USAID | GHANA
FROM THE AMERICAN PEOPLE

BIODIVERSITY AND TROPICAL FORESTS ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT

May 2011
This report was produced for review by the United States Agency for International Development (USAID). It was prepared by U.S. Forest Service, International Programs.

COVER PHOTOS (Kakum National Park and Cape Coast Fishing Boats) Courtesy of USFS, IP

BIODIVERSITY AND TROPICAL FORESTS ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT

May 2011

DISCLAIMER
The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government

This page is intentionally left blank

TABLE OF CONTENTS

ACRONYMS

CAADP	Comprehensive African Agricultural Development Programme
CBADs	Community Biodiversity Advisory Groups
CBO	Community-based organizations
CC	Climate Change
CDCS	Country Development Cooperation Strategy
CEA	Country Environmental Analysis
CEPF	Critical Ecosystem Partnership Fund
CFCs	Community Forest Committees
CFM	Collaborative Forest Management
CI	Conservation International
CIDA	Canadian International Development Agency
CITES	Convention on International Trade of Endangered Species
CPUE	Catch Per Unit of Effort
CPUE	catch per unit effort
CRC	Coastal Resources Center
CREMA	Community Resource Management Area
CRMU	Collaborative Resource Management Unit
CSIR	Council for Scientific and Industrial Research
CSIR	The Council for Scientific and Industrial Research
CSO	Civil Society Organization
CSP	Country Strategic Plan
CWSA	Water and Sanitation Agency
CWSD	Community Water and Sanitation Division
DA	District Assembly
DSD	dry semi-deciduous
EC	Energy Commission
ECOWAS	Economic Community of West African States
EPA	Environmental Protection Agency
EPA	The Environmental Protection Agency
ETOA	Environmental Threats and Opportunities Assessment
EU	European Union

FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization, UN
FASDEP	Food and Ag. Sector Development Policy
FASDP	Fisheries and Aquaculture Sector Development Plan
FC	Forestry Commission
FCPF	Forest Carbon Partnership Facility
FDMP	Forestry Development Master Plan
FMT	Facility Management Team
FR	Forest Reserves
FSD	Forestry Services Division
FtF	Feed the Future (USAID multi-year strategy)
FY	fiscal year
GAEC	The Ghana Atomic Energy Commission
GCMs	Global Circulation Models
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFTN	Global Forest Trade Network
GLSS	Ghana Living Standard Surveys
GoG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
GSBA	Globally Significant Biodiversity Areas
GSGDA	Ghana Shared Growth and Development Agenda
GWS	Ghana Wildlife Society
HDI	Human Development Index
IBA	Important Bird Areas
IEE	Initial Environmental Examination
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
ITCZ	Intertropical Convergence Zone
IUCN	International Union for the Conservation of Nature
JICA	Japan international development agency
LAP	Land Administration Project
LME	Large Marine Ecosystem
MDGs	Millennium Development Goals

ME	moist evergreen
MEO	Mission Environmental Officer
MEST	Ministry of Env., Science and Technology
METASIP	Medium Term Ag. Sector Investment Plan
MLNR	Ministry of Lands and Natural Resources
MOFA	Ministry of Food and Agriculture
MSD	moist semi-deciduous
MWRWH	Ministry of Water Resources Works and Housing
NAP	National Action Programme
NCCC	National Climate Change Committee
NCCPF	National Climate Change Policy Framework
NCRC	Nature Conservation Research Centre
NDPC	National Development Planning Commission
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NPA	National Petroleum Authority
NPP	New Patriotic Party
NRC	National Redemption Council
NREG	Natural Resources and Environmental Governance program
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
PNDC	Provisional National Defense Council
PURC	Public Utility Regulatory Commission
RAMSAR	Convention on Wet Lands, Ramsar Iran
REDD	Reduced Emissions from Deforestation and Degradation
REDD+	REDD including sustainable forest management, conservation, and enhancement of forest carbon stocks
RMSC	Resource Management Support Centre
R-PP	Readiness Preparation Proposal
SARI	Savanna Agricultural Research Institute
SEA	Strategic Environmental Assessment
SEIA	Social Environmental Impact Assessment

SM	southern marginal
SNEP	Strategic National Energy Plan
SNV	Netherlands development agency
SO	Strategic Objective
SOW	Scope of Work
STI	Sexually Transmitted Infections
TB	tuberculosis
TCPD	The Town and Country Planning Department
TES	threatened and endangered species
TIDD	Timber Industry Development Division
TVET	technical and vocational education and training
USG	US Government ()
UE	upland evergreen
UNCBD	United Nations Conservation of Biodiversity Treaty
UNCCC	United Nations Convention on Climate Change
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention for Climate Change
USAID	US Agency for International Development
VBA	Volta Basin Authority
VPA	Voluntary Partnership Agreement
VRA	Volta River Authority
WAPCA	West African Primate Conservation Action
WAPG	West African Gas Pipeline
WAPPOOL	West African Power Pool
WD	Wildlife Division
WE	wet evergreen
WITC	Wood Industries Training Centre
WPAs	Wildlife Protected Areas
WRC	Water Resources Commission
WWF	World Wildlife Fund

ACKNOWLEDGEMENTS

The team would like to acknowledge the support of the many individuals who contributed to this assessment. We would like to thank the USAID liaisons, Nino Nadiradze (Senior Environmental Officer) and Justice Odoi (Environmental Specialist) in Accra, Ghana for providing technical support to the team. Nino and Justice helped both in planning the report and assisting in setting up interviews and contacts during the three-week in-country fact-finding phase of the project. More than 100 people, representing a variety of governmental organizations, non-governmental organizations, civil society, and industry were interviewed and/or contributed papers to this report. The full list of those interviewed is contained in Appendix 1. We are grateful to these individuals for their generous contributions of time.

Lastly, the team would like, in particular, to thank Frederick Armah (University of Cape Coast) and Yaw Atuahene Nyako (Ghana Forest Services Division) for their contributions as the in-country members of the team. Without the knowledge and logistical support of these energetic men, the team would have struggled greatly to make efficient use of our time during wide ranging field trips and in arranging over 40 meetings with individuals and groups throughout the country.

This page is intentionally left blank

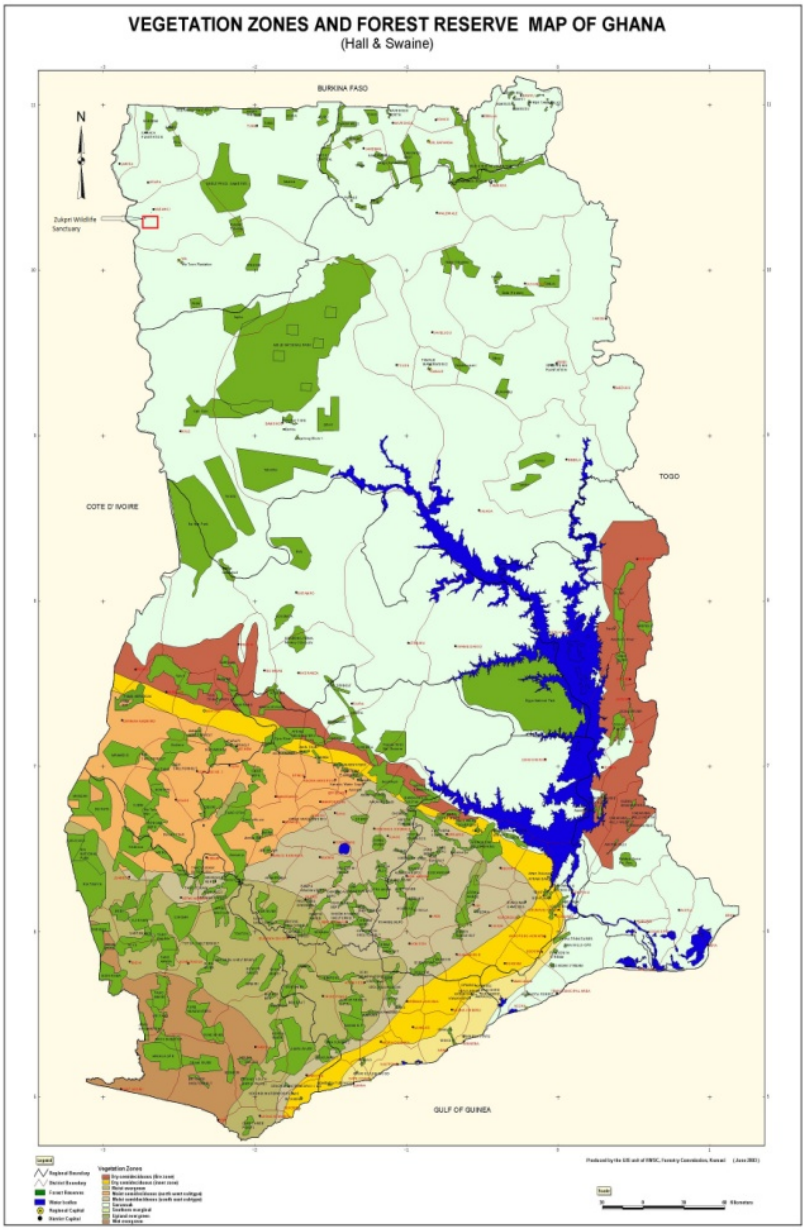
EXECUTIVE SUMMARY

This Executive Summary provides a summary of the combined Environmental Threats and Opportunities Assessment (ETOA) and Climate Change teams' observations and highlights of recommendations contained in each report. An Environmental Appendix has also been prepared, which is a "stand-alone" summary of findings and recommendations for the two reports.

COUNTRY OVERVIEW

Geography and Environment: Ghana is an ecologically diverse country with vegetation types that range from savanna to wet evergreen forests. The country is bounded on the south by the Gulf of Guinea, a once rich fishery that is now subject to extreme fishing pressures. The country is bordered to the west by Côte d'Ivoire, a country currently undergoing conflict following the last presidential election. To the north, Burkina Faso shares a dry savanna border with Ghana through which considerable transitory grazing has occurred over a long period of time. Burkina Faso also holds the headwaters of the White, Red, and Black Volta Rivers which drain a large portion of Ghana and are among the sources of Lake Volta. Lake Volta is the largest (by surface area) reservoir in the world and is an important source of fresh water fish as well as hydropower in Ghana. Togo forms the country's eastern border, with the Oti River forming a portion of the boundary before flowing into Lake Volta.

The map to the left shows nine vegetation zones represented in the country based on mapping done by the Forestry Commission in 2003. The northern two-thirds of the



Map 1 Natural Vegetation Zones and Protected Areas

Source: Hall and Swaine

country is dominated by savanna, transitioning to the moister southern one-third of the country. In the latter area, dry semi-deciduous forests have seen extensive use of fire and agricultural practices, which have converted many parts of this vegetation zone into savanna-like conditions. The dark orange areas on Map 1 are also known as the "fire zone" due to the strong influence of fire in these areas. Progressing further southwest, the vegetation becomes increasingly moist and more heavily forested, moving from moist semi-deciduous forest to moist evergreen forest and to wet evergreen forest as one progresses to the coast. In the southeastern portion of the country drier conditions prevail and short grass savanna can be found in the Greater Accra and southern Volta Regions.

Population and Economy: A census of Ghana was completed in 2010. Data from that census was not available to the team at the time of document preparation. The Food and Agriculture Organization (FAO) of the United Nations estimated the population to be nearly 24 million in 2009. The World Bank, also in 2009, estimated that Ghana had a gross domestic product (GDP) of $26.17 billion. Agriculture is an extremely important livelihood in Ghana and about 14.8 million ha of the country's 22.6 million ha of land is devoted to agriculture (based on FAO estimates, 2007). Ghana received a ranking of .467 in the 2010 United Nations Development Programme's Human Development Index (a ranking of social and economic development). This placed the country in the "low human development" range of the report, ranking 130th of 169 nations rated.

Climate Change: The principal feature of the climate of Ghana is the alternate wet and dry seasons. The rainfall seasons of Ghana are controlled by the movement of the Inter-tropical Convergence Zone (ITCZ), the tropical rain belt which oscillates annually between the northern and southern tropics following the position of the sun with a lag of 1-2 months. The dominant wind direction in regions south of the ITCZ is southwesterly, blowing warm, moist air from the Atlantic Ocean onto the continent. North of the ITCZ the prevailing winds (known as the Harmattan winds) come from the northeast, bringing dry, hot, and dusty air from the Sahara Desert. At the northern summer solstice, the ICTZ lies near the Tropic of Cancer and wet maritime winds produce a rainy season north of the Equator. When the ICTZ moves south and the sun is over the Tropic of Capricorn, most of West Africa comes under the influence of the continental, hot, dry Harmattan. As the ITCZ migrates between its north and south positions over the course of the year, the regions between the northern and southernmost positions of the ITCZ experience a shift between the two opposing prevailing wind directions, a pattern referred to as the West African Monsoon (Borrow and Demey, 2010, McSweeney et al., not dated)

Climate change will affect the regions of Ghana differently. Although Global Circulation Models (GCMs) agree generally that mean temperatures will rise, there is little agreement in future precipitation amounts or seasonality; some GCMs project increased precipitation in the northern three regions and others project decreases. People interviewed during our field visit to the north reported delays in the onset of the rainy season, heavier rains late in the rainy season, and increased flooding, causing crop damage.

The incidence of poverty is highest in northern Ghana, where temperatures are hottest, rainfall is low, and there is only one rainy season; thus, people residing in northern Ghana may be the most vulnerable to the effects of climate change. Climate variability contributes to current food insecurity and will be exacerbated by a changing climate.

Forests and Protected Areas: The forests of Ghana are undergoing serious and continuing decline. Estimates by the Forestry Commission placed the amount of "high forest" in Ghana in 1900 at about 8.2 to 8.8 million ha. Most recent estimates from the same source place the amount of equivalent forest at 1.2 to 1.6 million ha with a rate of decline of about 65,000 ha/year. Data on the amount of forest in Ghana is complex to analyze, with the amount and rate of change varying by the analyst's definition of "forest." In comparing similar criteria, the above figures provide a good relative comparison for largely intact forests (greater than 30 percent canopy cover). When the view of forests is broadened to include second growth or partially harvested lands retaining tree cover, the estimates of total forest cover in Ghana increases and the annual rate of decline decreases (see detailed discussion in section 4.E.: Forest Resources). Nevertheless, no matter how one views forest cover, it is declining in the country. Forestry employs about 120,000 people in

the timber industry and in public institutions. (World Bank, 2006, Ghana Country Environmental Analysis, p. 28)

Forest habitat is increasingly fragmented in Ghana. A substantial protected area system exists in Ghana with 291 Forest Reserves (which include 30 Globally Significant Biodiversity Areas, GSBAs) and 21 wildlife protected areas (which include parks, wildlife reserves, and RAMSAR (wetland) sites). Appendix 5 provides an individual listing of each type of area. The habitat managed the goals of each area, and the quality of management of each protected area varies greatly. For example, illegal logging, mining, and residential occupancy are known to occur in some protected areas. A combination of lack of physical and monetary capacity and, at times, public acceptance and support, has resulted in degradation of some protected areas in Ghana's system. However, some protected areas of Ghana appear to be well managed and meeting objectives. (IUCN/PACO (2010)). *Parks and reserves of Ghana: Management effectiveness assessment of protected areas.* Ouagadougou, BF).

Opportunities for potential expansion of protected areas exist in Ghana in both marine and wetland environments. An expanded use of a CREMA type concept (see "Habitat Linkage and CREMA" below) may be a viable approach to use in the Amansuri wetland area, where there appears to be local support for community-based protection, though not for park or wildlife reserve designation (personal conversation, Kofi Agbohah, CRC). The Coastal Resources Center (CRC) in Takoradi is also exploring the potential for a marine reserve off the southern coast of the country.

Biodiversity: Ghana is a country rich in biodiversity. More detail can be found on the subject in Section I. 4.A. of this report. Ghana contains nearly 900 species of butterflies. Wildlife species to be seen also include forest and savanna elephants, hippo, lions, leopards, hyenas, chimpanzee, baboons, seven species of monkey, three species of crocodile, buffalo, various antelopes, wild cat, bats, mongoose, dwarf mongoose, pangolin, whales, genet, jackal, clawless otter, warthog, hedgehog, manatee, aardvark, sea turtles and many other species. Ghana has ratified several international treaties (see Appendix 4 for more detail) including the United Nations Conservation of Biodiversity Treaty (UNCBD), the Convention on International Trade in Endangered Species (CITES) and several other treaties aimed, in whole or in part, on the conservation of biodiversity.

Though Ghana contains rich biodiversity, the habitats that provide this biodiversity are increasingly fragmented. Those fragments are subject to increasing pressure from a variety of sources. Human-set bush fires, clearing for occupancy and farming, charcoal production and fuel wood needs, unregulated grazing, water pollution due to inadequate sewage and treatment facilities, increasing populations, shifting agricultural practices (such as increased clearing for cocoa), and legal and illegal timber harvest and mining are all contributing to a reduction in biodiversity in the country. Illegal bush meat hunting also directly affects some protected species.

Habitat Linkage and CREMA: Efforts to increase wildlife habitat and the effectiveness of such habitat are being developed by communities, civil society, non-governmental organizations (NGOs), and the Forestry Commission. The Community Resource Management Area (CREMA) concept has been developed by the Wildlife Division as a means to improve wildlife habitat adjacent to protected areas and potentially as a means to link such areas through private land partners. The CREMA concept has met with mixed success. With its original focus solely on wildlife, some of those interviewed see the need to broaden the CREMA concept to include forests and products from the forests. Also, the CREMA pilot program is instituted through policy, not law, which could undermine the sustainability of management if the policy regarding CREMAs should change. This lack of permanency, correspondingly, in many situations, reduces the incentive for investment due to the risk that the policy could "go away" with changing leadership at the national level. Under the current policy there is no legal devolution of the land to the community. This could potentially undermine the utility of CREMAs in the long term. (Personal conversation: John Mason, NCRC). Those interviewed who are knowledgeable of CREMA seem to generally agree that for the concept to work in a particular situation there needs to be:

- A community desire to engage in the specific partnership
- A site-specific revenue stream(s) that brings sustainable benefit to the community partners
- No chieftaincy disputes
- A thorough understanding of local ethnic cultures in design of the partnership

According the Nature Conservation Research Centre (NCRC), there are 20 CREMAs in Ghana covering about 1 million ha. The most successful of these to date is thought to be the Wechiau Community Hippo Sanctuary, which protects and preserves the wildlife and the environment of a 40 km stretch of the Black Volta River in Ghana's Upper West Region. Not all CREMAs in Ghana have been successful. Where they have not been successful, the failures are normally attributed to the lack of one or more of the elements mentioned above.

Cocoa: The Western Region of Ghana is the focus of increasing developmental pressures including expansion of cocoa production, an important cash crop in the country. The area under cocoa production is now about 1,270,000 ha, comparable to the amount of high forest thought to be remaining in the country. The price of cocoa in recent years has stimulated an increase in cocoa planting and, particularly in the Western region, has resulted in clearing of native forests. Existing cocoa farmers are increasingly clearing trees from their farms. The clearing of trees is being done on farms that are being rehabilitated – i.e. old cocoa trees being replaced with a new breed widely believed to be more sun-loving.

For the 2005-06 crop year, the United Nations Conference on Trade and Development estimated that 21 percent of the world's cocoa production would come from Ghana. In the near term, Indonesia and Ghana are expected to fill the void created by the lack of production from Côte d'Ivoire whose political crisis is affecting its cocoa production. (Neena Rai and Caroline Henshaw, Wall Street Journal, April 6, 2011). In its 2009 paper on cocoa production in Ghana, the Katoomba Group states: "A prime driver of deforestation is clearance for cocoa farming, especially in the Western Region." (See Appendix 8 for website reference). Conversely, it appears there is the opportunity to utilize shade grown cocoa both to extend the life of cocoa plantations and to increase biodiversity. Some groups see potential for properly managed cocoa plantations to be eligible for REDD credits. (*Sweetening the Deal for Shade-Grown Cocoa: A Preliminary Review of Constraints and Feasibility of 'Cocoa Carbon' in Ghana*, Katoomba XV, 2009)

Fuelwood and Charcoal: Wood accounted for 78 percent of domestic energy in Ghana (FAO, *Woodfuels use in Ghana: social, economic and energy dimensions, 2000)*, and deforestation around urban areas for firewood and charcoal exert a heavy toll on forests and woodlands. This significant ongoing agent of deforestation is a particularly important issue in northern Ghana, which is dominated by savanna and where wood for fuel is intrinsically less plentiful than in the southern one-third of the country. The obvious connection that wood fuel is largely what is used to cook the food in Ghana, links food production with a significant deforestation agent, particularly in northern Ghana, and increasingly so in central and southern Ghana.

Oil: Increased development and land speculation is common in the Western Region due to the discovery and build up for the offshore Jubilee Oil field discovered about 70 km south of the coastal town of Effasu. Estimates on the economic value of the oil revenue vary widely. Some estimates place the value at 4 to 7 percent of Ghana's GDP when at full production. Expectations for improved conditions run high in much of the country based on assumptions that oil revenues will lead to social and infrastructure improvements. The discovery and development of oil will also be a test for Ghana's governance structures as little legal framework or experience with oil development exists in the country. The situation is both a challenge and an opportunity for the country in that traditional governance has not historically defined tenure rights to resources beyond the shore line, but the monetary values involved have sparked interest. The Parliament of Ghana passed the *Petroleum Revenue Management Act, 2010* in March of 2011 to manage the financial aspects of oil revenue.

There is the opportunity for oil revenue to be broadly used in the country as defined by the Government of Ghana (GoG). Ghana is not yet ready to handle gas by-products from oil production which will lead to gas flaring (burning) at well sites, meaning, at least in the short term, that there will be increased carbon emissions due to the oil production. Locating shore facilities (including gas plants) will likely lead to some dislocations of local residents. As an example of the later, during our field trip to the coastal areas, the team heard that about 200 people were being relocated in the Western Region to make room for oil-related shore facilities. Social responsibilities and comprehensive planning related to oil development are not well defined. The GoG has engaged in partnerships with international entities to increase the national capacity in this regard. Though financial legislation for oil revenues has been passed, the social and environmental management aspects of oil development are not yet well addressed.

Minerals and Mining: Mining contributes to the national economy with gold mining the leading mineral contributor. The World Bank states: " 'Mineral revenue represented about 4.1 percent in the national GDP and about 9 percent of government revenues, and the formal mining sector employed some 15,000 workers in 2004 (Minerals Commission, 2004)'. The Minerals Commission estimates that artisanal and small-scale miners, often called 'galamsey,' might account for an additional 500,000 people. Many of those involved in artisanal and small scale mining (ASM) are women and children, and a significant number of them are informal participants in the sector." (Ghana Country Environmental Analysis, World Bank, 2006, p. 72). Illegal mining activity is thought to be an important and ongoing factor adversely affecting both protected areas and water quality.

Fishing: Fishing is important in all the coastal regions of the country (Western, Central, Greater Accra, and Volta). Fish is an important source of protein in Ghana with consumption estimates from the FAO (2002) at about 30 Kg per person. Estimates of the number of fishers vary by source. The FAO also estimated that about 526,000 people either directly or indirectly earned incomes from fishing and that the industry contributed about 3 percent to the GDP (2002). Note that workforce estimates in the Climate Report (Mensah et al., 2003) vary somewhat from these estimates. Most sources cite increasingly poor catch in fishing which is attributed to overfishing (both by artisanal fishermen and by industrial commercial operations). (FAO, Fishery and Aquaculture Country Profiles). See also The Climate Report for an extensive review of factors influencing fisheries as well as the section in this ETOA.

Agriculture: Agriculture is an important livelihood throughout the country, and particularly so in the Northern Region, which is considered to be the poorest region of the country, with the least infrastructure. Loss of youth from farming and movement to more urban areas is being experienced (based on anecdotal information from interviews conducted with governmental officials and NGOs in the north). The dependence on water for crops and the cyclic nature of rainfall in this region make the area particularly vulnerable to effects from climate change. Of note is that most farming in Ghana is practiced on small holdings, often by "tenant" farmers with the land owner being a traditional leader. Tenancy, land rights, and ownership are extremely complex, cross-cutting issues in Ghana and are the subject of their own discussion in this report.

USAID programs to stabilize food production in Ghana will need to balance increased agricultural productivity with retention of forest cover, management of critical habitat areas (such as forest areas and riparian zones), and potential displacement of tenant farmers. Some of those interviewed for this report suggest care be taken in the design of agricultural programs to insure that (for example) increased mechanization in farming does not turn farmers into laborers, potentially (depending on the details of such programs) leaving such laborers with less incentives and less invested in long-term care of the land. Based on our review of the literature, agriculture is considered the most significant deforestation agent in Ghana. Much more detail on agriculture is in the agriculture sections and subsections of the ETOA, and climate reports.

Fire: The dry Northern Region also sees the highest incidence of fire on the landscape. Though fire is to some degree a natural feature of this landscape, our field trip to the north and literature on the topic indicate that the frequency and intensity of fire in Ghana has been detrimental, particularly in the Northern Region

and in the transition zone between the savanna and forest. Fires are set to clear land, stimulate forage for grazing, and to drive animals in some forms of hunting. This, combined with the extensive use of wood for fuel (either directly or for charcoal), has heavily influenced the vegetation in the Northern Region and has effectively converted many forested areas in dry semi-deciduous forest zones (see map 1) in the Eastern, Ashanti, and Brong-Ahafo Regions to savanna.

