat trade is linked to the availability of fish; during years of poor fish supply, there is more pressure on wildlife, hunting increases and numbers decline. The study found that “fish supply is linked negatively to the price of fish, the number of wildlife hunters, and the sales and supply of bush meat in local markets” (Brashares et. al. 2004). Results also showed that “the substitution of fish for bush meat is most evident close to the coast, where fish are more important in diets and for livelihoods. However, wildlife professionals (almost all those interviewed by the ETOA Team), were largely unaware of this possible link between bush meat and fisheries, and doubted its veracity. Most E/NR professionals stated that campaigns to discourage people from eating bush meat have failed because the campaigners have not understand the underlying causes, the diverse behaviors, attitudes, and preferences among the Ghanaian population, and this gap must be filled first to generate responses to illegal and unsustainable hunting for bushmeat trade.

In general, the discussion by wildlife professionals on the Brashares et. al. article went as follows: although this study established some correlations between bush meat hunting, wildlife decline, and fish supply using data from Ghana, direct causal relationship between fish supply and bush meat demand needs further analysis. The fishing industry in Ghana is based on resources from the marine and to a lesser extent, inland (freshwater) sectors. The marine fisheries sector contributes about 3 percent of the nation’s GDP. Fish is the preferred and cheapest source of animal protein and per capita consumption is estimated at about 25 kg per annum, representing 60 percent of animal protein intake by the Ghanaian populace; in 2002 the country exported US \$95 million worth of fish and fishery products (MOFA 2004). Any decline in fish supply may elicit various responses from government as well as individual Ghanaians. Some of these responses may include fish imports by government, increase in consumption of animal protein, not necessarily bush meat, by the affluent in society, and decrease in intake of protein in general by the poor coastal dwellers and other poor rural folk. Even if more bush meat becomes available on the market when fish supply is low, the issue of affordability will still play a major role in determining the hunting and consumption of bush meat.

3) Inappropriate fishing practices result in overexploitation of the resource and destruction of habitat: While trawling is an accepted fishing method world-wide, when it takes place in areas not earmarked for it, it can destroy fisheries habitat and over-exploit the resource. Trawlers are not supposed to trawl in the Inshore Exclusive Zone (30 m depth from the shore). Inshore areas serve as spawning grounds for most fish and are destroyed by trawling activities. In addition, some trawlers operate with nets with mesh sizes below the 75 mm (stretched) recommended. They also destroy fishing gear of artisanal fishers and conflicts result. The threat mainly comes from lack of adequate monitoring of trawlers’ practices. The use of poison—common in Ghana’s small-scale and artisanal fisheries—indiscriminately kills fish of all age classes. The majority of Ghana’s population relies on fish for its protein requirements (and the over-exploitation of fisheries may be, in part, driving the bush meat trade).

4) Extractive industries, especially illegal operators, pollute waters and destroy landscapes. Salt mining, sand mining, gold mining, and mining for other minerals can result in widespread damage to the environment. While legal operators are held to specific standards and monitoring and put up a bond to ensure environmental safeguards

are in place, due to the nature of mining, significant impacts occur, some may be short-term, but many will be long-term. Illegal mining is rampant, and government capacity to enforce regulations is minimal since small-scale miners are ubiquitous and mobile, and they make up the greatest portion of illegal operators. Monitoring the activities of artisanal and small-scale mining operations to protect against pollution and to require compliance with a set of conditions requiring the land to be reclaimed would require significant—and unavailable—budgetary and human resources. According to Hilson and Potter (2003), in Ghana, small-scale and artisanal gold miners are “...ravaging landscapes and quickly abandoning unproductive sites without reclaiming excavated pits and trenches.” In addition, mining uses water resources, and conflicts with other uses of water (for agriculture, washing, drinking, and wildlife). The pollution and landscape-level damage that results from poorly operated mining sites affects fisheries resources, soil, vegetation, and wildlife habitat. In addition, miners, especially small-scale and artisanal, often operate in relatively isolated areas, which are difficult to police, and have no access to other sources of protein so are likely to poach game and use fuel wood.

Most mining activity takes place in the more biodiverse areas of Ghana. For example, during the 1990s, Mineral Prospecting Licenses were issued which included portions of Forest Reserves, and mining companies were allowed to explore within these reserves in accordance with their license requirements. However, a moratorium was declared on further exploration in FRs in March 1996. The government’s *Environmental Guidelines for Mining in Production Forest Reserves in Ghana* (May 2001) state that since some mining companies used good environmental practices, and had invested large sums, the policy was revised to allow exploration activities to take place on a total of two percent of the land area in FRs. Mining in FRs remains one of the most contentious environmental issues in the mining sector since a significant portion of the FRs are located in mineral rich areas, and illegal miners as well as large scale mining companies have identified gold deposits in the reserves. Gold reserves have been identified in FRs in Eastern, Ashanti, Western, and Brong-Ahafo Regions, and leases for several of these have already been let.

The mining sector in Ghana is complicated by land tenure and mineral acquisition rights, and inherent in this sector, limited consultations among interest groups, as mentioned in Section 7, Threat 1, regarding the Mineral Development Fund.

5) Setting bush fires to clear land for agriculture, to improve land for grazing, for hunting animals, for harvesting honey from the wild, and for charcoal production inadvertently or purposefully destroys vegetation and wildlife. Bush fires are common during the dry season, and occur in the northern savanna as well as in forested areas, and destroy habitat and wildlife. Because they clear land of most vegetation, they also result in increased erosion and sedimentation of water bodies, and because forests and other natural vegetation provide cooler micro-climates than surrounding areas, bush fires increase local temperatures. The effects of climate change are exacerbated by bushfires. Rainfall is affected—evapo-transpiration is decreased, as is rainfall, and desertification/land degradation occurs. Water quality and quantity are also affected—sedimentation degrades water quality, agricultural chemicals are washed into water bodies, further affecting the quality. Destruction of vegetation and the resulting decrease in rainfall results in diminished quantity of water available. Fisheries habitat and resources are degraded or destroyed, and wildlife habitat and natural vegetation is degraded, fragmented and destroyed.

6) Filling of wetlands for development and degradation from pollution. Especially along the coast, wetlands, important for migratory and resident birds, and for other wildlife, for flood attenuation, serve to protect the shoreline, and are fish nurseries, are affected by rampant development. Port areas (Tema, Takoradi, etc) have long ago destroyed the wetland resources that once ran along most of the coastline. Now, with industrial, residential, and commercial developments, and salt mining, wetland areas are squeezed to an even smaller margin. There is tremendous pressure on the resource from developers, pollution, and from unsustainable use. Ramsar, while offering some visibility gives no power to regulate. EPA’s regulations on EIA and pollutant discharge are the main tools, along with CBNRM, available to protect the nation’s wetlands.