Grazing: The conversion of forest to savanna has also increased the area where grazing occurs in the country. As forests in the transition zone of Ghana (see orange colored areas in Map 1) are increasingly cleared, they have become more suitable for livestock grazing. This has led to conflicts, at times, between grazing and agricultural production. Though grazing in Ghana, most extensively in the Northern Region, has been a long-standing practice, conflicts related to grazing have also been of long-standing. Some perceptions (based on interviews conducted during the team's field visit to Ghana), are that the conflicts are most directly tied to Fulani herdsmen being unregulated in the country. Those holding this perception see the Fulani as independent actors who do not respect the property or crops of local farmers and who graze their cattle at will. Other people interviewed during the team's visit to Ghana, see the Fulani as largely employed by local people and normally with some tie to local land/cattle owners or traditional leaders and not as "independent actors." Legal frameworks for grazing, particularly off protected areas, are generally lacking. To that extent, grazing on private lands in Ghana is nearly unregulated in a formal sense. The issue is not unique to Ghana and is a common and difficult-to-resolve issue throughout West Africa.

Land and Resource Tenure: Issues of tenure cut across nearly every sector in Ghana. Who owns the land and the resources on it and under it is an extremely complex issue due to the overlay of traditional systems and current law. The latter have evolved from colonial law through several iterations. The constitution of the country has been revised four times since originally adopted in 1957 with new revisions being currently contemplated. Traditional ownership of lands is recognized in the current Constitution (Constitution Chapter 22, Chieftaincy, Articles 270-277). Under the existing arrangement, traditional land-owning authorities (stool chiefs, clan heads, and skins) hold allodial (absolute ownership) title to land on behalf of their people. This is further discussed in the Constitution (Chapter 21, Article 267). Thus, outright ownership of land is still a rare form of land tenure in Ghana. Within this complex framework, issues of gender inequity in control lands, products from the land and the allocation of economic benefits derived therefrom, further complicate land and resource tenure issues in Ghana.

Interwoven with the land tenure complexity is the question of ownership of natural resources, particularly forests and minerals. The Constitution states that minerals are held by the president in trust for the citizens (Constitution, Chapter 21, Article 257(6). Trees are somewhat more complex, but Article 268(1) of the Constitution is generally taken to mean that trees in Ghana are owned and controlled by the State. This has been modified in recent years by more recent law in which planted trees are controlled by the "owner." A very good overview of land and tree tenure is found in the REDD-Net article at: http://redd-net.org/files/Ghana%20Case%20Study.pdf.

Land and resource tenure systems in Ghana can inhibit investment in land to the extent that a clear title to land is usually difficult to obtain. The ownership of naturally occurring trees by the state, even on lands outside of protected areas, can serve as a disincentive for local land "owners" or tenants to invest in their long-term care, even though, in theory at least, revenue sharing is mandated under the Constitution (Article 267(6)a-c).

Governance: Governance, as land tenure, is a cross-cutting issue affecting all sectors. The Government of Ghana has been noted for having had multiple peaceful transitions of power. Governmental stability is vital to create a climate for long-term management of forests and biodiversity. To that extent, actions that promote tropical forests and biodiversity in Ghana appear to have a reasonable chance to lead to long-term success. That said, particularly in the natural resources arena, improvements in the legal frameworks, governmental transparency, capacity, coordination, and planning are all needed to move Ghana forward to the betterment of both its people and its environment. The World Bank's 2006, "Ghana Country Environmental Analysis" (see Appendix 8 for link) provides good, relatively recent, insight into the topic.

Our discussions and research have indicated many areas (detailed below) where improvement of governance in: legal frameworks, capacity for monitoring and enforcement, transparency, and technology, would improve the quality of the environment and the lives of the citizens.

Many of the findings of World Bank's report echo concerns our team heard during our meetings in Ghana. Corruption and lack of transparency in natural resource management is thought to still be prevalent in some dealings in government. There is limited capacity and staffing in many government agencies, especially as related to monitoring and enforcement of environmental regulations and fundamental environmental law. Government is not always readily accessible or user-friendly, particularly for rural populations. There is often lack of support for government rules and regulations, particularly in rural areas highly dependent on natural resources for livelihoods. In many protected areas, long-standing deterioration of reserves and parks, though documented, continues unabated. In the arena of fisheries, well documented declines continue to occur. In both cases, lack of personnel, financial resources, governmental will, and potentially ambiguous legal frameworks exist. These factors, when coupled with the resource dependency and long-standing interests of large numbers of people, make the situations volatile to change. Yet the absence of effective government action will ultimately lead to greater hardships for the people and the environment.

EXECUTIVE SUMMARY: ISSUES AND OPPORTUNITIES OF NOTE

Fishing-Related

- Rate of decline of fishery serious and significant and attributable to deficient legal frameworks, lack of conservation knowledge in the sector, low enforcement capacity, and limited policy engagement with the fishing community; all in the face of increasing fishing pressure.
- There is the opportunity to increase fisheries management capacity within the Fisheries Commission, particularly with the goal of increasing the ability of fisheries stocks to be monitored by a management agency (and/or non-industry based partners) rather than solely through self-reporting of fishers,as currently occurs.
- The current state of the inland fishery resource in Ghana deserves further scientific attention as does the potential impacts climate change might have on this resource.

Climate-Related

- If REDD becomes viable, Ghana has gone a long way to prepare itself to take advantage of it.
- Equitable distribution of REDD credits and governmental mechanisms to ensure benefits reach the people living in and near the forests claiming the credits have not generally been developed. The multiple land/resource tenure systems of the country make this very complex and subject to misappropriation unless solid, transparent, equitable benefit-sharing systems, with local buy-in, are developed. There is opportunity for pilot development in this regard.
- There is some skepticism that REDD payments will be significant and sustainable in the long run.
- Climate change will affect the regions of Ghana differently. Although Global Circulation Models agree generally that mean temperatures will rise, there is little agreement in future precipitation amounts or seasonality; some GCMs project increased precipitation in the northern three regions and others project decreases. People interviewed during our field visit to the north reported delays in the onset of the rainy season, heavier rains late in the rainy season, and increased flooding, causing crop damage.
- The incidence of poverty is highest in northern Ghana, where temperatures are hottest, rainfall is low, and there is only one rainy season; thus, people residing in northern Ghana may be the most

vulnerable to the effects of climate change. Climate variability contributes to current food insecurity and will be exacerbated by a changing climate.

- In northern Ghana, with existing dry conditions and foreseeable climate affects, agriculture stability is highly likely to be improved by irrigation and water retention projects which capitalize on capture and use of seasonal rainfall as well as better use of existing water sources.

Fuelwood, Biofuels, and Fire-Related

- Wood accounted for 78 percent of domestic energy in Ghana (FAO, *Woodfuels use in Ghana: social, economic and energy dimensions, 2000)*, and deforestation around urban areas for firewood and charcoal exert a heavy toll on forests and woodlands. This is a significant ongoing agent of deforestation is particularly an important issue in the Northern Region. The fact that wood fuel is by far the most common means of cooking food in Ghana, links food production with a significant deforestation agent, particularly in northern Ghana. Further, deforestation for agricultural expansion and fuelwood-gathering in desertification-vulnerable areas (like northern Ghana) strengthens the link between wood fuel, food production, and soil degradation. Ultimately, the success of the Feed the Future (FtF) program may depend in part on appropriately addressing the issue of cascading links among fuelwood/deforestation/desertification/food security.

- Wildfires and biomass burning are a significant component of Ghana's greenhouse gas (GHG) emissions. The draft National Wildfire Policy (as of 2006) seeks to overcome past policy limitations (unclear authorities, lack of deterrents, disregard of traditional practices, and no involvement of traditional authorities in policy formulation or implementation). Nevertheless, the draft policy is overly focused on fire prevention and suppression, ignoring the role of fire as an ecological agent and a traditional management tool. The policy assigns key roles to the Ghana National Fire Service (Ministry of the Interior), including fire suppression and training programs throughout the country and developing a system to detect and monitor fire occurrence. Neither of these roles has been addressed and the Fire Service is focused almost entirely on fire fighting of structures. (National Wildfire Management, Policy, Division of Wildlife, 2006)

- Charcoal production in Ghana is a largely non-sustainable operation and loss of tree cover may make charcoal production less viable in the future. Low-cost diversification strategies that are ecologically sustainable should be pursued. Particularly in the Northern Region (but applicable nationwide), to complement FtF, and to provide deforestation mitigation; programs for more efficient cooking stoves, use of alternative energy sources where feasible, and forestry initiatives to promote planting fast-growing tree species for use in family and community wood lots for fuel or charcoal should be encouraged.

- Biofuels development on plantations, especially jatropha and oil palm, is controversial and has led to, and may continue to lead to, land grabs in some places.

Deforestation-Related

- The rate of deforestation is significant and affects both biodiversity and tropical forests conservation. The following are contributory factors to this decline:
  - Clearing for agricultural expansion is likely the largest single deforestation factor in the country at present
  - High dependence nation-wide on charcoal production and wood use for fuel
  - Burning for hunting, grazing
  - Logging practices, including often unauthorized "chainsaw lumbering"

- Clearing for human occupancy
- Clearing increasing for cocoa production
- Increasing illegal occupancy in some protected areas

- Land and resource tenure systems are complex, multi-layered, not transparent, and often a disincentive for long-term care of (and investment in) forest and agricultural lands. There is opportunity to reform it, particularly as it relates to tree tenure, with the associated benefit of making family forests, community forest, and CREMA type activities more viable and enduring. Cocoa expansion, particularly in the Western Region, is currently a deforestation factor. There appears some potential to turn that around and, with agro-forestry technical aid and incentives, potentially use cocoa expansion as both a reforestation vehicle and an economic engine.

Management Capacity-Related

- Natural resource management capacity for law enforcement and environmental monitoring is limited in most resource management agencies which negatively impacts environmental sectors. This represents a distinct opportunity for improvement.

- Much environmental monitoring falls on EPA, an agency with limited field capacity to carry it out, representing an opportunity for legal reform, budget reform, agencies coordination, and technical capacity building both within the EPA, but also potentially within the natural resource management agencies themselves.

Biodiversity-Related

- There is an extensive protected area system in the country which is highly variable in its effectiveness, but which is extremely important in the maintenance of biodiversity and tropical forests in the country. Opportunities for protected area-specific and generalized capacity building in the management of protected areas are plentiful.

- There is some potential for increased habitat maintenance and connectivity through site-specific, community-based programs. The CREMA concept has worked in some areas and failed in others. Though not a universal solution to habitat maintenance, if thoughtfully applied in appropriate situations, it can help maintain biodiversity while improving community livelihoods. Conversely, where there are not natural revenue streams, and intrinsic community support, the concept is not likely to work.

- There is a general lack of knowledge and emphasis both in the regulatory structure and in administration at District and Regional levels in riparian management. The issue presents the opportunity, particularly in the north and in the Western Region for USAID programs to assist local governments, communities, and the GoG in improving technical knowledge on best management practices within riparian areas. Improvement in such practices would have direct benefits on water quality and quantity, as well as on the maintenance of habitats key to many species of plants and animals.

Oil-Related

- The social responsibility and environmental mitigation aspects of the current oil development in Ghana are only broadly addressed in law, leaving the Environmental Protection Agency (EPA) with a difficult task. However, there is still time for the GoG, civil society and industry to make the broadly stated mitigation objectives become tangible projects and more enforceable legal requirements.

Agriculture-Related

- There is an opportunity to assist farmers in gaining access to credit on terms that are feasible for them. Micro-financing projects also hold promise for helping individuals start small businesses.

- Livestock loan programs modeled on traditional practices in which relatives loan animals to kin who have lost their herds or wish to start new ones until they reproduce have been successful in some parts of Africa. There is high potential to assist households in developing livestock husbandry.

- Improving water infrastructure could help improve household drinking water quality and health; reduce travel time to water, freeing up labor; increase water supplies for livestock, an important limiting factor on their production; and increase water availability to support dry season household gardens and cash crop production. There have been notable failures in this arena to learn from.

- In development of irrigation and water retention infrastructure there is the potential issue of adverse impacts to riparian areas from ill-designed infrastructure development and clearing for agriculture. Conversely there is the opportunity to accommodate riparian function and structure in design of these agricultural programs and to increase local knowledge of the water quality, water quantity, soil stabilization, biodiversity, and forest retention benefits of well-managed riparian areas within agricultural settings.

- There is a lack of local processing facilities for agricultural and wild-harvested products. Establishing local processing facilities – for example, for shea butter or soybean oil – would make it possible to produce value-added products that increase incomes relative to the sale of raw products.

- Investments in education enable people to develop skills and knowledge that can help them pursue off-farm livelihoods and work outside of the natural resource sectors that are less vulnerable to climate change impacts. Education can also help migrants get better jobs in urban areas, earn more, and increase remittances back home.

Hydropower-Related

- An issue of note is hydropower. (For a more thorough discussion of the issue see the Climate Change Report, "Climate Change and Hydropower.") First, the water development focus between the two major countries in the Volta River Basin is fundamentally different. Burkina Faso has and is concentrating effort in the Basin on improved use and increased retention of water for agriculture with demands in that country (as well as northern Ghana) expected to increase rapidly. In contrast, Ghana's primary objective is to keep Lake Volta at optimal levels for power production. Clearly, potential exists for major conflict. Second, past meteorological data and hydrological modeling indicate that water levels in Lake Volta are highly sensitive to even small changes in rainfall. Rainfall projections of global climate models are mixed, adding to the uncertainty; however, trends from historical data indicate fairly dramatic decreases from long-term averages. Third, the design of Akosombo dam was premised on one of the wettest periods on record affecting optimal power production even during relatively short or modest dry periods in an inherently variable precipitation regime. Fourth, water allocation agreements are lacking among Ghana and the other riparian countries in the Lake Volta Basin. Finally, the future power production at Akosombo dam clearly will affect Ghanaian choices for alternate energy sources (i.e., fossil-based or alternative) in an attempt to meet shortfalls and ever increasing demand.

EXECUTIVE SUMMARY: RECOMMENDATIONS

A. RECOMMENDED SHORT-TERM INTERVENTIONS

The short-term recommendations are targeted primarily as specific actions based on existing USAID programs. These are incremental additions to, or changes in, USAID's current and projected program areas. This seems to be the most practical short-term approach to addressing biodiversity conservation given possible current and future funding constraints and opportunities. More detail on these recommendations and their rationale is found the in the "Recommendations" section of the ETOA and the "Options for Future USAID Programs" in the climate report. For ease of reference these recommendations are grouped by topic areas. Some recommendations have benefits in more than one topic area, but are only listed once.

Feed the Future-Related

- The Feed the Future initiative, in order to ensure that it does not have unintended consequences on tropical forests and biodiversity, should incorporate several design features aimed at limiting deforestation potential while still achieving the beneficial goals intended by the program. These design features are:
  - Ensure forestry input into the operational design of the program by having a community forester(s) on the design and implementation staff within the program that are familiar with the concepts and practices of agro-forestry.
  - Support the Ministry of Agriculture, including a community forester within the staff group working with the FtF program (with monitoring functions discussed below as well as community outreach and technical assistance to program farmers).
  - The Northern Region, the focus area for FtF, does not have a well-documented inventory of agricultural and forest lands. In order to establish monitoring controls for the FtF program, better baseline mapping of savanna forests and existing agricultural lands in the north should be done. Such an activity could either be undertaken by USAID directly, and/or implemented through the GoG, Forestry Division, and possibly in association with an NGO with interest and programs in baseline monitoring of forest cover and agricultural lands.
  - In the overall design for the FtF initiative, USAID should consider establishing strategic environmental support and technical capability within the program to incorporate landscape design features that consider the connectivity of forested landscapes, where possible. Within the Districts in the Northern Region, such strategic planning would present the big picture of where better transportation networks are planned, commercial hubs for storage/resale of products are (or would be), and such features as proposed irrigation networks. With such strategic planning in hand, design areas of proposed intensification and zone those areas for intense agriculture while also looking at establishing buffer areas for fuelwood and to maintain (or establish) connectivity for wildlife between protected areas, where possible.
  - Related to the above suggestion, to the extent irrigation programs are utilized in the FtF program, USAID, the GoG, and/or other partners should ensure that adequate site-specific hydrologic baseline information is available (or is gathered) prior to commitment of a given area to intensified irrigation projects.
  - With the above baseline, establish with the Ministry of Agriculture (possibly through their forestry liaison position discussed above) an ongoing monitoring program of the forested areas in proximity of FtF project areas.

- Design, within the FtF program, verification mechanisms to ensure targeted acres under the program are existing farmland (or most importantly, not forests or critical habitat areas whose development for farming would adversely affect forests or biodiversity habitat).

- To the extent that the FtF program increases road access to improve the economics of crop production: it may increase the viability of firewood gathering or timber harvest, and increase the physical area where farming may be economically viable. Such consequences, both unintended and intended, obviously could directly affect forests. Such effects could be mitigated by concurrently reducing the dependence on existing forests for wood fuel, and, as discussed above, by designing the program to ensure that currently forested areas (previously not accessible or viable) are not cleared.

Fuelwood-Related

- Fuelwood use and charcoal production in the northern regions (as well as nationwide) is an extremely important driver of deforestation and in the far north, a potential factor accelerating desertification. USAID development of, or assistance in, programs which increase the efficiency of wood stoves, promote the development of family and community forests to develop fast-growing wood sources, and, where feasible, to develop use of alternative fuel sources, could potentially significantly reduce the current rate of deforestation due to this pressure. Such programs could complement and help mitigate deforestation pressures (discussed above), which could develop from improved agricultural conditions spurred by the FtF program. Technical forestry assistance imbedded in the Ministry of Agriculture and within USAID's operational team for FtF could help develop forestry program assistance to the FtF program while integrating complementary programs to reduce the fuelwood pressure on existing forests.

Fishing-Related

- USAID should promote, within the Fisheries Commission, increased technical capacity and capability to both monitor and manage fisheries stocks and catch. Currently, nearly all catch is self-reported and such reports are, at times, somewhat suspect. Increased capability and capacity in this regard could greatly assist the GoG in actively managing the fishery resource. As discussed in the ETOA: "The Fisheries Act granted the Fisheries Commission broad powers for developing fisheries plans and licensing vessels and canoes. The Minister of Agriculture sets the policies to be pursued by the Commission. The Act also created a monitoring, control, surveillance and enforcement unit in association with law enforcement agencies." To this extent, supporting the development of more technical and management capacity within the agency would be highly consistent with existing law.

- In addition to the above, personnel capacity for enforcement of fishing regulations, and the physical capacity (boats, fuel, work stations to do so), is a program area that USAID should support and encourage. Perhaps more difficult will be to encourage the political will of the GoG to take on an issue tied to so many voters. Gaining an understanding of the issues at the community level through programs such as those that CRC offers, while simultaneously encouraging the GoG to engage with the communities to enforce regulations, that, in the long run, will benefit the Ghanaian people is a vital element of any initiatives to sustain and improve Ghana's important fishery resources.

- Look to develop similar partnerships with inland fisheries organizations similar to those that are being developed with coastal fishermen via the Our Coast program.

Management Capacity-Related

- The US Government (USG) has opportunities to assist with drought preparedness training as well as training district technicians (in the Northern Region targeted for the FtF initiative) and local communities on sustainable use of water and watershed management objectives.

- Support, promote, and encourage the GoG, District, and local governments in the understanding and maintenance of riparian areas and increase the technical capabilities of institutions in this regard. Greater technical capability (based on research referenced in the ETOA, Section 4: "Freshwater Resources") is needed to promote such understanding and gain acceptance for riparian area best management practices from local communities. With community input, regulations and community norms could be improved and made more meaningful. The largely policy-driven (on private lands) current approach has not been highly effective (which some sources attribute to limited capacity at the regional and district levels where the literature indicates riparian management has devolved). Community foresters/biologists in the Department of Agriculture stationed in key western or northern districts might be the most direct way to convey this type of knowledge.

Deforestation-Related

- USAID could support or develop a pilot cocoa agro-forestry project as an independent project or as an expanded element of CRC's programs. Expansion of cocoa plantations is a significant driver of deforestation in the Western Region. Such a project, using programs such as Sustaining Thriving Environments for West African Development (STEWARD), community forests, or a CREMA- type approach in conjunction with one or more local NGOs with interest in this arena, could create a valuable learning tool.

- With USAID's ongoing interests in the Western Region, a forest/wetland cover mapping project as described for northern Ghana would help provide a more accurate baseline to establish the rate of decline of forests and wetlands in this Region. As discussed in several areas of the main report, data on forest cover in Ghana varies widely. Very little data at all is available on wetlands/mangroves. Technical assistance to the Forestry Division, and/or through partners (CRC, NCRC for example) could foster collaboration to define agreed definitions of "forest cover" and help map them as described above in the recommendation for northern Ghana. Such information would be useful for planning and monitoring forest conditions in the Western Region. Such information is critical given the combined pressure of mining, legal and illegal logging, cocoa expansion, slash and burn agriculture, potential shoreline impacts due to climate change, and the infrastructure and population pressures from oil development that are all coming to play at once on the forests, mangroves, and wetland habitats of the Western Region.

- USAID could support an assessment/evaluation of community-based conservation activities in Ghana. The assessment should include an assessment of lessons learned, legal framework and needs for increased community-based conservation, and a toolkit developed for communities to access to demonstrate conservation options and the identification of realistic potential social benefits. This could also be jointly considered as part of STEWARD or as a stand-alone assessment of conservation activities in Ghana (including CREMAs, community-based natural resource management, etc.).

Climate-Related

- National and regional level coastal development plans should include adaptation strategies for sea-level rise (e.g., relocation of transportation, housing, and business zones) and natural mitigation measures to slow coastal erosion (e.g., mangrove zones, sand mining restrictions).

- The National Disaster Management Organization (NADMO) within the Ministry of the Interior is responsible for the management of disasters and similar emergencies. In addition, NADMO is charged with ensuring that Ghana is prepared to prevent disasters and manage them well when they occur. Currently, NADMO needs strengthening in its capacity to respond to extreme weather events (such as flooding and drought) and should disaggregate its national level planning to local development plans. Disaster planning and climate change adaptation are conceptually linked and should be explicitly coordinated within the GoG.

Biodiversity-Related

- A particularly difficult, site-specific, problem in protected area management in Ghana has been, and continues to be, the internal occupancy and degradation of the Kalakpa Resource Reserve. USAID assistance may be useful to the existing players (WD, Katoomba Group, SNV, Ghana) to help move this site-specific issue to resolution and/or applied to any of several protected areas with internal occupancy and external degradation issues.

- USAID should consider expanding upon the Our Coast Our Future Project in the Western Region to include improved forest-related benefit-sharing arrangements, especially with regard to payment for ecosystem services arrangements in the Amansuri wetlands area. We suggest exploring whether the scope and scale of the Our Coast Our Future USAID-funded program can be expanded to be used as a platform for increased sustainable landscape funding that includes payments for ecosystem services, and stewardship contracting on and off of forest reserves.

- Continue to support and look to increase support to USAID's Our Coast Our Future land use planning (especially with respect to spatial land use zoning and strategic environmental assessments of proposed land uses). Also continue to support this project to gain a better understanding of climate change adaptation issues. The key opportunity within the marine and coastal environments include the development of Integrated Coastal Zone Management, which includes expanding upon the lessons learned from the USAID-funded program in the Western Region and developing zoning and sound land use development planning.

Oil-Related

- USAID should encourage GoG to develop as soon as possible a natural gas pipeline from Jubilee Oil Field to an onshore gas processing and power production plant to prevent months to years of wasteful gas flaring in a country that currently struggles to meet electrical demand.

A variety of other short-term interventions are included below, which cover a wide range of topics (and are based on direct observations made by the team or on direct feedback given to the team during field trips):

- An evaluation of the USAID-established endowment fund to be managed by the Ghana Heritage Conservation Trust for the community programs and projects in and around the Kakum Conservation Area, Cape Coast Castle, Elmina Castle, and Fort St. Jago should be undertaken with the aim of potentially re-invigorating the endowment. (Main collaborators: Wildlife Division and local community groups)

- Assistance to the Forestry Commission in the mapping and clarification of the amount of forest cover in Ghana to facilitate planning efforts. A possibility includes working with groups such as the NCRC, IUCN, and the Forest Services Division to develop a project to define and map current forest cover in Ghana.

- Provide technical assistance/support to the maintenance aspects of the Forestry Commission's reforestation program to improve long-term results from reforestation efforts. This may not be an area where USAID has a competitive advantage, but could play a technical role.

- Relative to ongoing oil development, which is particularly impacting the Western Region, USAID could explore governance and technical assistance to EPA to improve the nation's legal framework, and planning and technical capability to make more concrete and operational the existing oil spill contingency plans, as well as to move broadly stated environmental and social mitigation plans in the Jubliee Environmental Impact Statement (EIS) into concrete actions. CRC could play a role in this regard in helping to ensure the voice of local affected communities is brought to the table in discussions of social mitigation programs.

- USAID could work with the Forestry Commission on a pilot program for forest timber contracts to explore utilizing "forest stewardship contracts" which, if properly used, can result in direct community and ecological benefits from the "stewardship" aspect of the sales. Such an approach would be a means by which communities could see tangible results and a potentially a degree of local employment from timber sales. The USFS has the ability to assist with training on implementation of stewardship contracting.

B. RECOMMENDED MEDIUM-TERM AND LONGER-TERM INTERVENTIONS

The mid- to long-term recommendations focus on the future of USAID's Governance, Health, Education, and the Feed the Future Initiative; and on the issues of community land/resource tenure and climate change adaptation. The latter two areas are broadly based and relevant for collaboration with other partners.

Governance-Related

- USAID should assist the GoG in developing sound and equitable governance of land and forest resources, legal reform of resource tenure (particularly tree tenure) as it affects forests on "off-reserve" lands.

- As a companion to the legal reform above, help the GoG create functioning community forest institutions to manage natural resources, through pilot programs aimed at legal resource tenure reform that create clear incentives (and concurrent responsibilities) for communities and individuals to engage in off-reserve forest management.

- Expansion of LOGODEP-type programs to decentralize land tenure administration in coordination with organizations like the Civil Society Coalition on Land (CICOL) to continue to work on transparency of land tenure by provision of land registration and ownership documentations services at District and Regional levels.

Biodiversity-Related

- Pilot community forestry/CREMAs, dedicated forests-type projects adjoining protected areas where there is community interest and where background work demonstrates viable revenue streams for livelihoods. The creation of a just and workable community forestry tenure instrument – which would include within it dispute resolution mechanisms at different levels and build expertise for dispute resolution based on both customary and statutory law – will be an important advance for Ghana.

Climate-Related

- Continued support for REDD+ at the national level is necessary while also working on pilot projects in different regions throughout the country that can serve as learning experiences and examples (based on the assumption that viable long term REDD credit funding is available).

Forest Management-Related

- Updating forest management plans is an action being undertaken by the NREG. USAID could provide technical assistance in this arena, potentially using STEWARD models for community involvement, with a goal to improve the engagement and the resource management knowledge of local communities as such work proceeds.

Deforestation-Related

- USAID, the Ghana Cocoa Board, and NGOs working in the cocoa sector could develop enhanced education and technical assistance programs to cocoa farmers to reduce the deforestation associated with ongoing cocoa expansion in the country. If REDD+ credits become a reality, there appears to be the possibility to couple sustainable cocoa production with REDD payments as an incentive to manage such plantations with more trees.

Education-Related

- Continue to incorporate environmental education into curriculums and special activities or attractions. Especially target rural areas with education relative to use of fire, ecological and social benefits of riparian management, and quality information and assistance on agro-forestry techniques. Kakum National Park, for example, with its steady influx of elementary aged students is an excellent place to have such a project.

- Another option is to work with groups such as Forest Watch, the Rainforest Alliance, or others to develop short radio programs targeted for rural areas, which address specific deforestation or biodiversity threats and the practices which help to combat such threats.

Hydropower-Related

- USG could provide support to Volta Basin Authority to assist with resolution to issues like the Bagre Dam.

Agriculture-Related

- The development of improved transportation networks and agricultural practices, both through USAID FtF programs and through the Millennium Challenge Corporation (MCC), has the potential to reduce the dependence on forest resources and build more land tenure security. (See caveats to this recommendation in Section 5 below).

Oil-Related

- Forge community resource area partnerships with oil companies to develop marine reserves or assist communities in protecting community wetland areas. Social responsibility agreements with the oil industry could be required as mitigation for oil development (as for mining operations) to improve community infrastructure and livelihoods through joint industry /community/GoG projects (for example: water treatment facilities) in communities experiencing growth due to oil development.

CLIMATE CHANGE-RELATED ISSUES AND RECOMMENDATIONS (FROM CLIMATE CHANGE ASSESSMENT)

The "Options for USAID Programming" section of the climate report contains a list of interventions related to climate change to resolve barriers to adapting to climate change and/or mitigating the effects of climate change. Possible interventions are proposed in five categories: Policy Environment, Governance and Tenure, Capacity and Infrastructure, Information and Analysis, and Awareness and Adaptation. The "Options for

Interventions" table within the climate report lists vulnerabilities in each category with a corresponding recommended intervention and the USAID program most closely related to the intervention. Recommendations from this table are listed in the summary below.

Policy Environment

- Within this category, many issues stem from uncoordinated response to climate change. The recommendations start with strategic support of completion and implementation of the Ghana National Climate Change Strategy.
- Support development of a national energy policy that includes climate change mitigation and low emission strategies, including advanced biofuels development and capturing flared gas.
- Encourage GoG to advocate development of a national policy of integrated fire management and develop regionally adapted policies that includes traditional practices to manage wildland fires to protect soil quality, increase forage quantity and quality, increase rates of reforestation and afforestation, and mitigate trends toward desertification in vulnerable areas (e.g., northern Ghana).
- Support development of a water allocation agreement among all riparian countries in the Volta River Basin.
- Support implementation of national and regional level coastal development plans, which include adaptation strategies for sea-level rise (e.g., relocation of transportation, housing, and business zones) and natural mitigation measures to slow coastal erosion (e.g., mangrove zones, sand mining restrictions).
- USAID's FtF program focuses on the northern regions where donor activity is high; western Brong-Ahafo and northern Volta regions also exhibit high social vulnerability to climate change. Consider a more targeted, district-based approach to implementing the FtF program in places where it is most needed, and explore expansion to high vulnerability areas of neighboring Brong-Ahafo and Volta regions.
- Farmers need stable and favorable crop prices to make investments in commercial crop production profitable; otherwise, they can become poorer. To this end, ensure a favorable policy environment for cash crop production.

Governance and Tenure

- Advocate for legislation defining carbon rights that provides equity to smallholders.
- Advocate for an examination of land tenure and property rights issues at the community level.
- Capacity building with traditional land management authorities, such as chiefs and *Tendanas*, to include more transparency in their dealings would help restore the customary tenancy regime, and provide for equality in land use practices.
- USAID should consider the difficulty marginalized groups face in accessing land and resources as they design and implement the FtF program, which could help improve conditions for these groups and help ensure that they are not further marginalized.
- Explore local strategies for providing affordable credit to landowners and tenant farmers.
- An equitable system of water allocation and management should be developed as an integral part of any irrigation development scheme.

- A social assessment of the impacts of implementing agricultural development projects should be undertaken to ensure that people do not lose access to land and resources, and to identify mitigation measures.

Capacity and Infrastructure

- Partner with organizations that can link FtF activity to carbon financing market or payments for ecosystem services markets.
- Data-sharing policies among agencies improved, especially meteorology data (revenue recovery focus reduces ability for agencies to share and coordinate efforts).
- Meld FtF activities with reforestation and afforestation projects to meet family and community needs for fuel and construction wood, to produce non-timber forest products (NTFPs), to protect riparian zones, and to sequester carbon.
- Partner with local implementers to build capacity at institutions that supply climate adaptation information.
- There is a lack of technical capacity and infrastructure in telecommunications that limits ability to move large data files (such as GIS data) between agencies.
- Strengthen local monitoring authorities, and connect them with local, regional, and national partners. (EXP Coastal Resource Center).
- Support adoption of highly efficient charcoal and wood-burning stoves that are culturally compatible with Ghanaian cooking modalities to substantially reduce wood-based fuel use, carbon emissions, and deforestation.
- More efficient wood-based stoves will also produce less smoke, and lessen the burden on women who are traditionally responsible for gathering firewood.
- Encourage GoG to advocate development of a national policy of integrated fire management and develop regionally adapted policies that includes traditional practices to manage wildland fires to protect soil quality, increase forage quantity and quality, increase rates of reforestation and afforestation, and mitigate trends toward desertification in vulnerable areas (e.g., northern Ghana).
- Encourage GoG to develop as soon as possible natural gas processing capabilities to avoid prolonged gas flaring (months to years) and hence increased GHG emissions at Jubilee Oil Field and to supplement an already inadequate national power grid.
- Lack of infrastructure impedes efforts to decentralize governance, especially in rural areas distant from district capitols. To facilitate decentralization, explore utilization of cell phone texting features to send online registrations, permit applications, etc.
- Explore development of farmer credit banks in rural areas to establish farmer accounts that can be used to pay for permits, etc. remotely. Address land tenure constraints to obtaining credit; develop credit schemes that are feasible for smallholders.
- Investments made in tourism infrastructure could lessen the reliance of coastal residents on the marine fisheries resource by providing viable alternative livelihoods.
- Additionally, investments in education could help provide a better defined skill set and widen employment opportunities for youth and young adults.

- Encourage the government to either provide training itself, or through a third party, that offers the technical skills necessary to seek employment in the Oil and Gas Industry.
- Explore alternative energy systems (e.g. solar, biofuels?) that might suit the needs of local communities.
- Due to the high percentage of households that are remote from markets and/or have no year-round roads, efforts to promote agricultural development and crop marketing in Northern Ghana should evaluate how market access and transportation infrastructure can be improved, and invest in making such improvements.
- Invest in construction of local processing facilities that add value to agricultural and wild-harvested products to increase income and create non-farm jobs.
- Develop improved grain storage facilities so excess grains produced in good years can be stored to buffer against crop failures.

Information and Analysis

- Partner with regional organizations (e.g., CILSS, AGRHYMET, CORAF, INSAH, FEWSNET) to ensure availability of and access to data (weather patterns, hydrological data, ground cover change, agricultural expansion, improved land productivity, fish populations) and forecast/projections
- Land cover/land use inventory and Forest inventory are needed to set baseline for deforestation, carbon pools under REDD" and to meet MRV requirements.
- Establish program of research and technology development in climate prediction, improve crop models, and link process-based crop models to high resolution regional climate models.
- Investigate uncertainties of commercial and large-scale agriculture sustainability in light of increasing (or minimally uncertain) future costs of petroleum-based fuels and agricultural chemicals and a changing climate.
- Investigate climate change at a sub-national level using appropriately scaled GCM models and within the context of desertification in the north, sea-level rise and coastal erosion, marine and inland fishery sustainability, water supply in the Volta Basin, and power production from Okosombo, Kpong, and Bui dam generators
- Investigate areas where carbon sequestration can complement FtF efforts, e.g., reducing coastal erosion by increasing mangroves, rangeland management, agro-forestry, farmer managed natural regeneration (FMNR), riparian forest management
- Evaluate in all FtF irrigation projects the impacts on the quantity and quality of local ground and surface water supplies as well as downstream user impacts
- Evaluate rates of coastal erosion nationally with an emphasis on identifying proximate and ultimate causes and on near- and long-term effects on coastal infrastructure and natural resources (e.g., cities, villages, highways, ports, marine facilities, biodiversity hotspots, lagoonal and inshore fisheries)
- Conduct a quantified evaluation of the temporal pace of vegetation change and soil degradation to evaluate rates and extent of desertification in northern Ghana especially in the context of projected population increases, food security, water demands, ecological services, and climate change
- Develop optimized shade-grown cocoa management schemes that provide high levels of return to farmers and also greater biodiversity benefits than sun grown

Awareness and Implementation

- Partner with local implementers to build climate change awareness of end users (e.g., farmers, fishermen, media, government) and enhance their ability to use information.
- Organize workshop on topics such as climate change, adaptation, and carbon sequestration for agriculture sector partners and FtF implementers.
- Increase cocoa productivity by intensification and access to inputs.
- Support efforts to increase awareness of GoG agencies and personnel on modern integrated fire management approaches; educate staff on traditional approaches to fire management and integrate the two.
- Increase agricultural productivity by increasing access to technology and inputs by improving distribution channels (e.g., fertilizer), farmer access to operating capital, and crop insurance schemes to mitigate effects of climate variability.
- Raise awareness of consumer quality expectations for (among other potential crops) rice, yams and institute quality assurance schemes for improved market access (Challinor, A., T. Wheeler, et al. (2007) and Challinor A., F Ewert, et al (2009))..
- Lower harvesting and handling losses by developing community or cooperative drying and storage facilities.

Agriculture Specific Observations and Recommendations (From Climate Assessment)

Agricultural specific recommendations have been included in the climate report and the environmental Appendix at the request of USAID due to the importance of the Feed the Future Program with its direct ties to improving agriculture in Ghana. The observations about agriculture in Ghana below are summarized from the climate report.

- Traditional cropping systems in semi-arid West Africa, including the Savanna Zone in Ghana, are dominated by cereal-based systems, usually combining two or more crops in a field. Intercropping minimizes risk of crop failure from drought or flooding and spreads the need for labor over a longer period. With the risk spread over two crops, a smallholder can take advantage of a long growing season during a year of above average precipitation. Low soil organic matter and limited availability of plant nutrients, in particular phosphorus and nitrogen, are major bottlenecks to agricultural productivity in Ghana, which is further hampered in the Savanna Zone by substantial topsoil losses through wind and water erosion
- Recent increases in production have come from expansion of the land cropped to cocoa and higher inputs of family labor. Increasing land in cocoa production has been a driver of deforestation. Because cocoa was traditionally grown under shade, however, many valuable timber trees were retained in cocoa fields, augmented by planting of fruit and other useful trees; thus shade-grown cocoa was an agroforestry practice with greater biodiversity value than slash and burn agriculture. Research has demonstrated the technical advantages of fertilized, low shade or full sun hybrids and current recommendations from the Cocoa Research Institute of Ghana call for fertilizing with phosphorus, potassium and micronutrients, densely planted hybrid cocoa in full sun or light shade. Little research has been directed towards increasing productivity of traditional shade grown cocoa although that is an alternative that would avoid the negative effects of full sun hybrid cocoa on biodiversity.

- Two challenges to commercialization of rice production in Ghana are to increase productivity and improve quality of domestic rice. Optimal whole-farm production systems including rice using traditional (grass fallow) methods requires over 9 ha of production land, which is about twice as much as the mean land holding for Northern Ghana. Transforming existing smallholders into commercial operations will require increasing land holdings. Replacing traditional grass fallow with short-duration leguminous cover crop fallow would be accompanied by increasing mechanization to replace the labor needed to farm the larger acreages.

- Although growth rates in agricultural production have slowed since the 1980s, they have been positive but for most crops, growth came from increases in the area harvested, not from productivity gains; rice and millet were exceptions. For maize there are substantial differences in regions of the country, both in terms of average growth rates and the share of growth resulting from increasing the area under cultivation (extensification) versus improving yields per ha (intensification). The strategy of extensification has caused significant environmental damage (deforestation, desertification and soil erosion) and is clearly unsustainable. Meeting the ambitious goals set by the government for increased agricultural productivity will be challenging; intervention is needed to set agriculture on a different development trajectory.

- Commercialization of maize and rice production requires increased land security in order to motivate farmers to invest in technology and inputs. Commercialization of maize production already has led to changes in the land tenure patterns and a tendency to preferentially allocate land to large-scale commercial farmers. Pressure on the available land resource has already intensified conflict in the northern Savanna zone; between farmers and herdsmen on the alluvial plains and among smallholders where land fallowed by one family has been reallocated to another family. Transforming rice cropping in the Northern Zone, if the model described were followed, would include concentrating access to land in the hands of wealthy producers, while smallholders would lose their use rights.

- The complexity of crop growth requires climate data (short-term variability, frequency of extreme events) at spatial and temporal resolutions that are currently beyond the reach of climate change models. In addition to inadequate climate models, crop modeling research has favored the major global food crops and devoted less attention to crops important to Ghana such as millet and yams. These observations are further discussed at the following references: "Assessing the vulnerability of food crop systems in Africa to climate change," Challinor, A., T. Wheeler. et al (2007) *Climatic Change* ***83***(3): 381-399) and also in Chillinor A., F. Ewert (2009) "Crops and climate change: progress, trends, and challenges in simulating impacts and informing adaptation," *Journal of Experimental Botany* **60**(10): 2775-2789. Additionally, crop models generally are specified for mono-cropping and rarely consider intercropping. Improvements in both climate and crop models and the ability to model effects at scales from the farmer's field to the region and nation will be critical to formulating adaptation options for agriculture and mainstreaming climate change into development programs.

I. INTRODUCTION

A. THE PURPOSE OF THIS ASSESSMENT

This assessment has been compiled for US Agency for International Development (USAID)/Ghana to:

- Serve as a planning tool to update data and assumptions on the status of the environment in Ghana and to better integrate environmental concerns into its overall programming.
- Meet core environmental requirements of the US Foreign Assistance Act (FAA) in regard to:
  - Section 117 "Environment and Natural Resources," which dictates that operation units will implement programs with an aim toward maintaining and restoring natural resources and to consider the impact of their activities on the environment
  - Section 118 "Tropical Forests," which requires an analysis of actions necessary to achieve conservation and sustainable management of tropical forests
  - Section 119 "Endangered Species," which requires an analysis of actions necessary to conserve biological diversity, and the extent to which the actions proposed for support by the Agency meet the needs thus identified.
- Inform USAID planning efforts of new developments in Ghana's environmental context that need to be taken into consideration.
- Provide USAID-Ghana with an overview of climate change projections for Ghana, an interpretation of the significance of climate variability and change in terms of effects on natural resources and human populations, and suggest potential adaptation measures with a view towards future USAID-Ghana programming.

B. METHODOLOGY

This report was prepared by a team of resource specialists assembled through the US Forest Service, International Programs office. The team consists of eight individuals with various resource and social expertise (see Appendix 2 for details). Two members of the team are Ghanaians and began coordination work to set up meetings and field trips prior to the arrival of the other team members in Ghana. (The full itinerary of the team is shown in Appendix 1).

In summary, the climate change group of the team arrived in Ghana on February 20, 2011 and was joined by the Environmental Threats and Opportunities Assessment (ETOA) group on February 27. The methodology used by the climate team is described in more detail in the Climate Change Assessment. The teams worked both collectively and independently to interview key stakeholders recommended by USAID and the in-country team members. With its high concentration of government agencies, civil society, and NGOs, many interviews were conducted in Accra. A field trip to the Northern Region (a focus area for Feed the Future) was set up to provide the team with first-hand views of this savanna region and to gather viewpoints from those living and working in the region. A second field trip to the Central and Western Regions was set up to gain insights into the tropical forests, oil, and fisheries issues, which are important in these regions. This field trip also provided the opportunity to view management of a tropical forest (Kakum Park) where USAID has had a program and to gain timber industry perspectives on the state of forest management.

Interviews were selected to get a thorough overview of the perspectives of government, civil society, NGOs, and educational institutions engaged in various aspects of tropical forest management, biodiversity, and climate change. Due to USAID's interest in emerging issues in oil development and fisheries, special efforts were made to arrange interviews with people knowledgeable of issues and activities in those sectors.

After the departure of the Forest Service team members from Ghana on March 12, team members continued literature searches to add to the information gathered during the in-country work. The amount of information available on various aspects of Ghana's biodiversity, tropical forests, and climate change issues and initiatives is immense. The team synthesized information from a variety of sources to present as accurate an assessment as possible of the current and likely future state of Ghana's environment and the current and likely future effects of climate change on that environment. With the mass of information and opinion available it is inevitable that there are conflicting viewpoints and varying data at times. Where this was encountered the team sought to use the most reliable data available. Where there are differences in data sets from creditable sources, to the extent possible, we tried to explain the reasons for such differences.

After assembling the data, the team analyzed it and listed threats, opportunities, and recommendations for USAID to consider. Recommendations are given for possible program direction to help improve biodiversity and tropical forests in Ghana and for the design of ongoing USAID programs in this regard. The recommendations from the team are those of the team and do not necessarily represent the views of USAID.

C. COUNTRY OVERVIEW

Ghana is a very biologically diverse country supporting two major biomes: tropical high forest and savanna. Below is listed a table of the Agro-ecological Zones of Ghana. (Table 1 is reprinted from the Food and Agriculture Organization of the United Nations (FAO) website for Ghana)

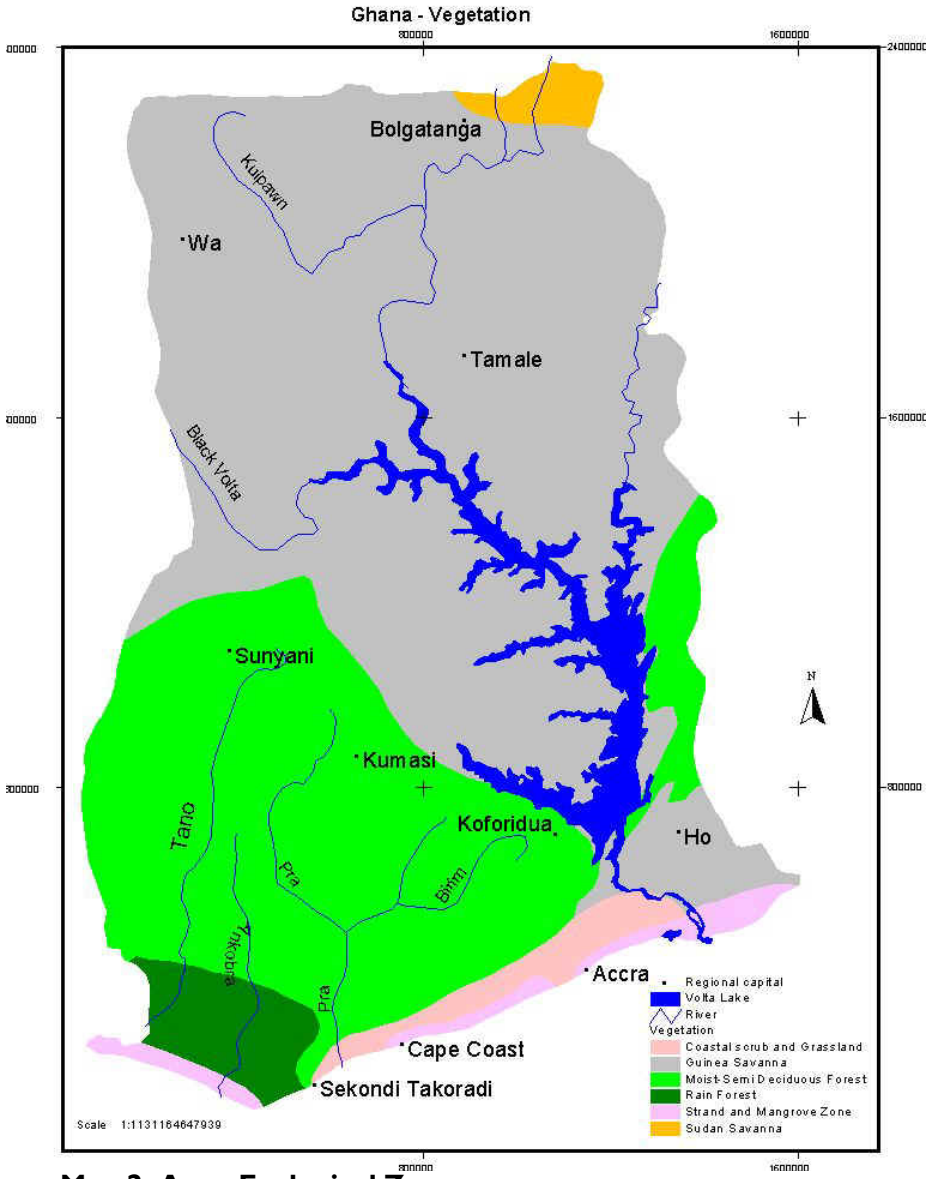
Table 1: Agro-ecological zones

Zone	Area ('000 ha)	Percent of total area	Mean annual rain (mm)	Growing period (days)	
				Major season	Minor season
Rain Forest	750	3	2,200	150-160	100
Deciduous Forest	740	3	1,500	150-160	90
Transition	6,630	28	1,300	200-220	60
Guinea Savanna	14,790	63	1,100	180-200	-
Sudan Savanna	190	1	1,000	150-160	-
Coastal Savanna	580	2	800	100-110	60

Map 2 below (also from the FAO website) shows the distribution of agriculturally related vegetation zones in Ghana. This mapping uses a slightly less detailed categorization of vegetation than the older, natural vegetation oriented (see Map 1).

The diverse ecosystems of Ghana contain a wide variety of flora and fauna. The Upper Guinean Rainforest area, which includes many forested areas in Ghana, is one of the world's 25 biologically richest and most endangered terrestrial eco-regions in the world. (Status of Biodiversity and Impact Assessment in Ghana, EPA, 2007).

The flora of Ghana includes a significant amount of tropical forest, which has been rapidly declining in recent decades under the combined pressures of agricultural expansion, timber harvest, human occupancy, mining, fuel wood production and fire. Under requirements of the UNCBD treaty (Conservation of Biodiversity), Ghana submitted their 4th Country Report on Biodiversity on March 25, 2009. The website to access the complete report is shown in Appendix 8. At the time the data was collected for that report, there were 291 forest reserves managed by the Forestry Division. Data listed in Appendix 5 shows 291 forest reserves (and two pending reserves). There are 16 Wildlife Protected Areas (WPAs), including seven National Parks, six Resource Reserves, two Wildlife Sanctuaries, and one Strict Nature Reserve in addition to five coastal wetlands (RAMSAR sites) in Ghana. One RAMSAR wetland site (Owabi) includes a 1,300 ha wildlife sanctuary. Collectively, these WPAs total about 14,890 sq km (6.2 percent of the country) and are managed by the Wildlife Division of the Forestry Commission (Forestry Commission, Wildlife Division website April 5, 2011). Forest reserves, when coupled with the parks, wildlife reserves, and wetlands managed by the Division of Wildlife, represent more than 38,000 sq km in some form of protected status. These areas constitute about 16 percent of the total land area of Ghana. (Ghana, CBD 4th Report, p. 26). See Appendix 5 of this report for a listing of the protected areas of Ghana.



Map 2: Agro-Ecological Zones

Source: Dickson and Benneh (1988)

Ghana has set aside all or portions of 30 Forest Reserves as Globally Significant Biodiversity Areas (GSBAs), to be managed in partnership with communities to conserve, and where appropriate, sustainably use, these areas. Interviews conducted for this report indicate that GSBAs were not necessarily significant in terms of "high" biodiversity nor have these areas seen increased management support, protection or budget due to their designation. Some wildlife species "hotspots" in Ghana are thought to be outside protected areas.

In the EPA's Status of Biodiversity and Impact Assessment in Ghana (Ghana EPA, 2007), the report characterizes a "lack of information on the full coverage of biological resources of the country," but goes on to state that are about 2,974 indigenous plant species, 504 fishes, 728 birds, 225 mammals, and 221 species of amphibians and reptiles have been recorded.

Other sources show somewhat different numbers. The Earth Trends database (website shown in Appendix 8) for Ghana has 3,725 species of vascular plants (43 endemic), 729 birds, 249 mammals, and 207 amphibians and reptiles. This data was largely compiled in 2004. According to the FishBase database, there are 230 species of freshwater fish and about 483 species of salt water fish in Ghanaian waters. Of these fish, four are thought to be endemic.

The International Union for the Conservation of Nature (IUCN) maintains a status list of species worldwide. This well respected organization lists 23 species of plants and 34 species of animals as endangered or critically endangered in Ghana. The complete list of these species is found in Appendix 6. By signing the Convention on International Trade in Endangered Species, Ghana has agreed to provide protection for the species listed for Ghana under this convention.

Ghana's rich biodiversity resources face many threats, as described in this ETOA. There is agreement from almost all sources that Ghana's forest cover is declining rapidly. The current amount of forest and the rate of decline are both subject to widely varying estimates, all of which show a declining trend. More detail on this subject is found in Section 4 "Forestry Resources."

2. SOCIO-ECONOMIC OVERVIEW OF GHANA

The following table provides a brief outline of the relevant socio-economic information for Ghana (Feed the Future IEE analysis, 1/2011).

Table 2: Ghana Socio-economic Profile

Geography and Environment	
Surface area: *total:*	238,540 sq km
Coastline:	565 km
Coastal zone (defined as the area on-shore below the 30-m contour):	7%
Maritime claims: *contiguous zone:* *continental shelf:* *EEZ (distance from shore):* *territorial sea:*	 24 NM 200 NM 200 NM 12 NM
Exclusive Economic Zone (EEZ):	216,900 km^2
Natural resources:	gold, timber, industrial diamonds, bauxite, manganese, fish, rubber, hydropower, salt.
Land use *arable land:* *permanent crops:* *others:*	 17.5% (2005 est) 9.22% (2005 est) 73.244% (2005 est.)
Irrigated land:	60 sq km (1993 est.)
Environment - international agreements: party to:	Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Law of the Sea, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Marine Life Conservation
Population	
Population:	23,832,495 (UN, 2009 estimate)
Population growth rate:	1.8% (2000 population)
Life expectancy: *total population:*	59.85 years (2009 est)
Urban population (% of total):	46.3 (2005 population)

Urban population annual growth rate:	4.15% (1995-2015)
Population living within 100 km from the coast:	42.5%
Population in coastal zone (defined as the area on-shore below the 30-m contour):	25%
Literacy: *(definition: age 15 and over can read and write)*	*total population:* 65% *male:* 80% *female:* 76% (2007 est.)
Economy	
GDP: GDP - real growth rate: GDP per capita: purchasing power parity	$16.654 billion (2008 est.) 6.2% (2008 est.) $739 (2008 est.)
GDP composition by sector: *agriculture, forestry and fisheries:* *industry:* *services:*	 36% 25% (including 15% from manufacturing) 31.4% (2000 est.)
Population below poverty line:	11.5 million (2008 est.)
Labor force:	9 million (2000 est.)
Labor force - by occupation:	agriculture 56% (including 3% in fisheries), industry 16.2%, services 5.9%, sales & clerical 19.3%, Professional 8.9% (1999 est.) mining, lumbering, light manufacturing, aluminium smelting, food processing 20.3% (2001 est.)
Unemployment rate:	20.3%
Industries: Industrial production growth rate: Industries located in coastal zone:	 4.2% (1996 est.) 70%
Electricity – production: Electricity - production by source: Electricity - consumption: Electricity - exports: Electricity - imports:	5.466 billion kWh (1999) *fossil fuel:* 26.82% *hydro:* 73.18% 5.573 billion kWh (1999) 400 million kWh (1999) 890 million kWh (1999)
Agriculture – products: Exports: Exports - commodities: Imports:	cocoa, rice, coffee, cassava (tapioca), peanuts, corn, shea nuts, bananas; timber $1.6 billion (f.o.b., 2000) gold, cocoa, timber, tuna, bauxite, aluminium, manganese ore, diamonds $2.2 billion (f.o.b., 2000)

Imports - commodities:	capital equipment, petroleum, foodstuffs
Currency code: Exchange rate	Cedi (GHC) Cedis per US dollar – 1.50 (December 2010)
Water Resources and Uses	
Internal flows	30 billion cu. m. 1999
Flows from other countries	22.9 billion cu. m. 1999:
Total resources per capita cu. m^3:	2,832
Annual freshwater withdrawals:	0.3 billion cu. m
% of total renewable resources:	0.6
% for agriculture:	52
% for industry:	13
% for domestic:	35

A. KEY ECONOMIC DRIVERS AND CONSTRAINTS

Ghana's economy is expected to grow faster than the rest of sub-Saharan Africa in 2011. The World Bank released its 2011 Global Economic Prospects report that projected Ghana's economy will grow at 13.4 percent in 2011, with a substantial contribution to the expected growth coming from the oil and gas sector. In contrast, other developing countries are expected to grow by an average of 6 percent in 2011. A November 2010 revision of Ghana's GDP by the Ghana Statistical Services raised estimates of its annual income by 60 percent, placing the country in the lower-middle-income bracket. Agriculture now constitutes 30.2 percent of the economy, as opposed to 37.7 percent in 2009. The World Bank warns that the inflows from the oil sector, if not well managed, could undermine the incentive structure for agricultural exports.

1. GHANA'S DEVELOPMENT GUIDELINES

Ghana has undertaken several policies and programs, with varying degrees of success, to accelerate the growth of the economy and raise the living standards of the people. These include, but are not limited to, Ghana Vision 2020: The First Step (1996-2000); the First Medium-Term Plan (1997-2000); Ghana Poverty Reduction Strategy (2003-2005); and the Growth and Poverty Reduction Strategy (2006-2009). According to the authors of the Ghana Shared Growth and Development Agenda (GSGDA) 2010-2013, these strategic programs contributed to substantial progress towards the realization of macro-economic stability and the achievement of poverty reduction goals. Structural challenges characterized by large fiscal and balance of payment deficits have, however, remained.

A modernized agricultural sector is projected to be the area in which Ghana's economy is transformed with resulting job creation, increases in export earnings, increased food security, and increased supply of raw materials for value added production levels. The main focus of agricultural development will be to accelerate the modernization of agriculture through the implementation of the Food and Agriculture Sector Development Policy (FASDEP II) and the corresponding investment plan as detailed in the Medium-Term Agricultural Sector Investment Plan (METASIP) and ensure an effective linkage between agriculture and industry. These programs and plans are expected to contribute to rural development and reduction in the incidence of poverty.

The medium-term, per capita income is projected to reach at least US$1,035 by 2013 with a projected non-oil average real GDP growth rate of 7 percent per annum, and an oil average real GDP growth rate of at least 9 percent. This is to enable Ghana to achieve and sustain per capita income levels consistent with the long-term

objective of a per capita income of at least US$3,000 by the year 2020 without compromising macroeconomic stability. These growth targets assume that the trend of buoyant prices for Ghana's two main exports, cocoa and gold, will continue and Ghana would take advantage of the favorable world market prices and increase the volumes of exports of these commodities. It is also assumed among others that:

- The population growth rate will not exceed 2.2 percent per annum
- Inflation rate is contained within single digit
- Foreign exchange rates will reamin stable

It is further assumed that in spite of the prospects of increased revenue from oil, Ghana will continue accessing development assistance on account of the existing large deficit in economic and social infrastructure, the need to intensify efforts to achieve the Millennium Development Goals (MDGs) as well reduce spatial disparities in development. To ensure aid effectiveness and coordination, the Ghana Aid Policy and Strategy provides for aligning external aid to Ghana's national development priorities and serves as a guide to government, development partners, civil society organizations, and other stakeholders in the management and coordination of external aid in Ghana.

In the Ghana Shared Growth and Development Agenda, the growth pillars will be: agriculture, manufacturing, infrastructure, services, extractive industry (oil, gas and minerals), tourism, and creative arts. Public and private sector investments will be directed at these sectors. In view of the dominance of agriculture as the single largest sector, in terms of income, employment, food security, and export earnings, the sector needs to be modernized to improve its performance. ***Government considers the modernization of agriculture as a pre-condition for the structural transformation of the economy and the sustainable reduction in the incidence of poverty.***

2. GHANA'S ECONOMIC CONSTRAINTS

Ghana's private sector is uncompetitive both locally and internationally. According to the GSGDA, this is largely attributed to a number of structural constraints at the policy and institutional levels, which hamper its developmental role. The constraints manifest themselves as conflicts between and amongst the arms of government and governance institutions, resource disparities that undermine the role of different arms of government, low participation of civil society organizations in governance, and as high corruption in the public sector.

Ghana's agriculture is currently made up predominantly of subsistence smallholder production units, with weak linkages to industry and the services sectors. It is characterized by low level of technology and productivity, low income, and uncompetitiveness in production, processing, and distribution. Given its central role in generating income and providing livelihood for a majority of the people as well as its potential to lead the transformation of the economy, agriculture is expected to drive the new development agenda.

Poorly planned development and unsustainable land uses have resulted in irreparable damage to productive lands through deforestation, air and water pollution, desertification, overgrazing, and the destruction of biodiversity. The total economic cost of poor environmental management and sanitation is more than 10 percent of Ghana's GDP. The fast growing population is presently exerting immense pressure on national resources, as well as creating waste management problems in the major towns and cities. Land degradation has been identified as one of the key environmental problems facing the country, resulting in declining productivity of the land in the face of mounting population pressure (GSGDA). The lack of knowledge on environmental issues and capacity to deal with issues on the management of the environment and sanitation have been and are likely to become increasingly significant constraints on Ghana's economy in the future.

Substantial progress has been made towards the realization of macroeconomic stability and the achievement of poverty reduction goals. However, structural challenges also emerged, characterized by large fiscal and balance of payment deficits, mainly as a result of fiscal over-runs and external factors, including upsurge in

crude oil and food prices. Remittances declined and access to private external financing became more difficult as a result of the global financial crisis. This was in spite of favorable global market conditions for cocoa and gold exports. Presently, the country faces several challenges, including:

- Accelerating progress towards the achievement of the MDGs, especially those relating to maternal mortality, child mortality, gender equality, and environmental sanitation.
- Major regional inequalities with the north experiencing significantly higher levels of poverty than the rest of the country.
- Major gender inequalities, with women and girls performing worse across all the main social indicators.
- Although the proportion of Ghana's population defined as poor fell from 51.7 percent in 1991-1992 to 39.5 percent in 1998-1999 and further to 28.5 percent in 2005-2006, poverty still remains an important challenge.
- A fiscal deficit that has risen to 14.5 percent of Gross Domestic Product (GDP), excluding new domestic expenditure arrears of 4.2 percent of GDP as well as resurgence of macroeconomic instability that manifested in an end-year inflation rate of 18.1 percent.
- Increased volatility on the foreign exchange market.

In spite of the improved GDP performance recorded over the period 2003-2009, national income data indicate that agriculture, especially crops and livestock, and fisheries as well as manufacturing, which have the potential to generate large scale employment opportunities, underperformed. Not surprisingly, poverty studies in Ghana, including various Ghana Living Standard Surveys (GLSS), reveal that while poverty has continued to fall in the forest zones and cocoa producing communities of Ghana, it has increased in the predominantly food crop producing areas and fishing communities.(GSGDA, 2010).

3. ECONOMIC PERFORMANCE/TRENDS AND ASPIRATIONS PER SECTOR

Agriculture

The GSGDA reports that "Despite the fact that Agriculture has the single largest share in GDP, its growth rates over the period were generally below overall GDP growth rates. The GDP growth rates experienced in recent years were on the back of the Services and Industry sectors of the economy. Indeed, for the Agriculture sector, the growth rates were generally attributed to cocoa production and marketing. Livestock, Fisheries and Food Crops sub-sectors, on the other hand, have not shown any appreciable improvements, thus reinforcing the characteristics found in various poverty studies including GLSS.

The modernization of the Agriculture sector is expected to be an important driver of growth in the medium-term on the basis of improved productivity (e.g., adoption of high yield crops, improved seedlings, use of pesticides and spraying technologies, and mass spraying in the cocoa sector) and increased acreage due to factors such as improved irrigation, subsidized inputs, improved mechanization services along the value chain, improved marketing, improved extension services, and improved institutional coordination for agricultural development. The Agriculture sector is therefore expected to grow at an average annual growth rate of 6.1 percent over the medium-term. Growth in the Agriculture sector is expected to be led by the crops and livestock sub-sector with about 7 percent per annum, followed by the fisheries sub-sector with 4.3 percent. Cocoa production and marketing is expected to grow at the rate of 3.9 percent, while forestry and logging is expected to grow at 3.5.

Industry

Currently, the Industry sector is the least contributor to GDP, behind the Agriculture and the Services sectors. For the attainment of economic transformation envisaged under Government's medium-term

agenda, the Industry sector is expected to play a pivotal role, growing at an average annual rate of 14.5 percent over the period 2010 - 2013. The main drivers of this sector include: enhanced growth from the construction sub-sector; growth in infrastructure development, in the oil, energy, and water sub-sectors in 2011 and beyond resulting mainly from the Bui Dam's operations; production of gas to generate thermal energy; and an increase in output from the mining sector, especially in salt production to meet industrial demand. The mining and quarrying sub-sector including the oil and gas industry is expected to lead the growth in this sector with an average annual growth rate of 22.7 percent over the period. The highest growth rate in the sub-sector is expected to be recorded in 2011 at 56.7 percent when oil production begins and eventually decline to 11.5 percent in 2013. The electricity and water sub-sector is expected to grow at an average annual rate of 15 percent, while the construction sub-sector is expected to grow by about 13.8 percent per annum. The manufacturing sub-sector is expected to register the least annual growth in this sector at the rate of 8.5 percent per annum.

Services

This sector depends on growth in Agriculture and Industry. The abating of the global financial crisis in the medium-term and the development of the oil and gas industry should positively impact growth of the Services sector, via the hotel and restaurants, transportation, international travel and tourism, and the banking and insurance sub-sectors. The transport, wholesale, and finance sub-sectors are expected to be the main growth drivers in the sector. The Services sector is expected to grow at an average annual growth rate of 9.3 percent over the medium term, with finance, insurance, real estat, and business services leading the growth in the sector with an average annual growth rate of about 13.5 percent. The wholesale and retail trade, restaurants, and hotels sub-sector is expected to follow with an average annual growth rate of 9 percent, while the transport, storage, and communication sub-sector is projected to grow at an average rate of 8.5 percent per annum. Government services and community, social and personal services are projected to grow at average annual growth rate of 5.6 percent and 5 percent respectively."

B. POVERTY AND EMPLOYMENT

1. INCOME AND HUMAN POVERTY IN GHANA

According to the GSGDA, Ghana has made great strides towards reducing poverty over the past two decades. Economic growth initiatives have been largely pro-poor with a steady rise in pro-poor spending. The strong growth in GDP nearly halved the poverty rate in Ghana from approximately 52 percent at the beginning of the 1990s to 28.6 percent in 2005-20006. At this rate, Ghana is poised to achieve the MDG of halving extreme poverty ahead of the 2015 target date. The reduction in poverty may be attributed to the strong growth in cocoa and forestry sub-sectors. Despite these gains, income inequality across regions and between socio-economic groups remains high and has increased during the period of accelerated growth.

2. POVERTY AND GENDER INEQUITY IN GHANA

High levels of poverty among women due to lower literacy rates, heavier time burdens, and lower access to productive resources and weak communication strategies for Government policies on women's issues still persist. Strategies aimed at slowing the increasing level of poverty among women will include promoting the economic empowerment of women through access to land, labor, credit, markets, information, technology, business services and networks, and social protection, including: property rights; promoting the social empowerment of women through access to education (especially secondary, vocational/ technical and tertiary education; non-formal education, opportunities for continuing education for school drop-outs; and scholarships); creating access to health/reproductive health services and rights, legal aid, social safety nets, social networks; and ensuring adoption of affirmative action policy/law to increase participation of women in areas of leadership and decision-making with the target of attaining a minimum of 40 percent female representation in political and public service appointments (GSGDA 2010).

3. UNEMPLOYMENT AND RATES OF URBANIZATION

According to GSGDA, formal sector employment as a percentage of total employable labor force is on the decline. Current estimates indicate that only about 8 percent of total labor force is in the formal sector of the economy with the remaining in the informal sector. This implies that Ghana faces significant unemployment and under-employment problems which need to be addressed.

At a projected average urban growth rate of around 3 percent between 2000 and 2030, Ghana's urban population is expected to increase from about 52 percent of the total population in 2010 to around 65 percent by 2030. The rise in urban population will continue to negatively affect the limited social infrastructure resulting in congestion, overcrowding and the emergence of slums.

4. POVERTY AND DEPENDENCE ON NATURAL RESOURCES

Livelihoods of Ghanaians are highly dependent on natural resources that are being overexploited by non sustainable exploitation practices. Forests are threatened by cocoa farming, mining activities, and a wood products industry. Soil fertility is threatened by erosion resulting from deforestation and poor agricultural practices; wetlands are threatened by deforestation and coastal pollution; fresh water resources are threatened by land degradation and desertification; the marine resources are threatened by over-fishing and pollution and Lake Volta is threatened by asphyxia. The economy depends on soils to supply agricultural production, hydro-power stations to supply electricity, timber to supply the wood-processing industry, mines to supply gold, imported oil to provide transport, clean environment to good health and nature to support the tourism sector. The cumulative effect of natural degradation endangers Ghana's economic development and social well-being.

The majority of Ghanaian poor households live in rural areas exploiting declining natural resources and face increasing livelihoods stress. Soil fertility is increasingly problematic in providing for subsistence farming, non-timber forest products. Fish are less available in daily diet. Diseases due to unsanitary conditions are increasing. Desertification and climate change increase the scarcity of essential natural resources such as wood for cooking and drinking water. Population growth and rural migration have increased the already overcrowded urban settlements generating bad sanitary conditions due to absence of water and solid waste management, inadequate quality of housing in slums, higher cost for food and few employment opportunities.

Ghana relies primarily on agriculture and mining for economic development. Approximately 72 percent of the whole land area of the country is considered vulnerable to desertification that will lead to reduction in the productive capacity of natural resource. The on-going, non-sustainable, management of the soils of Ghana leads to their rapid erosion, lost of fertility, lost of productive capacity, desertification and scarcity of fresh water resources.

C. HEALTH

Even though the health status of Ghanaians has generally improved over the years, there are persistent challenges that still need to be addressed. There are large gaps in access to the health MDGs and the goal on access to improved sanitation is not likely to be met by 2015 if the current trend continues. Health care differs between urban and rural as well as the rich and poor; gender gaps in access to health care due to poverty, deprivation and ignorance exist. There is an absence of an appropriate legal framework for the health sector as well as high infant and maternal mortality; high morbidity and mortality from communicable diseases such as HIV and tuberculosis. The health sector sees increasing prevalence of non-communicable diseases with high disability and mortality e.g. cancers and cardiovascular diseases. Ghana is also subject to threats of epidemic-prone diseases and diseases of pandemic potential, such as influenza. Overall, there is a low level of overall health expenditure and inadequate social protection.

To improve access to quality health care, the policy objectives will be to: bridge equity gaps in access to health care and nutrition services; improve governance and strengthen efficiency in health service delivery, including

medical emergencies; improve access to quality maternal and child health services; intensify prevention and control of non-communicable and communicable diseases (malaria, HIV, and AIDS/STI/TB); promote healthy lifestyles as well as strengthen mental health service delivery; and make health services youth-friendly at all levels.

The HIV and AIDS national prevalence rate of 2.9 percent among the general population poses a bleak future if strenuous effort is not made to check the pandemic. HIV, AIDS, and Sexually Transmitted Infections (STI) and tuberculosis (TB) continue to have a negative impact on productivity with respect to loss of productive assets, high treatment costs, and a break in the transfer of valuable livelihood knowledge from one generation to the next.

Nutrition and food security is an essential cross-cutting issue in addressing overall human resource development. Currently, there is a persistent high malnutrition rate among children, especially male children in rural areas and in northern Ghana. Coverage of nutrition programs is limited geographically and there is a general lack of national nutrition and food security policy (GSGDA 2010).

D. EDUCATION

According to GSGDA, the education sector comprising pre-school education, primary and junior high school, second cycle education including technical and vocational education and training (TVET), tertiary education and non-formal education faces problems of access, quality, and management. These problems are compounded by disparities at both regional and intra-regional levels, as well as gender disparities, leading to highly unequal outcomes. In addition, there is low motivation and poor conditions of service for education sector workers; low quality of teaching and learning; lack of supervision and poor management; inadequate educational infrastructure; low access to quality science and technical education; insufficient materials for special schools; and inadequate curricula emphasis on issues of population, environment, life-long learning, gender, health, HIV and AIDS/STI, conflict management and peace, fire safety, road safety, civic responsibility, human trafficking, and human rights to inculcate values and bring about the necessary attitudinal change.

While significant efforts have been made by Government and other agencies over the years to improve access, financing, and the provision of infrastructure and facilities at all levels, education quality issues remain a matter of national concern.

3. THE LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

This section provides an overview of the natural resource-related laws and policies of Ghana. Ghana is party to nearly all major international treaties related to the environment. The treaties to which Ghana is a party and the state of compliance with such treaties are described in detail in Appendix 4.

A. OVERVIEW OF KEY POLICIES AND LAWS (LAND AND NATURAL RESOURCES)

1. AGRICULTURE

The Ministry of Food and Agriculture (MOFA) is the lead ministry responsible for policy and planning for the agriculture sector. The agriculture sector encompasses activities of several ministries, departments, and agencies as well as those of many non-governmental organizations (NGOs) and the private sector. In 2007 MOFA, with these stakeholders, formulated the policy known as FASDEP II. As the policy itself is a statement of intent, a Medium-Term Agriculture Sector Investment Plan was developed for the implementation of the broad strategies specified in the policy. According to the FASDEP II document, the "vision for the food and agriculture sector is linked to the national vision in the Growth and Poverty Reduction Strategy (GPRS II) ..." (MOFA, FASDEP II, 2007 p.20). Both the Ghana Shared Growth and Development Agenda (and the Comprehensive African Agricultural Development Programme (CAADP) framework have targets for agriculture sector performance that will contribute to the attainment of the broader goals. The GSGDA expects agriculture to spur industrial growth. Also, in the GSGDA the economy (non-oil) is expected to grow at 6.5 percent by 2010 and 8.2 percent by 2013. The ECOWAS Agricultural Policy (ECOWAP) and the CAADP of the New Partnership for Africa's Development (NEPAD) are the key efforts with the overriding goal of helping African countries increase their economic growth through agriculture-based development, which eradicates hunger, reduces poverty and food and nutrition insecurity, and makes it possible to increase exports. This goal is in close harmony with GSGDA I (2010-2013) and the FASDEP II.

2. WATER

The Ministry of Water Resources Works and Housing (MWRWH) is the ministry responsible for policy and planning for the water sector.

The Water Resources Commission Act

The Water Resources Commission Act (Act 522 of 1996) establishes a commission to regulate and manage the water resources of the Republic of Ghana. The Commission is tasked with establishing comprehensive plans for the use, conservation, protection, development, and improvement of Ghana's water resources and is able to grant rights for the exploitation of water resources. No water may be used without the granting of water rights, which may be granted, on application, by the Commission. The Act lays out the requirements and process for the application and subsequent transfer of such rights.

The Water Resources Commission has drafted the *Buffer Zone Policy for Managing River Basins in Ghana (August 2008)*. The policy is still in draft form at this time and does not carry the force of law. The policy notes that some agencies have developed buffer widths required for some activities near streams (for example the Forestry Commission has a buffer width of 50 m along major streams and 25 m along "smaller" streams).

Water and Sewerage Corporation Act (Act 310 of 1965)

Section 14(e) of the *Water and Sewerage Corporation Act (Act 310 of 1965)* establishes a body which is mandated with: "*(a) The provision, distribution and conservation of the supply of water in Ghana for public, domestic and industrial purposes; and (b) The establishment, operation and control of sewerage systems for such purposes."* The Water and Sewerage Corporation is authorized to make regulations regarding the prevention of water pollution.

National water policy was drafted in 2007. The policy document contains sections on integrated water resources management (including water for energy, food security, and transportation), urban and community/small town water delivery. The policy also highlights the international legal framework for the domestic and trans-boundary utilization of water resources. In 1994, a Community Water and Sanitation Division (CWSD), was established within the GWSC to manage the NCWSP and cater solely for rural water and sanitation. In 1998, the Government transformed the CWSD into the Community Water and Sanitation Agency (CWSA) by Act 564, charged with coordinating and facilitating the implementation of the NCWSP in District Assemblies.

The Water Use Regulations, 2001 (L.I. 1692) provides procedures for allocating permits for various water uses including domestic, commercial, municipal, industrial, agricultural, power generation, water transportation, fisheries (aquaculture), environmental, recreational, and underwater (wood) harvesting. The Irrigation Development Authority Regulations, 1987 (L.I. 1350) provides procedures for managing irrigation projects, including water management, within such projects. The Ministry of Harbours and Railways has the oversight responsibility for inland-water and ocean transportation.

The Ghana Maritime Authority Act, 2002 (Act 630) provides for regulating and coordinating activities of the maritime industry. The Ghana Maritime Authority implements enactments on water-borne transport and navigation including those of in-land waterways.

3. FORESTRY AND WILDLIFE

The Forestry Commission (FC) of Ghana, which is under the Ministry of Lands and Natural Resources (MLNR), is responsible for the regulation of the utilization of forest and wildlife resources, the conservation and management of those resources, and the coordination of policies related to them. The FC Act 571 brought under the Commission, the main public bodies and agencies implementing the functions of protection, development, management, and regulation of forests and wildlife resources and to provide for related matters. The following Divisions were thus created; Forest Services Division (FSD), Wildlife Division (WD) and Timber Industry Development Division (TIDD). The Commission, in addition, has two Centers – the Wood Industries Training Centre (WITC) and the Resource Management Support Centre (RMSC) – to help in the effective achievement of its object and functions.

While the FSD is responsible for the protection, management, and development of forest resources, the Wildlife Division is to ensure sustainable management and development of Ghana's wildlife resources and the development of their habitats. The TIDD emerged from a merger of the Timber Export Development Division and the Forest Products Inspection Division in 2002, as part of the Institutional reform in the Commission. It is responsible for ensuring standards in the timber processing industry, regulating export of timber products, tracking the movement of logs from the forest gate to the mill, and promoting Ghana's timber interests overseas. The RMSC is the research wing of the Forestry Commission. The Commission also offers high quality training, extension, consultancy, and appropriate technology transfer services in all aspects of downstream wood processing through the WITC.

The 1994 forest and wildlife policy replaced the 1948 forest policy, which provided for the creation and management of permanent forest estates, research in all branches of scientific forestry, maximum utilization of areas not dedicated to permanent forestry, provision of technical advice, and cooperation in schemes for the prevention of soil erosion and in land use plans. The new forest policy provides an additional basis to develop a national forest estate and a timber industry that provides the full range of benefits required by society in a manner that is ecologically sustainable and that conserves the nation's environmental and cultural

heritage. The policy aims at the conservation and sustainable development of the nation's forest and wildlife resources for maintenance of environmental quality and perpetual flow of optimum benefits to all segments of society. It promotes public participation in the share of benefits and responsibilities in forest management and encourages integrated and coordinated research in forest-related issues.

The most significant change in the policy was the recognition of the role of local communities and indigenous knowledge in the conservation of forest and wildlife resources. Out of this emerged the Community Forest Committees (CFCs) and Community Biodiversity Advisory Groups (CBADs), which were initiated by FSD to help in the management of forest resources at the local level. The WD also introduced the CREMA concept as a way of devolving management authority to user communities and encouraging their participation in conservation and sustainable use of wildlife resources outside the Protected Areas.

Although the Forestry Research Institute of Ghana comes under the Council for Scientific and Industrial Research (CSIR), it plays a very important role in the forestry sector. Its mission 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.

4. LAND

In December 2008, a new act was passed and gazetted to establish a new Lands Commission to integrate the operations of public service land institutions under the Commission in order to secure effective and efficient land administration and to provide for related matters. The new Lands Commission is made up of the following divisions: Survey and Mapping Division, Land Registration Division, Land Valuation Division, and Public and Vested Lands Management Division.

The Land Administration Project (LAP) is the MLNR initiative to implement the policy actions recommended in the National Land Policy document launched in June 1999. The key issues identified in the policy document include inadequate policy and regulatory framework, weak land administrative regime – both public and customary, indeterminate boundaries of customary lands, multiplicity of land dispute – which has clogged the court system, and general indiscipline in land use development and disposition. The mechanism for addressing these issues is the Land Administration Programme, the first five years of which is the LAP. The LAP-1 is the first phase of a commitment by the Government of Ghana to use the Land Administration Programme to reduce poverty and enhance economic/social growth by improving security of tenure, simplifying the process of acquiring land by the populace, developing the land market, and fostering prudent land management by establishing an efficient system of land administration – both state and customary based – on clear, coherent polices and laws supported by appropriate institutional structures.

5. FISHERIES

The Directorate of Fisheries is responsible for policy formulation and implementation, management, and control of the fishing industry under the general guidance and direction of the Fisheries Commission.

According to Atta-Kesson and Atuguba (2007), in 1972 the government of the National Redemption Council (NRC) promulgated the Fisheries Decree, 1972 (N.R.C.D. 87). In 1977, the Fisheries (Amendment) Regulations 1977 (L.I. 1106) were passed by the same government to amend the Fisheries Regulations, 1964 (L.I. 364). In 1979 the government of the Armed Forces Revolutionary Council (AFRC) also promulgated the Fisheries Decree, 1979 (A.F.R.C.D. 30). In that same year, the Fisheries Regulations, 1979 (L.I. 1235) were promulgated. In 1991, the government of the Provisional National Defense Council (PNDC) promulgated the Fisheries Law, 1991 (PNDCL 256) to repeal the AFRCD 30 while saving the Fishing Boats (Certificate of Competency as skipper and Second Class Engineers) Regulations, 1972 (L.I. 770) and the Fishing Boats (Certificate of Competency First Class and Second Class Engineers) Regulations, 1974 (L.I. 988). In 1993, the Fisheries Commission Act, 1993 (Act 457) was passed amending PNDCL 256. In 2002, the Fisheries Act, 2002 (Act 625) was enacted by the New Patriotic Party (NPP) government to consolidate with amendments

all the foregoing laws on fisheries; to provide for the regulation and management of fisheries; to provide for the development of the fishing industry and the sustainable exploitation of fishery resources and to provide for connected matters. Atta-Kesson and Atuguba (2007) make the point that virtually every government, post-independence, did pass a number of laws to regulate the fisheries industry. On this basis, they further argue that it must be an important industry indeed.

The Fisheries Act 625 (2002) established the Fisheries Commission as a body to regulate and manage the utilization of the fishery resources of Ghana and coordinate the related

6. CLIMATE CHANGE POLICY AND LEGAL FRAMEWORK

The National Climate Change Committee (NCCC), hosted by the Ministry of Environment, Science, and Technology (MEST) has been mandated by the Government to develop the National Climate Change Policy Framework (NCCPF). The vision of the NCCPF is to ensure a climate-resilient and climate-compatible economy while achieving sustainable development and equitable low carbon economic growth for Ghana. The NCCPF aims to enhance the understanding of climate change issues among policy makers and implementers across all sectors at various levels. This will help to integrate the climate change agenda into policies and interventions at all levels and across the high risk sectors. The Government wants every part of the economy to be part of a national solution to the challenges of climate change, recognizing that climate change is not solely an environmental issue. The NCCPF is being developed to support the delivery of Ghana's vision of a climate-resilient and climate-compatible economy – an economy that takes advantage of the opportunities presented by addressing climate change and, at the same time, reduces the impact of climate change on the people of Ghana.

The REDD secretariat is hosted by the FC. As part of the FC's commitment to ensuring the sustainable management of Ghana's forests, the secretariat is leading efforts to prepare Ghana to engage with international mechanisms on REDD+. Ghana has taken a proactive role to initiate analysis and discussion regarding how the REDD+ concept could be applied to bolster its efforts to better manage its forest sector.

Through a comprehensive and exhaustive multi-stakeholder consultations process, Ghana has developed the REDD+, Readiness Preparation Proposal (R-PP) document which was submitted to the Forest Carbon Partnership Facility (FCPF) of the World Bank in January 2010. Ghana has received an approval by the Facility Management Team (FMT) of the World Bank at the 5th Participating Committee meeting in Gabon (22nd -25th March 2010) to implement the REDD+ Strategy document. The FCPF will support the implementation of Ghana's R-PP from 2010-2013.

7. ENVIRONMENTAL PLANNING

The MEST is the primary Government agency with the overall mandate of formulating, developing, implementing, monitoring, and evaluating environmental, science, and technology policies in Ghana. The mandate of the Ministry is to promote and facilitate the integration of environmental, science, and technology issues into the policy, planning, and national development processes. It has oversight responsibility over the following Departments and Agencies:

- The Council for Scientific and Industrial Research (CSIR)
- The Ghana Atomic Energy Commission (GAEC)
- The Environmental Protection Agency (EPA)
- The Town and Country Planning Department (TCPD)

CSIR is mandated to coordinate scientific and industrial research activities of its institutes in support of the national economy, especially in food and agriculture (for ensuring food security), industry (especially intermediate technologies for small and medium enterprises), and in frontier technologies, such as biotechnology and nano-sciences. Currently, CSIR oversees the activities of 13 institutes.

The EPA was established by the Environmental Protection Act, 1994 (Act 490) to oversee, coordinate, and regulate all issues bordering on the environment. The EPA is mandated to among others:

- Advise the Government on all matters of the environment
- Evolve regulation for the management of the national and built environment, including chemicals control and management, environment impact assessment, and all other aspects of the environment
- Charge fees which should be paid into the Environment Fund

The EPA has 10 regional and three district offices. The Town and Country Planning Department is charged with the responsibility of planning and management of growth and development of cities, towns and villages in the country. It therefore seeks to promote sustainable human settlements development based on principles of efficiency, orderliness, safety, and healthy growth of communities. It plans, manages, and promotes harmonious, sustainable, and cost-effective development of human settlements in the country and in accordance with sound environmental and planning principles.

The MEST has developed a National Environmental Policy. The main aim of this policy is to effectively and efficiently exploit natural resources and to maintain the environment in a friendly manner not only for the current generation but also for the existence of future generations. Hence, the policy aims to achieve the triple-bottom-line objectives of sustainable development: social, economic, and the environment.

8. ENERGY

Energy Policy formulation is under the Ministry of Energy and specifically handled by the Energy Commission. The Energy Commission welcomes investors – Ghanaian, African, and foreign – in efficient energy production projects and programs in a competitive market. As a regulatory body the Energy Commission encourages building energy efficiency standards and insists on energy efficient appliances. It has done this through the enactment of L.I 1815 – Energy Efficiency Standards and Labelling (Non-ducted Air Conditioners and Self-ballasted Fluorescent Lamps) Regulations, 2005. The Commission has also enacted the Electricity Distribution and Supply (Technical and Operational) Rules, 2005 (LI 1816), which specifies the rules of practice for electricity distribution service providers. The Energy Commission has published the Strategic National Energy Plan (SNEP) 2006-2020. The document was expected to be adapted as the national energy policy in January 2006. SNEP 2006-2020 consists of three parts – the Petroleum Sector, the Electricity Sector, and Traditional Woodfuels and Renewables. A Bio-energy Policy was also drafted in August 2010.

Ghana is signatory to the United Nations Framework Convention for Climate Change (UNFCCC). Ghana is signatory to several conventions on climate change, biodiversity, land degradation, and other environmental issues, including the Kyoto Protocol.

Within the West African sub region, the Economic Community of West African States (ECOWAS), of which Ghana is a key member, is promoting regional energy cooperation and integration. The West African Gas Pipeline (WAPG) and the West African Power Pool (WAPPOOL) offer considerable opportunities for inter-country trade and cross-border infrastructure in energy. Broadly, the Energy Commission (EC) is responsible for licensure and policy issues, the Public Utility Regulatory Commission (PURC) is responsible for utility pricing, and the National Petroleum Authority (NPA) is responsible for fuel pricing. A limited number of legislative instruments are in place: *L.I. 1816-Electricity Supply and Distribution (Technical and Operational) Rules 2005* and *Electricity Supply and Distribution (Standards of Performance) Regulations, 2008. (L.I. 1935).*

The Volta River Authority (VRA), established by the Volta River Development Act, 1961 (Act 46), is responsible for, among other things, the generation of electricity by means of the water resources of the Volta River, and by other means and also for the administration of certain land adjacent to the Volta Lake. The Volta River Authority is responsible for the planning, development and management of the Volta River (including the use of the Volta Lake) as a source of fish and means of transportation, among others.

Currently the upstream sector of the petroleum industry in the country is governed by piecemeal bits of legislation that span a period of over two and a half decades. These laws include Ghana National Petroleum Corporation Act, 1983 (P.N.D.C.L 64), the Petroleum Exploration and Production Act, 1984 (P.N.D.C.L, 84), the Petroleum Income Tax Act, 1987 (P.N.D.C.L 188), the Internal Revenue Act 2000, the Ghana National Petroleum Corporation Petroleum Model Agreement, the Ghana Shipping Act, 2003, and the Maritime Security Act, 2004 (Act 675).

The Petroleum (Exploration and Production) Act, 2010, is under consideration by Parliament. The Petroleum Revenue Management Act, 2010 has been enacted as of the time this report was written. Another oil-related act, The Petroleum Commission Bill, is also awaiting action. Relative to the environment, section 8 of the former act states: "Each contractor and person who performs a function, discharges a duty or exercises a power under this Act in relation to the exploration, development and production of petroleum resources shall take into account and give effect to the environmental principles prescribed in the Environmental Protection Agency Act, 1994 (Act 490), the subsidiary legislation under that Act and any other relevant legislation." This would seem to place the primary burden on the EPA for development of environmental standards for oil operations under their authorities.

If passed as currently drafted, section 38 of the Petroleum (Exploration and Production) Act, 2010 states:

> **38.** (1) A contractor or subcontractor carrying out petroleum operations
>
> *(a)* shall maintain at the work site an establishment capable of dealing adequately with fire, oil spills, gas leakages, blow-outs, accidents or other emergency situations so as to prevent or control the situations and to minimize loss or damage there from; and
>
> *(b)* is responsible for any pollution or damage caused by or resulting from the operations as well as pollution or damage caused by or resulting from petroleum operations undertaken by an agent or employee of the contractor …" and:
>
> (2) The Minister or the Authority may take necessary measures to ensure safety and may recover the costs and expenses of so doing from the contractor or the subcontractor…"

The Petroleum Revenue Management Act, 2010 is aimed at financial issues on accountability, transparency, and benefits-sharing rather than environmental impacts associated with oil and gas production such as gas flaring. Although, Ghana subscribes to a "no flaring policy" it is common knowledge that lack of gas infrastructure will lead to the necessity to violate this mitigation element of the EIS, at least until facilities can be developed to handle gas by-products from the oil extraction activities.

The final EIS for the Jubilee field is on the web at: (http://www.tullowoil.com/ghana/index.asp?pageid=14).

Chapter 6 of that document contains the mitigation provisions for such issues as oil spills and the social mitigations the developers have agreed to. Social responsibility provisions are listed in Chapter 6, sections 5.7.4-9 of that document. As written, these provisions are broad. Their effectiveness will be dependent on the working relationships of the Ministry and EPA with industry as well as on the mentoring, monitoring, and enforcement capacity of EPA to make the measures meaningful, tangible, and binding.

B. SECTOR ISSUES/OPPORTUNITIES

- Improvement of legal framework for fishing regulations is needed.
- Improved monitoring and enforcement capacity is needed for land management agencies to better manage Ghana's system of protected areas.
- Improvement in transparency of land and resource tenure would improve the investment climate and user incentives for responsible long-term land management. Land and resource tenure laws are complex and lack transparency, leading to reduced likelihood of industrial investment and

disincentives for private individuals to make long-term investments particularly in forest development.

- Coordination and responsibility-sharing between ministries relative to enforcement and monitoring of environmental compliance could be improved. EPA appears to carry the responsibility of most environmental compliance, but has limited capacity for field monitoring and enforcement. The Natural Resources and Environmental Governance program (NREG) established for resolution of issues between and among agencies has been established. Some of those interviewed believe that natural resource conservation has not yet carried the same weight as resource development in the workings of this group and that the functioning of the group needs to be more transparent.

- Riparian zone buffer management is still evolving; a national draft policy has been written. Actual implementation of such policy will require interaction with local and traditional governance authorities. Incentives for riparian land owners to abide by such buffers are generally lacking and riparian impacts (farming, dumping, development, occupancy) are continuing in riparian areas throughout the country.

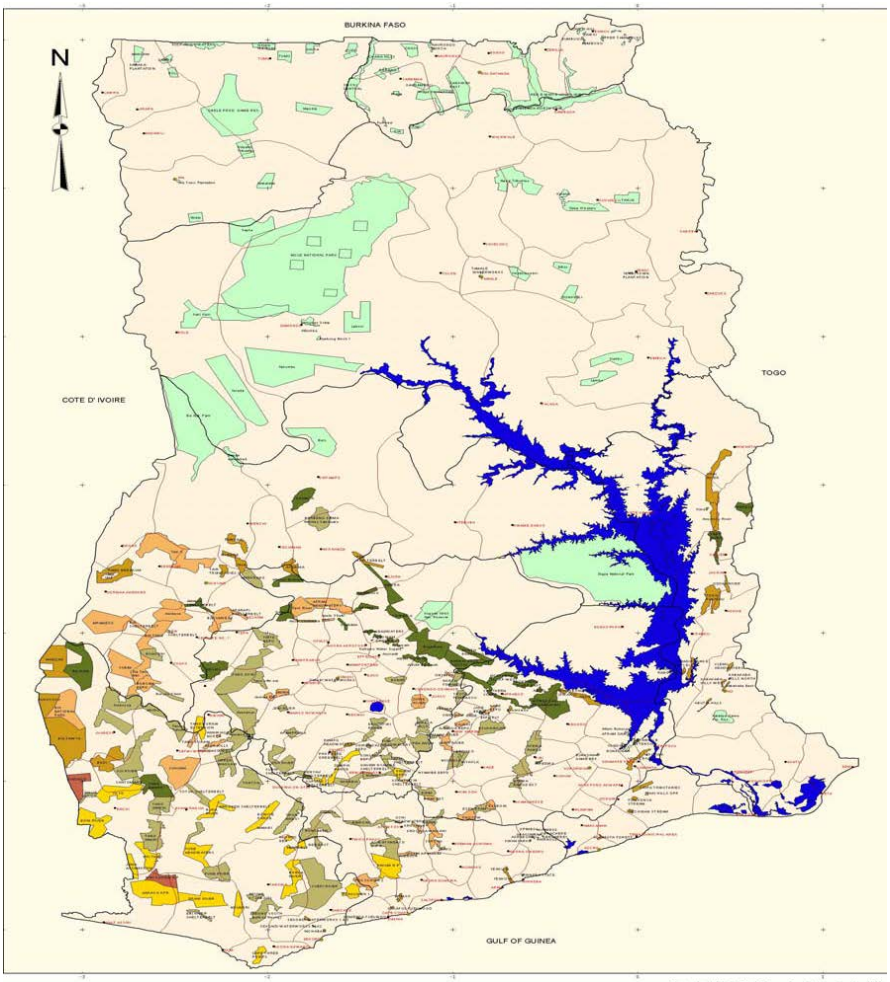
- The legal framework for environmental and social regulations and planning of oil development is somewhat piecemeal. The most recent legislation (the Petroleum Revenue Management Act, 2011), focused on revenue aspects of oil development. Coordinated spill response, and environmental mitigations are very broadly addressed in the draft Petroleum (Exploration and Development) Act. Actual environmental mitigations largely fall upon EPA to be established through that agency's environmental assessment process. Regulatory social mitigation or social responsibility frameworks appear to be lacking, but these issues are addressed broadly in the final Environmental Impact Statement.

4. GHANA'S BIO-DIVERSITY AND NATURAL RESOURCE MANAGEMENT SECTORS

A. ENDANGERED SPECIES AND BIO-DIVERSITY CONSERVATION

1. BACKGROUND

Map 3, though somewhat dated, provides an excellent visual overview of the state of Ghana's protected areas. These protected areas are core features that provide habitats for the flora and fauna of Ghana. These highly diverse habitats vary from dry savanna in the north to tropical forests in the south. This diversity is home to total of 3,600 species of flora. One species of plant, the West African cycad (Encephalartos barteri), is indigenous to Ghana and is the only Appendix 1 (threatened with extinction) plant listed for Ghana in the CITES database (CITES 4/19/2011).



Map 3: Condition of Protected Areas of Ghana

Source: Hall and Swaine (1981)

Animal diversity is also high in the country with significant pressures on animal populations due to bush meat hunting, overfishing, and habitat alteration or destruction due to a variety of human uses The CITES database lists 20 species of animals in the country threatened with extinction. These vary from the Roloway monkey and chimpanzee, which are both subject to mortality through the bush meat trade, to four species of turtle found in the heavily fished coastal waters of the country. The IUCN 2007 listings of critically endangered or endangered species for Ghana show: five species of mammals, seven species of amphibians, two species of reptiles, two species of birds, and 19 species of fish in these two categories. The IUCN shows 145 species of plants and animals as "vulnerable." Ghana is particularly rich in butterflies with about 900 different species found in the country so far. There is a high degree of butterfly endemism in Ghana where about 23 species are classified as endemic or near endemic.

Some differences exist in the data above compared to that from the Earth Trends database (See web site listing in Appendix 8). According to that source, 3,725 species of vascular plants (43 endemic), 729 birds, 249 mammals, and 207 amphibians and reptiles have been recorded in the country of Ghana. According to the FishBase database there are 230 species of freshwater fish and about 483 species of salt water fish in Ghanaian waters. Of these fish, four are thought to be endemic. Appendix 6 provides the CITES and IUCN lists of threatened and endangered species of plants and animals for Ghana.

2. STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

Strengths	Rich diversity of plant and animal species associated with diverse habitat types Appeal of wildlife can generate support and funding Established system of protected areas representative of habitat types Dedicated legislation and institutions with mission goals aimed at biodiversity conservation as well as active civil society and NGOs with intrinsic interests in the sector Some successful examples of community-based approaches to natural resource management which benefit tropical forests and biodiversity conservation
Weaknesses	Rapid overall decline of forested habitat components both on and off protected areas High fragmentation of forest habitat components Poor monitoring and law enforcement capacity for land management agencies Limited strategic planning for habitat connectivity. However, land tenure systems makes collaborative private land/public land partnerships to create connectivity difficult to negotiate due to complex, multi-layered interests. Local residents often dependent on the lands useful for habitat connectivity for their livelihoods Limited funding/capacity to manage wildlife/community conflicts Limited focus/funding for management of wetland habitats Complex tree tenure systems limit local incentives for sound forest management Limited riparian habitat legal protections within complex water rights/tenure systems (tenure complexity is both traditional and governmental) Highly variable and largely limited local knowledge of (and support for) conservation
Opportunities	Improvement of protected area management plans with the update of such also an opportunity for community engagement and environmental education. Improvement in management and enforcement capabilities though civil society/NGO partnerships, technical assistance, budget reform. Expansion of habitat connectivity through targeted community collaborative based partnerships (e.g. CREMA, community forests) where community interest and viable revenue streams exist. Agreements for non-timber forest products gathering in protected areas are being used as one means to provide a revenue streams for sustaining CREMA activities. Creative use of the revenue potential of NTFPs may be able to expand community partnerships in areas adjoining other protected areas. REDD credits, if long-term funding and equitable, transparent, and credit

	distribution mechanisms are developed, may also provide an incentive in this regard. Working with the GoG on long-term pilot projects or areas where tree tenure is vested (on private lands) with local owners in return for entering into sustainable management agreements could test the incentives such systems could provide for reforestation and active forest management. Potential to increase habitat connectivity with increased education, incentives, and improved legal framework for riparian habitat protection Site-specific opportunities for wildlife-based tourism near important wildlife habitat exist that, when coupled with infrastructure development and the use of community forest approaches, may serve both local livelihoods and resource conservation. Need local support and such approaches will not work everywhere. Pragmatically based strategic planning for improvement of habitat connectivity Introduction of Conservation Education in rural areas through a variety of media in partnership with Government, civil society, NGOs Increase incentives for tree retention (for example, legislative reform giving local landowners REDD credits if sustainable and if sharing mechanisms developed appropriately). Use of certification process to increase value for sustainably grown timber, cocoa, palm oil. Improving coordination among international and local cooperators with the GoG through forums that provide a means to exchange program information among the many actors in this sector. The objective of such coordination is to Improve the efficiency and effectiveness of overall international agency, donor, NGO, and civil society groups engaged in activities in this sector
Threats	Overexploitation through illegal bushmeat trade Loss of forest habitats from agricultural clearing, illegal logging, mining, burning, and occupancy Decline of productivity and loss of natural savanna habitats due to burning, charcoal production Protected area habitat loss due to internal occupancy and external encroachment (such as illegal mining and logging) Inability to enforce laws due to issues of capacity, social complexity, and will Increasing population pressure on habitat Poverty, poor agricultural practices, lack of forest management incentives for communities, and lack of local resource conservation knowledge continue to combine to create a downward spiral on the natural forest and savanna habitats of Ghana Climate change increases pace of habitat change with essociated affects on threatened or endangered species, particularly in the savanna regions of the country. In addition, sea rise will affect coastal habitats

3. SECTOR SUMMARY/NGO AND OTHER GOVERNMENTAL ACTIVITIES

Ghana has a broadly diversified system of forest reserves, parks, wildlife reserves, and wetlands that, if managed properly can help buffer the enormous developmental pressures on wildlife habitat in the country. The country also has established resource management agencies that, with increased capacity (financial, technical, and legal), seem well positioned to take on the many challenges facing the forest reserves and protected areas of Ghana. The increasing engagement of local communities in the management of protected areas, through community forests, CREMA and other initiatives, if coupled with increased capability for rule enforcement, would be an effective combination to see better protection of the existing protected area systems.

There are many NGOs in Ghana with interests and programs in endangered species and biodiversity conservation. (An extensive listing of NGOs, civil society, and their program interest areas is found in Appendix 7.) During our review in Ghana, the team also visited with personnel from the foreign aid programs for Canada and the Netherlands. These nations (and others) have active programs in Ghana and

could (and do) serve as collaborators on any number of projects that could improve biodiversity and conservation in the country.

4. SECTOR CONCLUSIONS

Wildlife and plant species diversity in Ghana is important nationally and internationally, and remains high in the country, but is threatened by habitat reduction through alteration and destruction of the forests and savannas of the country as described in the "Weaknesses" and "Threats" portions of the table above. In addition, habitat components, particularly forest components, are highly fragmented. (See Figure 1 in the "Forest Resources" portion of this section for a satellite photo of the extent of this fragmentation.)

USAID's programs in education could benefit the sector to the extent that such programs address environmental education. Aspects of USAID's health programs that improve Ghana's water quality and sanitation issues will find that there are linkages to riparian and wetland management. To that extent, water quality and sanitation "health" improvements would directly benefit retention of unique and limited habitats on the landscape that could also serve biodiversity and species conservation while reducing habitat fragmentation. Perhaps the single greatest influence on habitat destruction in Ghana is clearing for agriculture. If carefully planned, USAID's programs through its "Feed the Future" strategy could help stabilize farms and improve agricultural productivity with associated benefit to biodiversity. However, unintended reductions in forest cover could occur due to agricultural expansion unless such agricultural programs have specific design and incentive for forest cover retention built into their fabric. Displacement of farmers could also occur if programs to improve sustainability and productivity of agriculture fail to take into consideration existing land tenure, farm size, and labor force. That said, a key to improvement of the biodiversity trajectory of Ghana is improvement and reform of its agricultural sector.

In addition to habitat destruction and alteration, illegal bush meat hunting threatens endangered wildlife species. Improved education, collaborative work with communities and improved law enforcement capacity are all needed to reduce this threat.

The extensive network of potential partners and the existence of a country-wide network of protected areas are positive factors in the country. With outreach and coordination among partners and use of collaborative conservation initiatives, there is much that can be done to conserve and improve biodiversity conservation in the country.

B. COASTAL AND MARINE ENVIRONMENTS AND FISHERIES

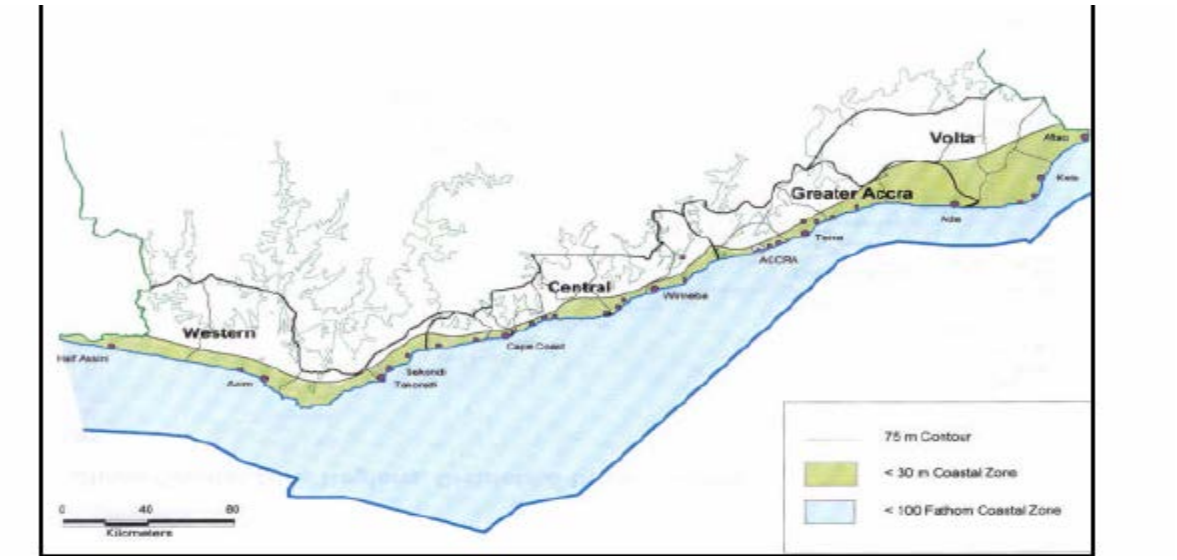
1. BACKGROUND

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. The coastal fisheries and wetlands resources provide a critical source of food security in Ghana. About 75 percent of all fish production is consumed locally at an approximate per capita rate of 23kg/year. Landings from both marine and freshwater fisheries and aquaculture contributed at least 4.5 percent to the nation's GDP in 2008 (FASDP, 2009).

Coastal wetlands include lagoons, lagoon depressions, swamps and marshes, and the intervening higher land within the coastal catchments. Along the coast, there are about 90 lagoon systems. Most of the coastal wetlands harbor important bird life, both resident and migratory (70 species). 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 (Gari, 2005). Little to no information, other than isolated case studies, is available to

assist in quantifying, managing or monitoring the fishery. Five of the 90 lagoons are designated as Ramsar sites.

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 example, 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. 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).



Map 4: Coastal Zone of Ghana

Source: World Bank 1996

The Guinea Current Large Marine Ecosystem (LME) contains some of the most productive coastal and offshore waters in the world. This productivity is based upon the seasonal upwellings off Ghana and the Côte d'Ivoire. The upwellings occur twice a year, typically from July to September and again in December and January. The upwellings drive the productivity of the LME and could be strongly affected as global climate change evolves. The value of the annual fishery harvest peaked at $1 billion in 1991 (in 2000 US dollars) and has more recently been in the range of $800,000. See the Fisheries Resources section in the Climate Change Assessment for a very complete analysis of the fisheries resources. The overview below complements that analysis.

The fishing industry in Ghana is based primarily on a large, marine fishery, and to a lesser but important extent, on inland or freshwater fisheries and aquaculture. Fish make up about 40-60 percent of the protein in the Ghanaian diet (Finegold et al., 2010). Much (about 42 percent) of the population lives less than 100 km from the coast, and a majority (65 percent) live more than 200 km from the coast (Perry and Sumaila, 2007). The Volta Lake impoundment, other reservoirs, aquaculture, and coastal lagoons are the sources of inland or freshwater fish. Lake Volta is the main source of inland fish landings, contributing more than 90 percent of inland fish landings annually.

Marine fisheries have long been a pillar of Ghana's economy. Fishing is an important source of livelihoods in every shorefront community. The wealth of protein provided by the fisheries has for centuries been critical to the diet of all Ghanaians and to populations far inland. The Ghanaian fish consumption rate requires importing a third of the fish consumed each year. However, Ghana exports about a third of its catch. The exports are both species that command high prices in world markets and the traditional, primarily smoked fish that is traded with neighboring countries. The imported fish is primarily low value frozen blocks – dominated by sardines and other small pelagics – that are smoked before being consumed. Catching, smoking, and distributing fish – primarily the abundant small pelagics – has been the centerpiece of the economy and the major source of employment in the majority of the Western Region's shorefront communities.

Ghana's large reserves of oil and gas are presenting new environmental threats and economic opportunities to the marine and coastal environments. Growth in coastal towns is increasing which places additional pressures on existing infrastructure. The economic opportunities that surround the coastal and marine environment are in stark contrast to the fact that the coast of the Gulf of Guinea is known for the poverty of its people and its political instability.

Fisheries Issues

More detail and context, including numerous tables and figures related to fisheries issues, are found in the Climate Assessment under "Fishery Resources and Overfishing." Portions of that section are repeated below as they are directly relevant to this "environmental threats and opportunities" portion of the report. Please see The Climate Report to view the issues identified below in more detail.

Fleet Issues

One of the most notable changes in recent decades is the tremendous growth in fleet size in nearly every category (see Table 19) – just only one indication of the increasing pressure being put on the marine fishery resource. Without registration requirements and no limits on access to the fishery, the number of active canoes in Ghana has continually increased from 7,000 in 1980 to an estimated current fleet size of 13,500 (projected from last canoe survey in 2004, Finegold et al., 2010).

The semi-industrial or inshore fleet consists of mostly locally built, planked wooden-hulled vessels (8-30 m long) with inboard diesel engines (90-400 hp) (Bannerman and Cowx, 2002; DoF, 2003; Nunoo et al., 2009). The rapid and continued increase in this fleet likely relates to the adoption of light fishing, and the associated year-round access to the small pelagic resource (Finegold et al., 2010).

The industrial fleet consists of large, steel-hulled foreign-built vessels that are further distinguished from the inshore fleet by their ability to freeze fish at sea, and hence, their ability to stay at sea for long periods of time (Finegold et al., 2010). A problematic gap in the Ghanaian fishery sampling system is that industrial vessels provide information on their own catches (self report), and no method is in place to verify the information provided. Extremely low catch and effort are reported by this fleet, so low it is inconceivable they could make a profit, providing strong indications that vessels substantially under-report catches (Finegold et al., 2010). Given the catch potential of these large vessels and their ability to stay at sea for long periods and transship catch to places other than Ghana, better data on this fleet segment is urgently required. The industrial fleet also supports another emergent but illegal "fishery"; one where so called "trash fish" (low value, small or damaged fish) are transferred at sea from trawlers to canoes specially modified to transport large volumes of fish (Nunoo et al., 2009). These fish then enter the normal beach-based market chain as accessed by canoe fishers. If this trade continues, Ghana's long-standing traditional fishing vocation, which is ranked among the best in West Africa (Atta-Mills et al., 2004) may be lost. Also, the increase in discards on the market tends to encourage offshore vessels to fish much closer to shore and also to use small, illegal mesh sizes. The continuation of trash fish trade puts more pressure on Ghana's depleting fish stocks, yet another situation that may push the already overfished stocks towards collapse. In addition, a government subsidy on fuel for artisanal fisheries, which is supposed to be used for legal fishing activities, is channeled into trans-shipment of catch at sea (Nunoo et al., 2009).

As the smallest fishery segment in Ghana, lagoon fisheries are the least known from scientific or national fishery authority perspectives (Finegold et al., 2010). No management or monitoring of this resource is undertaken by the GoG and, although acknowledged as important to local people, the fisheries contributions to local livelihoods are unquantified. Given the 90 lagoon systems along the coast, they are significant in terms of subsistence and seasonal commercial fishing for many communities (Koranteng et al., 2000). The strong traditional belief systems around lagoons and the de-facto property right due to proximity of villages exploiting the resource present an entirely different set of incentives for governance to those seen in coastal and offshore fisheries (Finegold et al., 2010).

Fishery Specific Issues

All fleet segments exploit the pelagic fishery resource in Ghana although catches by industrial trawlers are largely incidental. Small, schooling species (sardinellas, anchovies, and mackerel) make up the vast majority of this catch, but the small pelagic catch is currently at its lowest level since the 1970s.

Demersal fish (bottom associated) are less mobile than pelagic species and as such depend to varying degrees on the integrity of seafloor habitat. Even though the trans-boundary migration issues associated with pelagic stocks are less of a problem, the habitat association and the sedentary nature of this group make them highly susceptible to overfishing and habitat damage. The resource in Ghana is exploited in inshore waters and on the continental shelf to a depth of about 75-m. Demersal fishes are targeted by all three prominent fishing fleets: line fishing in the canoe fleet; bottom-set gill nets, beach seines, and low ("warm") season trawling by the semi-industrial fleet; and trawling by the industrial fleet. Ghana's demersal fishery is exhibiting symptoms of an unstable ecosystem. Some notable examples indicative of instability are the repeated collapse and recovery of a shrimp fishery operating around the Volta estuary (Koranteng, 1998; Koranteng and Pauly, 2004) and the massive proliferation in trigger fish (Balistes carolinensis) in 1973 followed by near-total collapse in the early 1980s, a near total recovery in the late 1980s, and a sustained and perhaps permanent collapse in 1989 (Ansa-Emmim, 1979; Koranteng, 1984; Caverivière, 1991; Aggery-Fynn, 2007).

Fishing Effort and Technology Issues

One of the significant shortfalls of fishery regulation and management in Ghana is a failure to document fishing effort among fleets. However, at the coarsest level, fleet size provides a measure of fishing effort. Increased numbers of active fishing vessels will likely lead to greater fishing pressure on resources. In Ghana, all fleets have expanded, some substantially so, since the 1990s, but the expansion is not reflected in total landings. To the contrary, as fleet size increased, catch has dropped. This coarse level of measurement is not the whole story, but it is a warning sign regarding the state of resources (Finegold et al., 2010).

Another indicator of fishing effort is time spent fishing or catch per unit effort (CPUE). If vessel numbers increase, but the time spent fishing by each vessel decreases, then vessel numbers viewed in isolation may represent an overestimate of the change in fishing effort. Data suggest a severe decline in CPUE for the inshore fleet, but no particular trends for the canoe or industrial fleet (Finegold et al., 2010). Although an improvement beyond simple measures of fleet size, measuring effort only as the number of fishing trips – which is how Ghanaian fisheries authorities measure effort – can be misleading in comparing across decades. Changes in technology and fishing practices can have a dramatic impact on effective fishing effort with no associated change in number of fishing trips (Finegold et al., 2010).

Fishers in Ghana have adopted a number of changes to their fishing practices that could substantially increase the effective fishing effort of a single trip. In the canoe and inshore fleets in particular, continued innovation and change have massively increased fishing power, even in the last decade. Among these are the use of outboard motors, changes in net type, net construction, or net size, and light fishing (Finegold et al., 2010). See the "Fishing and Technology changes" portion of section "B. Fishery Resources and Overfishing" in the Climate Report for more detail on the impact of the changes noted above.

Fisheries Administration and Management

The Directorate of Fisheries of the Ministry of Food and Agriculture is responsible for policy formulation and implementation, management and control of the fishing industry under the general guidance and direction of a Minister of State for Fisheries Commission. This Commission advises the Minister in all matters pertaining to the industry. The Directorate's mission " ….is to promote sustainable exploitation and responsible utilization of fishery resources of Ghana through sound management practices, research, appropriate technological development for both culture and capture fisheries, effective extension and provision of other support services to fish farmers, fishermen, fish processors and traders for improved income and fish food security."

The functions of the Directorate are summarized as follows:

- To prepare and keep under continual review, plans for the management and development of marine and freshwater capture fisheries and aquaculture
- To carry out research for the assessment for fisheries resources
- To ensure the monitoring, control, and surveillance of the fishery waters of Ghana

The Directorate has five operational divisions for Marine Fisheries Management: Inland Fisheries Management (and Aquaculture); Marine Fisheries Research; Monitoring, Control, and Surveillance; Finance and Administration.

The current Fisheries Law (Act 625 of 2002) provides for the integration of the Directorate of Fisheries and the Fisheries Commission for the regulation and management of the utilization of fisheries resources of Ghana and coordination of the policies in relation to them. The Fisheries Act granted the Fisheries Commission broad powers for developing fisheries plans and licensing vessels and canoes. The Minister of Agriculture sets the policies to be pursued by the Commission. The Act also created a monitoring, control, surveillance, and enforcement unit in association with law enforcement agencies. An important feature of the Act is that it requires that canoes be registered and licensed "on demand" – meaning that the canoe fishery shall remain an open access fishery.

In 2001, the Fisheries Department developed a Marine Fisheries Management Plan that addressed the over-exploitation of the demersal stocks by measures that included banning new trawlers, and increasing minimum mesh sizes for all categories of nets. The plan was not approved and the provisions of the 2002 Act provide only very general statements on the objectives of fisheries management, limiting access and enforcement. This perpetuated a situation in which there is no legal framework for co-management, no explicit statements on such measures as licensing, limiting fleet sizes or specifying gear limitations. In August 2010, a revised and updated set of fishery regulations were released. What the response will be in terms of enforcement and voluntary compliance will mark another important juncture in efforts to manage Ghana's fisheries.

The Government of Ghana and the World Bank have joined forces and released in 2009 a draft Fisheries and Aquaculture Sector Development Plan (FASDP) that proposes to re-activate the community-based approach by reorganizing some 200 committees and creating District Fisheries Management Committees in each of the 22 coastal District Assemblies. These District Fisheries Management Committees would be responsible for overseeing the implementation of a consolidated set of fisheries bylaws. The Plan argues for eliminating the pre-mix program, licensing all canoes and semi-industrial vessels, and eventually making the transition to a managed access fishery.

In Ghana, as in the great majority of coastal nations, the open access to fisheries is a passionately defended principle with deep historic roots as well as a powerful political voice. According to CRC, the most immediate problem facing the fisheries industry is the increase in fishing effort and the only way to address this is if the entry into the fishery is not open to one and all.

2. STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS

Strengths	Natural richness of the LME Natural beauty of the coastline Dedicated legislation and institutions Community-based approaches to governance are evolving
Weaknesses	Over-exploitation, collapse of stocks Fish catch is almost entirely self-reported and often fabricated Fisheries management capacity within the Government is limited to almost non-existent Limited funding and governmental capacity for research, monitoring, and regulation Poor management (including by-catch and by-kill)
Opportunities	Develop ecosystem-based management Integrated Coastal Zone Management of the coastal areas which accommodates all stakeholders and ensures that impacts are minimized The potential exists to increase fisheries management capability and, through this, increase the GoG's ability to better manage and monitor fish populations, develop more effective regulations, and to better interact with the fishing community Sustainable mariculture Sustainable (eco) tourism
Threats	Over-exploitation Climate-driven variability of the LME Foreign vessels and illegal fishing within Ghana's coastal fisheries zone The petroleum industry Growing pollution Unplanned coastal development Onshore and offshore mining Climate change Issues in management of catchment areas which feed the coastal zone

The coastal and marine environment in Ghana is threatened by growing population, unregulated development, and over-exploitation. The lack of sufficient regulatory mechanisms at the national, regional, and district level to enforce and plan for the development that is occurring in the coastal and marine environment is a significant threat to Ghana's continued growth. Ghana's fisheries are considered to be in a crisis situation. As in the Guinea Current LME as a whole, the major stocks are overfished and experts predict that the collapse of critically important stocks may be imminent as the effort expended to produce the annual harvest spirals upward, competition between three distinct fleets intensifies, and rules designed to protect the resource are flagrantly ignored. The ability to manage fisheries is further limited by harvest data that is almost entirely self-reported, often fabricated, and only weekly and intermittently verified by fishery-independent surveys of stock status.

Onshore and offshore oil and gas activities and overfishing are considered the most important threat to marine and coastal biodiversity but, in the future decades, climate change (e.g. increasing environmental variability, sea-level rise, coastal erosion, loss of mangroves) and pollution are likely to have a growing impact.

Development of the coastline is currently inadequately planned and controlled. There are many conflicting interests relating to coastal zone management in Ghana – most notably between biodiversity conservation efforts, and the fishing and oil and gas industries. In spite of concerns about rapid uncontrolled growth in the oil and gas and fisheries, these sectors, if they are well managed and integrated with communities, are regarded as being key to the sustainable development of the coast.

3. SECTOR SUMMARY: NGO AND OTHER-GOVERNMENTAL ACTIVITIES

There appear to be numerous efforts underway that are designed to address the unsustainable land and resource practices affecting the coastal and marine environment in Ghana. The USAID-funded program in the Western Region (Our Coast, Our Future) is in the initial stages of attempting to develop the pre-conditions necessary for improved and effective ecosystem governance. A similar approach has been implemented in several other countries and has resulted in improved resource conditions.

The key opportunity within the marine and coastal environments includes the development of Integrated Coastal Zone Management, which includes expanding upon the lessons learned from the USAID-funded program in the Western Region and developing zoning and sound land use development planning.

4. SECTOR CONCLUSIONS

Despite numerous legislative developments designed to curb the overexploitation of Ghana's fisheries, the depletion of Ghana's marine resources is of considerable concern. Over-exploitation of pelagic fish continues and has the potential to result in partial and irreversible ecosystem collapse, affecting the biodiversity and abundance of top predators (fish, birds, and mammals) and disrupt ecosystem functioning.

After over-exploitation, onshore and offshore oil and gas activities are considered the most important threat to biodiversity but, in the future decades, climate change (increasing environmental variability, sea-level rise, and coastal erosion) and pollution are likely to have a growing impact.

A key to addressing the above and other concerns is adopting a common vision for the development of the coast through Integrated Coastal Zone Management and the implementation of carefully considered and well-designed strategies and safeguards. These must result from multi-stakeholder collaboration and consensus. The USAID-funded Our Coast, Our Future project aims to achieve this in the Western Region.

Sustainable development strategies along the Ghanaian coast include zonation and sound development planning, the use of Strategic Environmental Assessments and Environmental Impact Assessment tools to ensure that decision making is consistent and inclusive, and encouraging far greater cooperation between institutions than has been the case thus far. The legal framework is largely in place to enable this.

C. FRESHWATER RESOURCES

1. BACKGROUND

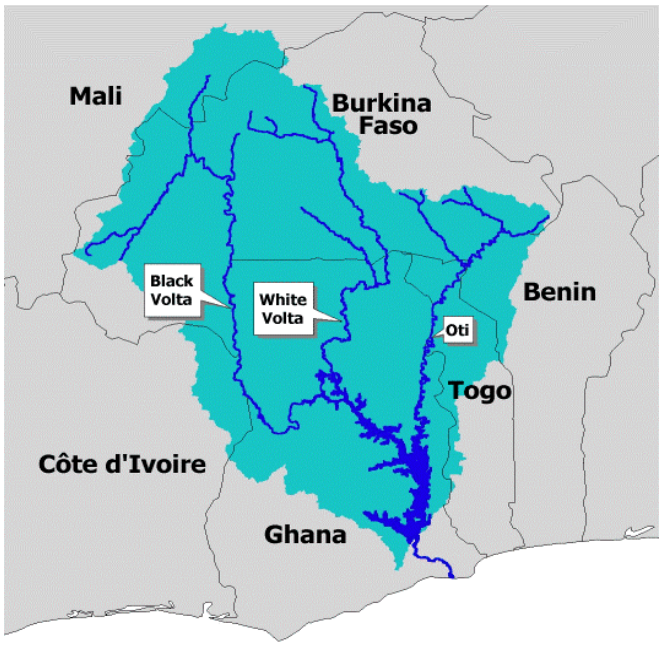
Freshwater resources of Ghana are at risk because of inappropriate management, high rates of logging, fuel wood extraction, poor agricultural practices, surface mining, and desertification leading to increasing poverty in rural and urban areas. Surface water in cities and mining areas is increasingly being polluted due to lack of waste management. Rivers and lagoons located near industrial areas are dying as a result of the discharge of untreated industrial and domestic effluent. The burden of diseases in the country indicates that about 70 percent can be attributed directly to the environment, mainly due to the lack of potable water and means of sanitation.

The transboundary countries of the Volta Basin have very weak capacity to deal with environmental issues, such as loss of biodiversity, reduction of fisheries resources, groundwater resources depletion, and flooding and river pollution. These problems are water-related and trans-boundary in nature. In the six trans-boundary countries, many institutions are charged with responsibilities for managing water, food, and soil resources. This results in overlapping of responsibilities and difficulties in coordination. Coordination of activities among institutions is weak, and in some cases exists only on an ad hoc basis for crisis situations. For the management of water and soil resources to be effective, it should be integrated at the local and national level, with emphasis on inter-sectoral coordination (Trans-boundary Water Governance in the Volta River Basin, 2009). The establishment of the Volta Basin Authority (VBA) in 2006 is intended to address these trans-boundary issues but the effectiveness of this authority in addressing these issues has yet to be seen.

River systems

Ghana is well endowed with water resources, but the amount of water available changes markedly from season to season as well as from year to year. Spatially, rainfall increases from north to south with mean annual values ranging from less than 500 mm in the extreme north to more than 1600 mm in the forested regions in southeastern Ghana. Temporally, over 70 percent of the annual total rainfall occurs in the three months of July, August and September, with little or no rainfall in the months from November to March in most of the Volta Basin. However, availability of water is decreasing owing to rainfall variability (climate change), rapid population growth, increased environmental degradation, pollution of rivers and draining of wetlands.

All of Ghana's rivers drain southwards to the Gulf of Guinea. The Volta Basin, with a catchment area within Ghana of nearly 70 percent of the country, is by far the largest river system, draining the entire north, center, and east of the country. The remaining rivers, all in the south and southwest, drain about 30 percent of the country. The major sub-basins of the Volta include the Black and White Volta Rivers, the Oti River and the Lower Volta, including Lake Volta. The South-Western Rivers System comprises the Bia, Tano, Ankobra and Pra Rivers, while the Coastal Rivers System is made up of Ochi-Amissah, Ochi-Nakwa, Ayensu, Densu and Tordzie/Aka Rivers. The Volta River basin is shared with Cote d'Ivoire, Burkina Faso, Togo, Benin, and Mali. The Bia is shared with Cote d'Ivoire, while the lower reaches of the Tano River also form part of the boundary with Cote d'Ivoire. The Volta River and Lake provide water for industrial and domestic use, irrigation as well as livelihoods for a number of people who are engaged in fishing along its banks and remains an important transportation link between southern and northern Ghana. The quality of freshwater in these three major systems is generally good for multipurpose use.



Map 5: Volta River System

Impoundments and reservoirs have been constructed for hydropower generation, water supply, and irrigation. At Akosombo, 100 km from the mouth of the Volta, the first Volta hydroelectric dam was constructed in 1964, which has created one of the largest man-made lakes in the world, covering an area of about 8,300 km2. A smaller impoundment, the Kpong Headpond, covering an area of about 40 km2, was completed in 1981, when another hydroelectric scheme was commissioned at Kpong, 20 km downstream of Akosombo. Other important impoundments are the Weija and Owabi Reservoirs on the Rivers Densu and Offin, respectively. In addition to these, the only significant natural freshwater lake in Ghana is Lake Bosumtwi.

Surface water quality considerations are becoming increasingly important due to mining activities, urban and industrial pollution problems, and agricultural development. Reliable data on water quality is of importance for proper management and thereby the protection and development of surface water resources for the future. A further important ongoing concern requiring appropriate hydrological data is the current and future development of urban drainage in a number of Ghana's major cities, for which flood and storm runoff data is needed for proper planning and design.

Groundwater

The occurrence of groundwater in Ghana is associated with three main geological formations. These are the basement complex, comprising crystalline igneous and metamorphic rocks; the consolidated sedimentary formations underlying the Volta basin (including the limestone horizon); and the Mesozoic and Cenozoic sedimentary rocks. The basement complex and the Voltain formation cover 54 percent and 45 percent of the country respectively. The remaining 1 percent consists of Mesozoic and Cenozoic sediments.

The depths of aquifers are normally between 10 m and 60 m, and yields rarely exceed 6 m^3/hr. In the Mesozoic and Cenozoic formations occurring in the extreme south eastern and western part of the country, the aquifer depths vary from 6 m to 120 m. There are also limestone aquifers, some of which are 120 m to 300 m in depth. The average yield in the limestone aquifers is as high as 180 m^3/hr.

The quality of groundwater resources in Ghana is generally good except for some cases of localized pollution and areas with high levels of iron, fluoride, and other minerals. Salinity in certain groundwater occurrences is also found especially in some coastal aquifers.

Water use

The major consumptive uses in Ghana are water supply, irrigation, and livestock watering. Domestic and industrial urban water supplies are based almost entirely on surface water, either impounded behind small dams or diverted by weirs in rivers. Water supplies in rural areas, however, are obtained almost exclusively from groundwater sources. The various groundwater development programs have resulted in the establishment of more than 10,000 boreholes countrywide. At present, irrigation development does not play an important role in the overall water resources balance considerations. However, the potential for irrigation has been shown to be considerably larger than the present land area being irrigated. The main non-consumptive uses are hydropower generation, inland fisheries, and water navigation.

On the basis of surface water resources alone, the consumptive water demand for 2020 has been projected to be 5.13 billion m^3, which is 13 percent of the surface water resources. Likewise, the non-consumptive demand can also be met from the surface water available. Rainwater harvesting has also become common and has a great potential to increase water availability in certain localized areas. It can be concluded that if properly conserved and distributed, the surface water resources of the country should be adequate to meet future demands.

Act and Regulations

The major laws that guide the regulation and management of water resources in Ghana are the Water Resources Commission (WRC) Act (Act 522 of 1996) and the Act and Regulations, Legislative Instrument (LI 1692 of 2001). Section 12 of Act 522 stipulates that "the property in and control of all water resources is vested in the President on behalf of, and in trust for the people of Ghana." This implies that there is no private ownership of water in Ghana, but that the President, or anyone so authorized, may grant rights for water use. The Water Resources Commission is the agency authorized under the Act to regulate and control the use of water resources, through granting of water rights and water use permits.

2. Strengths, Weaknesses, Opportunities and Threats

Strengths	Supply of freshwater Volta dam Ghana Water Vision 2025
Weaknesses	Aridity, climate variability, and drought unpreparedness Environmental requirements of river systems poorly considered Land use in catchments degrades runoff, water quantity, and quality
Opportunities	Technology innovations in the irrigation, water recycling, and artificial recharge spheres Awareness and education

	Price support mechanisms that favor water conservation measures Strengthening Volta Basin Authority to create policy, plan projects, and resolve water conflicts
Threats	Land use in catchments Urban growth and sanitation Industrial growth, especially mining Climate change Flooding

3. SECTOR SUMMARY: NGO AND OTHER GOVERNMENTAL ACTIVITIES

Ghana's water vision for 2025 aims at achieving an efficient and effective management system for the sustainable development of water resources and to ensure full socio-economic benefits for present and future generations. However, water management is still a major development challenge. The pressures have resulted in the dwindling of freshwater resources, increasing pollution load, health and transportation problems, and reducing ecosystem resilience. The impacts of the pressures pose significant threat to sustainable development.

One of the most immediate issues in the basin that continually has emerged as a cause of tension is the flooding caused by the Bagre Dam in Burkina Faso. The opening of the floodgates of the Bagre Dam was exclusively decided by officials in Burkina Faso, who then warned officials in Ghana. The opening of the floodgates in Burkina Faso has a severe effect on agriculture in Ghana and may damage property and homes in Ghana. Although this situation has not resulted in conflict or destroyed relationships, it maintains a tension between the two countries. USG could provide support to VBA and helping resolve issues like the Bagre Dam could assist with the establishment of procedural steps that can help address the more complex situations envisioned in the future, such as the growing disagreements surrounding declining water levels in the Akosombo Dam area.

In addition, USG has opportunities to assist with drought preparedness training as well as training district technicians (in the Northern Region targeted for the Feed the Future – FtF – initiative) and local communities on sustainable use of water and watershed management objectives.

4. SECTOR CONCLUSIONS

Fresh water resources of Ghana are at risk because of inappropriate management (including lack of riparian management), high rates of logging, fuel wood extraction, poor agricultural practices, surface mining and desertification leading to increasing poverty in rural and urban areas leading as well as higher country sensitivity to human and natural disasters. Support for training on watershed management and water conservation can help reduce the risks to Ghana's freshwater resources.

The six countries in the Volta Basin are independently exploiting the basin's water resources in order to maintain and develop their economies. Conflict exists between Burkina Faso, who wants to expand its irrigation by extracting more water from the river, and Ghana, who wants to generate more hydropower to fuel its economic development. These independent approaches can and will lead to conflict and negative environmental effects unless regional approaches are developed that improve the region economically while preserving and protecting the ecosystem for the future.

D. AGRICULTURE AND RANGELAND RESOURCES

1. BACKGROUND

According to FAO estimates (Livestock Sector Brief, 2005), about 14.68 million ha of Ghana are "agricultural" with about 8.35 million ha under pasture. This report estimates that about 38 percent of Ghana's gross domestic product (GDP) is from agriculture with about 6.2 percent of the GDP from livestock production. According to a study by the University of Ghana: agriculture: "… contributes over 40

percent of Gross Domestic Product and employs about half of Ghana's labor force. Out of Ghana's total land area of 23,853,900 hectares, 13,628,179 hectares (57.1 percent) is suitable for agriculture. But the total area under cultivation in 2000 was 5,808,600 ha (42.6 percent) of the agricultural area" (*Codjoe, Samuel Nii Ardey:* Population growth and agricultural land use in two agro-ecological zones of Ghana, 1960-2010). This report provides a good overview and history for agriculture and agricultural programs in Ghana. The report also makes observations on crop trends and impacts on biodiversity.

Agriculture in Ghana continues to be dominated by small farms, although there are some large farms and plantations, particularly for cocoa (1,200,000 ha), oil palm (285,000 ha), seed cotton (62,000 ha), tobacco (1,600 ha) and coconut, banana, kola, etc. (1,502,500 ha). (Source: Codjoe, Population growth and agricultural land usein two agor-ecological zones of Ghana, 1960-2010)

Grazing is a significant activity in Ghana and a source of protein and income in the nation. The FAO estimates that about 8.35 million ha of pasture land exist in Ghana (FAO, Country Brief, extracted March 2011). More detailed data from the FAO report on pasture and forage (2000) in Ghana indicates "domestic livestock meat production is low and amounted to 66,283 metric tons in the year 2000 of which beef contributed about 27 percent, mutton about 18 percent, goat meat and pig meat about 17 percent each, and poultry meat about 21 percent [According to FAO data there were also 57,000 metric tons of game meat produced in 2000]. Domestic milk production is estimated at 13,700 metric tons for the same period ... Both the meat and milk production represent about 30 percent of the national animal protein requirements". (Oppong-Anane, Kwame: FAO, Country Report, Pasture/Forage Resource Profiles).

Grazing in Ghana has been the source of some social conflict and is cited by many sources as one of the causes of environmental degradation in specific instances. For example, illegal but long-standing settlement within the Kalakpa Resource Reserve in the savanna area of the Volta Region has led to associated grazing of 5700 head of cattle within the reserve, with overgrazing common (Katoomba Group, Kalakpa Resource Reserve, Resources and People in Crisis).

There is little local knowledge of the ecosystem services provided by riparian vegetation, or the cumulative negative consequences of poor grazing practices. Poor grazing (as well as poor forestry, mining, and agricultural practices) threaten water quality, and the habitat and linkage services that can be conveyed by vegetated corridors for wildlife and fish. Grazing impacts include the use of bush fire which: "…can be correlated with human presence, as indeed can cattle density, since fires occur most frequently in areas with very high cattle populations. Damage done by fire to the natural pastures is very significant and is a major contributing factor in the decline in the condition of both natural and sown pastures." (Kwame, FAO)

Both grazing and agriculture can, and do, affect Ghana's riparian areas. Draft national policy relative to riparian management exists; however, progress in improving riparian management is made complex by the fact that enforcement and education efforts related to riparian policy are largely linked to District government. (See: *Maxwell Opoku-Agyemang: The role of the district assemblies in the management of trans-district water basins in Ghana, 2005.*) District government is normally understaffed, underfunded, and receives limited training. The complexity of tenure rights to water and land adjoining streams, combined with a lack of local understanding and acceptance of the resource values of riparian land, makes the role of District government in gaining acceptance of riparian land management reform a difficult goal to reach.

Grazing in Ghana often exists within a matrix of agricultural activities. About 60 percent of all farms in the country are less than 1.2 hectares, 25 percent are between 1.2 to 2.0 hectares, with a mere 15 percent above 2.0 hectares, and the mean farm size is less than 1.6 hectares. Small- and medium-sized farms of up to 10.0 hectares account for 95 percent of the cultivated land (Oppong-Anane, Kwame, FAO, Country Report, Pasture/Forage Resource Profiles). This intermix can, and has, led to sometimes violent conflict between livestock grazers and farmers when free roaming livestock destroy crops.

2. STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

Strengths	Large amount of agricultural and range land Relatively good supply of water (though variable through country) Large labor force with active governmental, NGO, and civil society involvement in the sector
Weaknesses	Slash and burn agriculture commonly practiced Legal framework relative to grazing lacking (particularly off protected areas) Technical / environmental knowledge among farmers and grazers generally poor Availability of credit low, reducing potential for capital requiring productivity improvements such as irrigation and fertilization Levels of poverty and site-specific dependence on traditional farming and grazing practices leads to non-acceptance of protected areas (PAs) boundaries as fertility of lands adjoining PAs is depleted Lack of forums for dispute resolution and collaborative solutions between farmers and grazers Herdsmen are not well organized and subject to social stereotyping Land tenure issues make investment in agricultural lands difficult Limited standards for riparian, stream, and water quality protection related to agriculture or grazing
Opportunities	Technology innovations in irrigation, fertilization, crop selection and management, and product marketing could increase yields, income, and sustainability of agricultural practices Potential for investment, improved yields, and livelihood betterment Awareness and education for farmers and livestock growers on agro-forestry techniques Increased communication between and among the farming and grazing communities to increase mutual understand of issues through the brokerage of civil society, NGO's, GoG Development of a regulatory framework for grazing, particularly off reserve and protected areas High level focus and understanding by GoG on importance of sector currently exists
Threats	Current agricultural practices are likely the single greatest cause of deforestation in Ghana Increased productivity in agriculture, without a forest stewardship component, could lead to accelerated deforestation Very limited regulation of current grazing and agricultural practices Climate change is affecting precipitation patterns and temperature increases may affect viability of some crops Flooding has adversely affected some agricultural lands in the past Expansion of cocoa plantations and increased reliance on sun-loving varieties, has led, particularly in the Western Region, to increased deforestation

3. SECTOR SUMMARY: NGO AND OTHER-GOVERNMENTAL ACTIVITIES

Strength and opportunity areas in this sector are discussed in the table above. A high percentage of Ghana is suitable for agriculture and grazing and a large portion of its population is devoted to work in the sector. These, coupled with increasing focus on the economic importance of the sector by the Ghanaian Government, create opportunities for improvement and reform in this sector that can benefit biodiversity while stabilizing agriculture and grazing in the country. The tie of agriculture and grazing to biodiversity and forest conservation is direct. Though this linkage can create environmental issues, it also links this sector to many governmental organizations, NGOs, and civil society whose more fundamental issues may be biodiversity, wildlife, tropical forests or endangered species. This linkage creates opportunities for collaboration beyond the traditional grazing and agriculture sectors.

For a list of NGO and other potential collaborators for USAID programs in this sector, see Appendix 7. Some examples of areas to continue or expand collaborative multi-partner activities include (but are not limited to):

- Expand and improve activities of organizations with projects to clarify land and resource tenure. To this extent, improvement in the clarity of land tenure, and reform of resource tenure to favor long-

term conservation by private individuals, can benefit agriculture and grazing while also improving the potential for such activities to improve (or at least not reduce) biodiversity and tropical forest conservation.

- The social and environmental issues associated with grazing herdsmen in Ghana are serious and complex. This is particularly an issue where governmental, NGO, and civil society facilitation is needed to increase understanding of the grazing economy, the people involved in it, and to broker communication between the grazing and farming interests (which, despite widespread opinion in the country to the contrary, often overlap).

Also see the "Opportunities" section in the table above.

4. SECTOR CONCLUSIONS

Agriculture is a huge factor in both in Ghana's economy and in its biodiversity management. Efforts which improve the sustainability and productivity of agriculture, to the degree they integrate principles of biodiversity, can have a large and direct effect to improve the lives and the environment of the people of Ghana. To the degree agriculture continues down its current path (or fails to integrate sound ecological principles in its reform), it will continue to be one of the largest factors in the country contributing to biodiversity decline.

So too, grazing has had important effects on biodiversity and tropical forest management. Grazing management, and associated riparian area management, particularly on private lands, is largely voluntary.

More assistance from the central government, NGOs, and civil society in education, technical assistance, brokering grazing/farming communication, and strengthening the legal framework for grazing (with provision for subsequent monitoring and enforcement) can all improve the situation.

E. FOREST RESOURCES

1. BACKGROUND

Map 6 Air Photo of Forests of SW Ghana

Ghana divides its forests into zones: high forest zone, transitional zone, and savanna zone with further sub-delineation as discussed in the Biodiversity section above. Forest cover within these zones varies along a north-south gradient, where the "high forest zone" (HFZ) dominates the southern region and transitions to savanna towards the north. Forests are further classified into forest reserves (forest land within reserves and under protection) and off-reserve forests (any land area outside forest reserve in the HFZ mainly made up of forestland or mosaic of agricultural fields, fallow lands, and secondary forest patches).

Highly variable estimates of Ghana's forest cover and rate of forest loss exist throughout the literature. To illustrate the variability, several estimates of forest cover and deforestation rates follow.

- The Forestry Commission website for the Division of Forestry estimates that there are currently 1.2 million ha of forest left in the country as compared to about 8.2 million ha of similar type forests in 1900. The Forestry Commission estimates an annual deforestation rate of about 65,000 hectares per year and also estimates that, at current deforestation rates, the nation's forests will be gone in 23 years. (http://www.fcghana.com/programmes/nfpdp/nfpdp.html). Note that this latter estimate is presumed to compare forests with current composition and canopy similar to those found in the early 1900s. Thus, the estimate of decline is presumed to project current rates of decline onto the whole forest estate of Ghana. Some protected areas, due to their protected status, are not, in actuality experiencing such rates of decline. That said, our research indicates that many protected

areas are experiencing deforestation due to overharvest, illegal logging, burning, and agricultural or residential clearing.

- The EPA's "Status of Biodiversity and Impact Assessment in Ghana" (2007) estimates the current amount of forest (at that time) at about 1.56 million ha with a rate of decline of about 22,000 ha/year (Status of Biodiversity…, p. 5).

- Ghana's "Country Profile" on the Conservation of Biodiversity (CBD) website states that there were 2.46 million hectares of "tropical forests" in the country at the time of the report.

- *The National Biodiversity Strategy for Ghana* (MEST, 2002) states "The current area of intact forest is now estimated at between 1.58 million ha and 1.72 million ha which represents between 10.9 and 11.8 percent of the original cover and 6.9 percent of the country's total area. Current deforestation rates average 22,000 ha/annum or about 1.3 percent. Very little closed forest remains outside the forest reserve network."

- The World Bank database shows 5.29 million ha of forest in Ghana as of 2007 with a rate of decline of about 0.5 percent annually from 2005 to 2007.

- The FAO official forest statistics for Ghana set the 2005 forest areas at 5.5 million ha and the annual deforestation rate at approximately 2.0 percent (FAO 2006). Globally, this puts Ghana among the countries with the highest net deforestation rates (FAO 2006).

Some of these discrepancies are due to how the data gathering entity defined forests. The Forestry Commission was comparing turn of the century forests (which were largely intact) with the amount of similar forests remaining today. The World Bank defined a forest as any natural or planted stands of trees at least 5 meters tall. The standards by which the "forests" are measured in all these comparisons are different, but in all cases the trend is downward. Most experts agree that the condition of Ghana's forests has been in decline for many years, with many forest reserves heavily encroached and degraded, and the off-reserve stocks being rapidly depleted. All forest zones are affected, including the high forest, transitional areas, and northern savanna.

According to the Ghana's Readiness Preparation Proposal (December 2010), the problem is one of gradual "degradation" rather than "deforestation," and is incremental rather than dramatic, with no single dominant driver. (Other reports do point to agricultural-related deforestation as the largest single driver.) The underlying causes involve a complex of demographic, economic, and policy influences. The immediate drivers include: forest industry over-capacity; policy/market failures in the timber sector; burgeoning population in both rural and urban areas, which increases local demand for agricultural and wood products; high demand for wood and forest products on the international market; heavy dependence on charcoal and woodfuel for rural and urban energy; limited technology development in farming systems, and continued reliance on cyclical "slash and burn" methods to maintain soil fertility. The prominence of one forest crop in the national economy (cocoa), and recent varietal changes (from shade to full-sun), have also exerted a major influence on trends in forest cover. Mining (industrial and artisanal/small scale) is a concern in some areas, as is the use of fire in livestock management, and in some hunting practices.

Arresting deforestation and forest degradation is an important priority for the country, and Ghana has already embarked on a series of forest and natural resource governance initiatives to address these challenges. The most prominent of these are the Forest Law Enforcement, Governance and Trade (FLEGT) Initiative, and the multi-donor sector budget support through the Natural Resources and Environmental Governance Program (NREG).

As of 2011, Ghana does not have a single Forest Stewardship Council (FSC)-certified operation. The markets in Europe, a trading partner in timber, are more robust for FSC wood than they were a decade ago. The European Union has favored an approach called 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. The VPA program is currently in the implementation stage. The wood tracking system is being piloted in selected reserves in some districts in two regions. The piloting is almost completed and the two parties (Ghana and EU) would meet to review progress of the pilot and address problems. Based on the lessons learned, the two parties will agree on the way forward.

Illegal logging is widespread in Ghana and most (75 percent) is conducted by the informal sector who produce for the domestic market, variously called chainsaw operators or pit-sawyers (Hansen and Treue, 2008; Marfo et al., 2010). Chainsaw milling for commercial purposes is illegal in Ghana but provides jobs for about 130,00 people and livelihood support for 650,000 people (Marfo et al., 2010). Additionally, chainsaw milling supplies 84 percent of domestic lumber supply at prices 12-74 percent lower than conventional sawmill lumber (Marfo et al., 2010). Hansen and Treue (2008) estimated that much of the illegal timber is taken from forest reserves, as much as 1.5 million m^3 yr^{-1}, which is clearly unsustainable. Commercial species are favored by the illegal loggers, who selectively harvest the higher-value species (Abugre and Kazaare, 2010;Hansen and Treue, 2008Marfo et al., 2010).

Table 3: Forest Protected Areas by Type of Area

Typology	Area	Comments
Off-reserve areas	201,000 km^2	Off-reserve areas are lands that are currently (or were) forests but where the policy presumption is that these lands would be converted to other use – in particular, agriculture. This includes 5,000 km^2 of unreserved forests, 60,000 km^2 of bush fallow, 71,000 km^2 of bush fallow, 36,000 km^2 of unimproved pasture and 29,000 km2 of tree and annual cropland.
Forest Reserves	24,133 km^2	These are areas that have been designated as forest reserves where no farming is allowed (except for in "admitted" farms, which were usually present at the time of reservation of the forest).
Dedicated forests	4 km2	Dedicated forests are designed to enable communities to manage their own forest "reserves" based on approved management plans. They take the form of patches of forests, sacred groves, and secondary forests in off-reserve areas. A dedicated forest management scheme was initiated in 1994. Under a pilot project, two communities were assisted in declaring Dedicated Forests (215 ha & 190 ha) in Fosu District to determine the scheme's feasibility to communities. The results were positive, and draft legislation and a program to promote dedicated forests were formulated in 1997; however, no further action was taken.
Sacred Groves	Unknown	Numerous sacred groves are found throughout Ghana. They are managed wholly by communities, but they have no legal status and are extremely small in most instances.
Protected Areas (national parks)	10,500 km^2	A protected area is generally a large and relatively undisturbed area of outstanding natural value containing representative samples of major natural regions, features, or scenery and containing one or several entire ecosystems; it is an area not materially altered by man (or reflecting longstanding cultural land management practices). The areas should be accessible to the public, have high recreational, educational, inspirational, and cultural potential of clear benefit to the local people, the region, and the nation. The highest competent authority, i.e., the Ghana Wildlife Division (GWD), administers and manages these areas to prevent or eliminate exploitation or intensive occupation in order to maintain them in perpetuity in a natural or near-natural state.

Typology	Area	Comments
Resource reserves (game production reserve)	1,664 km^2	These areas are of varying size. They contain habitats managed to guarantee the conditions essential to the well-being of selected species for the sustained production of wildlife products (meat, timber, pasture, fruits, honey, bamboos, rattans, medicinal plants, and other non-timber forest products). The areas are used for cultural practices, tourism, and trophy hunting. Conservation priorities involve the manipulative management of species and their habitats to ensure the protection and propagation of the target species, including introduced indigenous and exotic species. Management is to be conducted in such a way as to preserve the areas' natural aspect as far as possible. Other forms of land use compatible with these goals are allowed. These areas may be managed by a central authority or, through agreement, by other levels of government, special trusts, or local community institutions as appropriate under the overall supervision of GWD.
Wildlife Sanctuaries	66 km^2	Wildlife sanctuaries can be created on state land or local land. A revenue-sharing mechanism is in place at Agumatsa Wildlife Sanctuary (community – 57 percent, FC – 23 percent, and Hohoe District Assembly– 20 percent).
CREMAs	30 km^2	The Community Resources Management Area is a legally recognized unit of management capable of managing the wildlife resources within the defined area. Devolution of authority to the CREMA from the Executive Committee is conditional and confers the right to restrict access to the common property and extra-farm resources. This measure provides incentives for sustainable management of wildlife resources. So far only one CREMA (Amokwasuazo) has received the authority to manage its resources.
Globally Significant Biodiversity Area (GSBAs)	1173 km^2	GSBAs are legally established areas identified within the existing forest reserve system. They form a potential network of 30 forest reserves that are proposed for either full (11 reserves) or partial (19 reserves) protection to provide global security for floristic diversity. Included in this group are Southern Dry Forests and the Provenance Protection Areas.
Strict Nature reserve	386 km^2	Only one strict nature reserve, Kogyae, is in existence. Originally created from a forest reserve, it was taken over by the WD in 1971 and established as an IUCN Category I strict nature reserve. However, the WD has been unable to evict a number of farms and settlements within the reserve.
RAMSAR sites	1,784 km^2	Six RAMSAR sites are listed as wetland sites of international importance. Under the RAMSAR convention the contracting parties are generally obligated to include wetland conservation considerations in their national land-use planning. They have undertaken to formulate and implement this planning to promote, as far as possible, the wise use of wetlands in their territory.

Sources: Ghana Country Environmental Analysis, World Bank (November 2007) (Forest Reserve Information from Forestry Commission, Ghana) (Ramsar Site Information from Ramsar database).

2. STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

Strengths	Forests are scattered throughout country in protected areas as well as off forest reserve. Forest reserve boundaries largely in place. Framework of policies, laws and institutions is strong (yet emphasis and implementation favors exploitation over conservation).
Weaknesses	Skills, capacity, and budget in Forestry Commission are limited. Lack of ownership on on-farm trees creates perverse conservation incentives. Insecure land and resource tenure make community investments in natural resource-based economic activities problematic. Lack of sufficient social benefit-sharing regulatory mechanisms for forest conservation. Poor follow-up on maintenance of plantations. Emphasis is on initial planting and associated employment Low level of rule enforcement. Low fees for forest products.
Opportunities	Legislative reform, including clarifying off-reserve timber harvest regulations and farmer's rights, especially modifying financial benefits to benefit forest conservation. (Also see Hansen for additional forest sector recommendations) Ghana framework for REDD readiness has potential to focus on several key issue areas (social benefits, tenure, reforestation) affecting deforestation and forest degradation. Improved inventory and monitoring of forest resources. Improved valuation of timber products to capture more revenue. Eliminating and/or reducing subsidies. Awareness of and education about forestry can increase their priority for conservation. Fuelwood (firewood and charcoal) is a crucial part of the energy base of the country and to avoid depletion of forest resources, alternative approaches including Woodlot Plantation Development and Collaborative Community Forest Management Programs must be strengthened and/or developed. Forestry Commission's plantation programs to rehabilitate degraded areas, fits in the government's policies and vision of job creation for the youth. Need to resolve the causes of forest degradation and habitat loss, through governance and institutional reforms, securing financial arrangements for the Forestry Commission, and strengthening initiatives for local community-based management of off-reserve resources and dedicated forests. Better application and enforcement of the EIA requirements under EIA Regulations within the Forestry sector is required. Prosecution of offenders to be stepped up.
Threats	Population growth and poverty increases pressure on firewood resource and to clear land for crops, which both drive deforestation. Gold and other minerals are common in protected areas. Illegal mining as well as the ramifications that could fall out from legal exploration pose a threat to protected areas. Fire is another major cause of losses of forest and savanna lands. Illegal chainsaw activities. Charcoal industry is possibly also driving over-exploitation of valuable species. Urbanization, Harvesting at unsustainable rates. Hybrid cocoa production and lack of tree retention. Climate change may create additional income insecurity which increases pressure on forests.

The weaknesses identified for forest conservation efforts in Ghana are extensively explained in two excellent information sources: 1) *Neither fast, nor easy: the prospect of Reduced Emissions from Deforestation and Degradation (REDD) in Ghana* (Hansen, International Forestry Review, 2009), and 2) *Ghana Country Environmental Analysis,* World Bank 2007. These two documents as well as the numerous interviews and site visits provided the emphases to the strengths and weaknesses and opportunities identified in this report.

Hansen summarizes the following with respect to Ghana's political timber economy: "Its central elements are political control over access to, and price of, standing timber as well as access to the world market through discretionary allocation of formal timber rights, low official forest fees, and the banning of log exports. The system has nourished an oversized and technically inefficient, but politically effective, wood processing industry that has successfully lobbied its interests in getting exclusive rights to standing timber at low official costs. This interpretation of Ghana's political timber economy features many similarities with the general theory on how African governments extract revenues from rural areas to promote industrialization, generate export revenues and consolidate political as well as administrative powers, c.f. Bates (1981, 1983)."

The Ghana Country Environmental Analysis summarizes key features of the Forest sector as on the brink of major change; again identifying the elite capture of economic rent as a cause of deforestation and degradation as well as identifying the distorted incentive structures that reduce forest conservation incentives.

3. SECTOR SUMMARY: NGO AND OTHER-GOVERNMENTAL ACTIVITIES

Major efforts are underway to improve how Ghana's natural resources and environment are governed, financed, and managed, including: the Natural Resources and Environmental Governance program, REDD readiness Preparation, implementation of the Voluntary Partnership Agreement, the Non-Legally Binding Instrument on All Types of Forests (NLBI), prioritization of plantation development, and efforts to address social rights and inequalities. The NREG Program is intended to promote sectoral and cross-sectoral policy reforms that contribute to addressing land degradation and promote sustainable use of land resources, particularly in the forestry and mining sectors. However, the NREG is a new program and interviews indicated that NREG program participants have only met twice, that meeting topics are not formalized, and that expectations of this group achieving harmonization on needed cross-sectoral reforms is diminishing.

Ghana is strongly placed to develop a national REDD+ program due to its stable socio-political situation and the initial support from the World Bank Forest Carbon Partnership Facility for its REDD Readiness Preparation Proposal (R-PP). However, as Hansen points out, there are numerous issues that may affect the ability of Ghana to fully capitalize on the benefits perceived to be available under REDD+.

While yet to be backed by legislation, the CREMA policy has potential to be a useful tool to support efforts to reduce deforestation and degradation. The purpose of a CREMA is to enable community-based wildlife management, ecotourism, decentralization of law enforcement, and habitat management to reduce deforestation and wildlife habitat degradation. CREMAs therefore provide a natural resource management structure that is highly conducive to community-based REDD+ projects, particularly in off-reserve landscapes that include mosaics of forests, agro-forestry, and agriculture. Strengths of CREMAs include clear boundaries, a constitution developed through a participatory process, backing by District Assembly by-laws, strong social cohesion, and opportunities for generating revenue and benefit-sharing outside the normal legal framework. USAID support for analysis of strengths and weaknesses of CREMA's in Ghana as well as possibly scaling up through sustainable landscapes, biodiversity, and/or climate change budgetary support should be considered.

4. SECTOR CONCLUSIONS

The fundamental requirements of REDD+ are: improved forest governance, clarification of carbon property rights while ensuring positive incentives for landowners and farmers, clarification and good governance in benefit-sharing arrangements, an integrated and inter-sectoral land-use policy framework, and strong inter-sectoral coordination. Continued support for these efforts at the national level is necessary whilst also working on pilot projects in different regions throughout the country that can serve as examples. While

considerable doubt among many we interviewed exists as to whether or not Ghana will be able to realize the perceived benefits of a REDD+ program, the activities to support improved governance that are a part of REDD+ are expected to produce long-term benefits for forest conservation.

USAID should consider expanding upon the Our Coast Our Future Project in the Western Region to include improved forest-related benefit-sharing arrangements, especially with regard to payment for ecosystem services arrangements in the Amansuri wetlands area. Exploration is being carried out to see whether the scope and scale of the Our Coast, Our Future USAID-funded program can be expanded to be used as a platform for sustainable landscape funding. The Western Region seems to be a viable demonstration area in which to demonstrate the potential for achieving cost-effective and sustainable net emissions reductions.

USAID FtF initiative investments could also serve to reduce impacts on degraded forest reserves by increasing productivity and income of existing farms so farmers have less need to abandon them for a new forest area, although this policy should also be complemented by measures to improve livelihood and income options in the source areas of migrant farmers.

Outside forest reserves, the main potential to improve forest conditions rests with the development of CREMAs or Dedicated Forests involving increased farmer or landowner management benefits and/or rights over trees – conversely, there is little hope for REDD in off-reserve areas assuming continuation of the current tree tenure and social benefit institutional arrangements.

5. RECOMMENDATIONS AND CONCLUSIONS

The assessment team has formulated a set of recommendations for program actions for USAID to consider in improving its contribution to natural resources management and biodiversity conservation in Ghana. Although the recommendations do not address all the actions needed to protect tropical forests and conserve biological diversity, the assessment team believes that these recommendations would lay the foundation for a more comprehensive and cohesive approach to natural resource management in Ghana and future longer-term investments. Conclusions about the strategic effect of broad USAID programs on the environment, tropical forests, and biodiversity are listed below, followed by more specific program recommendations.

A. CONCLUSIONS ON THE STRATEGIC AFFECT OF USAID PROGRAMS ON THE ENVIRONMENT

USAID has led in successful programs to nearly eradicate guinea worm in Ghana, distribute bed nets to fight malaria throughout the country, dramatically increase immunization coverage for children under five, and make other substantial improvements to the health of Ghanaians. Many other donors, including the World Bank, have used USAID's health program as a model for their own activities. With its increased focus on HIV/AIDS and Malaria prevention, the Mission has the opportunity to address related environmental issues such as loss of human capacity, sanitation, and best management practices that result in conservation of natural resources.

USAID, through its Strategic Objectives Program areas of Health, Education, Democracy and Governance, Feed the Future Initiative and MCC programming contribute to biodiversity conservation and the protection and management of tropical forests in Ghana. While benefits to forests and biodiversity conservation are not explicitly portrayed in the results framework for these programs, these programs do play a major role in these areas as follows:

- USAID and the USG have built up a strong comparative advantage in its health programs, which over the last decade have improved the health of the poorest Ghanaians', particularly in rural areas. Health programs, particularly as they improve water quality and sanitation, have direct and indirect benefits to the environment and biodiversity conservation as described in section 4 A. To that extent, these programs comply with the Foreign Assistance Act (FAA), Sections 117, 118, and 119.

- Through its Democracy and Governance program, particularly LOGODEP, USAID has the opportunity to encourage more accountability for conservation activities and could provide a voice for development activities that consider the conservation and equitable distribution of Ghana's natural resources. In so doing, this program area can help improve/maintain the environment and natural resource management, tropical forest conservation and endangered species protection, consistent with the intent of the FAA.

- The Mission's Education program has been at the forefront in providing access to education, including disadvantaged and vulnerable populations. This approach to education and training would enable it to respond to the variety of learning challenges that are being faced by Ghana's environment and natural resource management institutions, again consistent with the intent of the FAA.

- USAID's agricultural program has the opportunity to enhance the long-term protection of biodiversity and tropical forests by promoting sustainable use and by providing a much needed source of alternative income. Agricultural program activities, with proper design, can also help orient people away from critical protected areas as well as other areas highlighted as important for conservation. Such activities would be highly consistent with the FAA. Important specific caveats in this regard are noted in the "Long- and Medium-Term" recommendations.

- The assessment team understands that USAID/Ghana will be receiving additional biodiversity, climate change, and food security funds in FY 2011. By using these and future bilateral resources directly (or in coordination with programs such as STEWARD), the Mission can directly benefit the environment of Ghana.

- An increased emphasis on alternative livelihood activities, along with new community rights/tenure legislation, increased support to the decentralization of natural resource management – including expanded support to USAID's Our Coast, Our Future land use planning, and a better understanding of climate change adaptation issues would all combine to make a thoroughly integrated USG conservation and development program, one that is responsive to GoG needs and concerns, and one that contributes substantially to reducing threats to biodiversity and tropical forests as intended by the FAA.

B. RECOMMENDED SHORT-TERM INTERVENTIONS

The short-term recommendations are targeted at specific actions based on existing USAID programs. These are incremental additions to, or changes in, USAID's current and projected program areas. This seems to be the most practical short-term approach to addressing biodiversity conservation given possible current and future funding constraints and opportunities.

Recommendation: Fuelwood use and charcoal production in the northern regions (as well as nationwide) is an extremely important driver of deforestation and in the far north, a potential factor accelerating desertification. USAID development of, or assistance in, programs which increase the efficiency of wood stoves, promote the development of family and community forests to develop fast growing wood sources, and, where feasible, to develop use of alternative fuel sources, could potentially significantly reduce the current rate of deforestation due to this pressure. Such programs could complement and help mitigate deforestation pressures (discussed above) which could develop from improved agricultural conditions spurred by the FtF program. Technical forestry assistance embedded in the Ministry of Agriculture and within USAID's operational team for FtF could help develop forestry program assistance to the FtF program while integrating complementary programs to reduce the fuelwood pressure on existing forests.

Rationale: Clearly, the fuelwood resource needs to be managed better and USAID could make a substantial contribution to this effort by analyzing fuelwood (charcoal, firewood) value chains, and developing fast growing plantations and agroforestry systems with local communities and entrepreneurs to meet growing demand. Plantations (woodlots) and agroforestry systems have the added advantage in that carbon credits for such efforts can be sold under both the Clean Development Mechanism (CDM) and voluntary markets, and producers can get paid for both sequestration, and after a period of time, harvesting and sale of product.

Recommendation: USG has opportunities to assist with drought preparedness training as well as training district technicians (in the Northern Region targeted for the FtF initiative) and local communities on sustainable use of water and watershed management objectives.

Rationale: The impacts associated with agriculture development in the North should consider drought preparedness training as well as appropriate consideration of flood hazard in areas determined for development.

***Recommendation*:** USAID could support or develop a pilot cocoa agro-forestry project as an independent project. Such a project, using programs such as STEWARD, community forests, or a CREMA-type

approach in conjunction with one or more local NGOs with interest in this arena, could create a valuable learning tool.

Rationale: If the Feed the Future program can be reasonably associated with sustainability of cocoa farming, the pilot cocoa activity suggested in the "Medium-Term" interventions below is also a potential "Short-Term" opportunity. Such a project, using a STEWARD, community forests, or CREMA- type approach in conjunction with one or more local NGO's with interest in this arena, would be a project- specific undertaking worth considering. The viability of such a project would not be dependent on REDD credits, but REDD could be used as an additional incentive if both long term financing and local delivery/accounting systems are in place. Without these elements of REDD in place, such a pilot program may still have viability solely based in value of certified cocoa, and potential long term sustainability advantages. An associated short term project would be to field a team to explore the technical feasibility and potential site location of such a project. Providing an alternative to increased clearing for soil depleting, sun-based cocoa farming could alleviate a significant deforestation pressure, particularly on the Western Region forests.

***Recommendation*:** USAID should consider an assessment/evaluation of conservation activities in Ghana. The assessment should include an assessment of lessons learned, legal framework, and needs for increased community-based conservation, and a toolkit developed for communities to access to demonstrate conservation options and the identification of realistic potential social benefits. This could also be jointly considered as part of STEWARD or as a stand-alone assessment of conservation activities in Ghana (including CREMA's, community based natural resource management, etc.).

Rationale: The issue of community support for conservation is intrinsically linked to the ability of communities to be able to provide livelihoods for their people. Community-based approaches seem to many the most promising way to sustainably improve livelihoods and improve the conservation knowledge and ethic of communities in a collaborative fashion. Such an approach also makes use of the knowledge and intrinsic interest the communities provide in developing management approaches to given areas.

Recommendation: A particularly difficult, site-specific, problem in protected area management in Ghana has been, and continues to be, the internal occupancy and degradation of the Kalakpa Resource Reserve. USAID assistance may be useful to the existing players (WD, Katoomba Group, SNV, Ghana) to help move this site-specific issue to resolution and/or applied to any of several protected areas with internal occupancy and external degradation issues**.**

Rationale: The issues at play are extremely complex and there are potential partners already working on the problem, but USAID assistance may be useful to these players to help move this site-specific issue to resolution (for more information see: Kalakpa Resource Reserve, Resources and People in Crisis: http://www.moongateassociates.com/documents/KalakpaFinal.pdf

Recommendation: USAID should consider expanding upon the Our Coast, Our Future Project in the Western Region to include improved forest-related benefit-sharing arrangements, especially with regard to payment for ecosystem services arrangements in the Amansuri wetlands area. We suggest exploring whether the scope and scale of the Our Coast, Our Future USAID-funded program can be expanded to be used as a platform for increased sustainable landscape funding that includes payments for ecosystem services, stewardship contracting on and off of forest reserves.

Rationale: The Western Region seems to be a viable demonstration area in which to demonstrate the potential for achieving cost-effective and sustainable net emissions reductions. This region is also subject to multiple threats to tropical forests as described in several sections of this report.

***Recommendation*:** Continue to support and look to increase support to USAID's Our Coast, Our Future land use planning (especially with respect to spatial land use zoning and strategic environmental assessments of proposed land uses). Also continue to support this project to gain a better understanding of climate change adaptation issues. The key opportunity within the marine and coastal environments includes the development of Integrated Coastal Zone Management, which includes expanding upon the lessons learned

from the USAID-funded program in the Western Region and developing zoning and sound land use development planning.

Rationale: This ongoing program appears to be linked to both the technical knowledge and the local sectoral relationships that need to come together for effective land use planning along the coastline area, which is seeing issues relative to oil development, pollution, and fisheries pressures as well as opportunities that potential social responsibility activities related to oil development (outlined, but not specified, in the mitigation measures Jubilee EIS) may provide.

Recommendation: Also look to develop similar partnerships with inland fisheries organizations similar to those that are being developed with coastal fishermen via the Our Coast, Our Future program.

Rationale: Freshwater fisheries are estimated to provide about 16 percent of the protein for Ghana. This industry has potential to help provide more diversified livelihoods for farmers and, if managed properly, could contribute to the stabilization of farming and inland fishing operations.

Other short-term possible interventions, based on what the team heard or observed on its field trips, include:

***Recommendation*:** An evaluation of the Ghana Heritage Conservation Trust (http://ghct.limewebs.com/ghct/) and potentially, re-invigoration of the Trust Fund. (Main collaborators: Wildlife Division and local community groups)

Rationale: There is a growing issue from people surrounding the park relative to elephants destroying crops as well as concern from traditional authorities with respect to the long-term sustainability of the ecotourism to Kakum as well as the lack of social benefits arriving to local communities. Funds from an operable trust could be used to help alleviate this situation which appears to have the potential to grow worse.

***Recommendation*:** A possible health-based intervention is to look into the feasibility of staffing the vacant clinic in the community of Abrafo near Kakum Park. According to villagers, the building was constructed about 10 years ago with USAID funding, but never staffed or supplied.

Rationale: Local chiefs asked that the potential to staff the clinic be explored. Our limited follow-up indicates there may be clinic services in a nearby village, but locals think that there should be emergency services closer to the entrance to Kakum Park.

***Recommendation*:** Assistance to the Forestry Commission in the mapping and clarification of the amount of forest cover in Ghana to facilitate planning efforts. A possibility includes working with groups such as the NCRC, IUCN, Forest Services Division, and working within established protocols, develop projects to define and map current forest cover in Ghana.

Rationale: Our research shows a considerable variation in forest cover estimates from a variety of sound sources. A collaborative review of data and agreement on definitions and terms used in analyzing forest cover and deforestation rates would establish a better base-line for measurement of progress in improving forest conditions in Ghana.

Recommendation: Provide technical assistance/support to the maintenance aspects of the Forestry Commission's reforestation program to improve long-term results from reforestation efforts. This may not be an area an area where USAID has a competitive advantage, but could play a technical role.

Rationale: We heard from several sources that the Forestry Commission's plantation program's emphasis tends to be on employment of people and initial acres planted, but that the quality of planting stock and the maintenance of planted stands is low. To that extent, assistance in this area would improve long-term reforestation efforts. This may not be an area where USAID has a competitive advantage, but could play a technical role.

***Recommendation*:** Relative to ongoing oil development, USAID could explore governance and technical assistance to EPA to improve the nation's legal framework, planning and technical capability to make more concrete and operational, oil spill contingency plans, as well as to move broadly stated environmental and social mitigation plans in the Jubliee EIS into concrete actions.

Rationale: Our research indicated that, for example, oil-related marine traffic and exclusion zones for fishing near the Jubilee have an impact on local fishing operations. The opportunity appears to exist for the oil developers, GoG, civil society, and NGOs to develop mitigation plans for such impacts. Already, a local NGO, the Centre for Environmental Impact Analysis, in collaboration with the University of Alabama at Birmingham have initiated the 'lessons learned from the deepwater horizon oil spill' with a view to building capacity of allied stakeholders in the oil sector. USAID-Ghana could become more active in facilitating such initiatives. More information on this activity is found at: http://www.soph.uab.edu/ghanaoilseminar/

***Recommendation*:** USAID could work with the Forestry Commission to pilot a program for forest timber contracts to explore utilizing "forest stewardship contracts" which, if properly used, can result in direct community and ecological benefits from the "stewardship" aspect of the sales. Such an approach would be a means by which communities could see tangible results and a potentially a degree of local employment from timber sales. The US Forest Service (USFS) has the ability to assist with training on implementation of stewardship contracting. Such contracting would require pilot authority through the Forestry Commission and interaction with the community, NGO, and civil society sectors**.**

Rationale: This approach is another mechanism in which timber harvest (even on designated forest reserves) can benefit communities directly and, as such, could engender both support for long-term management of such reserves in the community, and help contribute to site-specific community needs and potential augment local employment.

C. RECOMMENDED MEDIUM-TERM AND LONGER-TERM INTERVENTIONS

The mid- to long-term recommendations focus on the future of STEWARD and the Feed the Future Initiative, community land and resource tenure, and climate change adaptation, with the latter two more broadly based and relevant for consideration by other donors

Recommendation: USAID should assist the GoG in developing sound and equitable governance of land and forest resources through assistance in community-based pilot projects, and legal reform of resource tenure (particularly tree tenure) as it affects forests on "off-reserve" lands.

Rationale: Sound and equitable governance of land and forest resources is a necessity for rural Ghanaians to move out of poverty. When combined with other objectives, such as better access to markets and diversification of incomes, it can be transformative. A legal and institutional framework that allows rural Ghanaians to make productive investments in their lands and forests is a cornerstone of rural development. Careful stewardship of forests and other natural resources will follow from more secure rights if accompanied by clear delineation of responsibilities, capacity building for community enforcement, and sustainable economic growth opportunities.

***Recommendation*:** Expansion of LOGODEP-type programs in coordination with organizations such as the Civil Society Coalition on Land (CICOL) to continue to work on transparency of land tenure by provision of land registration and ownership documentations services at District and Regional levels.

Rationale: Based on input the team received throughout its travels, land tenure ambiguity continues to inhibit agricultural investment. Targeting local governance structures to facilitate land registration could help clarify those issues while improving both governance and the possibility of outside investment in FtF type activities. Expansion of the program in the Northern Region (or targeted Districts thereof) would coordinate well with the FtF program.

***Recommendation*:** Pilot community forestry/CREMAs, and dedicated forest-type projects adjoining protected areas where there is community interest and where background work demonstrates viable revenue streams for livelihoods.

Rationale: The creation of a just and workable community forestry tenure instrument – which would include within it dispute resolution mechanisms at different levels and build expertise for dispute resolution based on both customary and statutory law – will be an important advance for Ghana. Community forestry/CREMAs, and Dedicated Forests are seen as means to more secure tenure for rural people. Through community forestry/CREMAs and/or Dedicated Forests, communities with historical ties to particular forest areas will be able to retain these areas for livelihood purposes as well as some forms of commercial use.

***Recommendation*:** USAID/Ghana could provide technical support to the GoG institutions in the areas of land and resource tenure and associated property rights.

Rationale: Such a program could provide technical assistance in the form of support to national-level land and property rights forums. Sub-components of the program could include: applied research on existing tenure arrangements, analyses of current land tenure and property rights laws, and provision of specific policy recommendations to the government on possible approaches to improve land and property rights system. Such a program would provide the opportunity for training for local authorities on how to implement land tenure alternative tree tenure projects, and should be designed to support legal rights and increase incentives for local investment.

Recommendation: Continued support for REDD + at the national level is necessary (while also working on pilot projects in different regions) throughout the country that can serve as examples. (Based on the assumption that viable long-term REDD credit funding is available.)

Rationale: The fundamental requirements of REDD+ are improved forest governance, clarification of carbon property rights while ensuring positive incentives for landowners and farmers, clarification and good governance in benefit-sharing arrangements, an integrated and inter-sectoral land-use policy framework, and strong inter-sectoral coordination

***Recommendation*:** Updating forest management plans is an action being undertaken under the influence of NREG. USAID could provide technical assistance in this arena, potentially using STEWARD models for community involvement, with a goal to improve the engagement and the resource management knowledge of local communities as such work proceeds.

Rationale: Though management plans for forest reserves have existed for many years, there is an active initiative to update them. USAID could help bring community collaboration into this process using experience gained in other programs to help improve the plans and their understanding and acceptance in local communities by showing how collaborative processes can be used as the plans are updated.

***Recommendation*:** Continue to incorporate environmental education into curriculums and special activities or attractions. Especially target rural areas with education relative to use of fire, ecological, and social benefits of riparian management, and quality information and assistance on agro-forestry techniques. Kakum National Park for example, with its steady influx of elementary aged students, would be an excellent place to have a project (if one does not already exist).

Rationale: Lack of understanding of the long-term effects of poor natural resource management is cited by many we visited with as contributory to the decline of the nation's forests. Kakum draws an impressive number of students on a routine basis. One means to reach an important audience would be to join resource educators with the Park and interested local community members to develop a short curriculum to weave into the tours the children take at the Park .

***Recommendation*:** Another education option is to work with groups such as Forest Watch or the Rainforest Alliance and develop short radio programs targeted for rural areas addressing specific deforestation or bio-diversity threats or opportunities to combat them.

Rationale: Radio is often an excellent medium to target rural communities with specific information in their own language.

***Recommendation*:** USG could provide support to Volta Basin Authority assisting with resolution to issues like the Bagre Dam.

Rationale: Assist with the establishment of procedural steps that can help in addressing the more complex situations envisioned in the future, such as the growing disagreements surrounding declining water levels in the Akosomba Dam area.

Recommendation: The development of improved transportation networks and agricultural practices, both through USAID FtF programs and through MCC, has the potential to reduce the dependence on forest resources and build more land tenure security. The Mission and USG are capable of facilitating the involvement of large, international NGOs with an interest in biodiversity and tropical forest conservation, and support to these organizations can have an important positive impact on conservation in Ghana. However, the important caveats (which follow the rationale section below) should be noted.

Rationale: The economic viability of farming, in many rural areas of Ghana, is adversely affected by limited transportation network and poor agricultural practices. The latter quickly deplete the land, requiring farmers to clear yet more land. The former often makes the revenue received from the crops lower than the transportation costs. Both feed a cycle of land depletion, clearing, and poverty. Improvement of both the agricultural practices and transportation systems could benefit the nation's forests and biodiversity by countering these forces.

Caveat 1: Improvements in transportation infrastructure and support for improved infrastructure and management capacity for regional food supply are essential to improving the economic status and well-being of isolated rural populations. However, such activities could have a negative effect on the environment, facilitating the overexploitation of natural resources by bringing down transportation costs for fuelwood and charcoal as well as facilitating human immigration into remote regions. To the extent that facilitating human movement between commercial centers and remote areas is a component of this (or any) activity working in or adjacent to areas of high biodiversity importance, measures should be taken to mitigate such potential problems. It is critical that the appropriate government and non-government partners be contacted and brought into the planning process when such activities are to be undertaken. This will not only help avoid unintended consequences but could play a positive role by acknowledging the importance of protected areas.

Caveat 2: Improvements in agricultural practices, though essential for the long-term social and environmental improvement of Ghana, should focus on sustainability as well as increased production and livelihood betterment. To that extent agricultural programs should have as an intrinsic element such best management practices as: riparian buffer management both in farm placement and irrigation development, and use of international certification standards for environmentally sound (which often equals "tree friendly") crop selection and management.

***Recommendation*:** USAID/Ghana and the USG can also use their positions in Ghana to help the GoG forge conservation partnerships with corporations such as Newmont, and/or other companies operating mining concessions, cocoa companies, and/or oil and gas concessions. Examples:

- USAID, the Ghana Cocoa Board, and NGOs working in the cocoa sector could develop enhanced education and technical assistance programs to cocoa farmers to reduce the deforestation associated with ongoing cocoa expansion in the country. If REDD+ credits become a reality, there appears to be the possibility to couple sustainable cocoa production with REDD payments as an incentive to manage such plantations with more trees. An important caveat is that the cross-cutting issue of governance

would need to be addressed to build (or allow to be created, if the system were privatized) reliable and transparent mechanisms of REDD payments to be both sustainable and deliverable to the cocoa farmers, before building expectations in this regard. Even without REDD incentives, it may be possible to use international certification standards as a means to grow environmentally friendly cocoa. A pilot program of this type might be an entry point for a STEWARD-based activity.

– Another example would be to forge community resource area partnerships with oil companies to develop marine reserves or assist communities in protecting community wetland areas. Social responsibility agreements with the oil industry could be required as mitigation for oil development (as for mining operations) to improve community infrastructure and livelihoods through joint industry/ community/GoG projects (for example: water treatment facilities) in communities experiencing growth due to oil development.

Rationale: In both examples, USAID could take advantage of existing current situations that could leverage financial incentives or (in the case of oil) social responsibility contributions, from the industry to help make the projects viable.

APPENDIX 1. TEAM ITINERARY AND CONTACTS

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
21-Feb-11	Publish What you Pay - Ghana	Mohammed Amin Adam	National Oil Coordinator	+233-20-8382222	tabat15@yahoo.com	www.pwyp-ghana.org
21-Feb-11	Publish What you Pay	Freida Quagraire	Program Manager, Oil and Gas Platform			www.pwyp-ghana.org
21-Feb-11	Public Agenda	Frederick Asiamah	Coordinator			www.publicagendaghana.org
22-Feb-11	Conservation Alliance	Yaw Osei - Owusu	Country Director	+233-21-780-906, +233-244-277-795	yosei-owusu@conservealliance.org	www.conservealliance.org
22-Feb-11	Conservation Alliance	Ernestina Doku-Marfo	Conservation Biologist	+233-21-780-906, +233-244-844-459 (M)	edoku-marfo@conservealliance.org , tinammarfo@yahoo.com	www.conservealliance.org
22-Feb-11	USAID	Nino Nadiradze	Office of Economic Growth, Senior Environmental Officer	+233-24-431-3526	nnadiradze@usaid.gov	www.usaid.gov/gh
22-Feb-11	USAID	Allen Fleming	Economic Growth Office, Office Director	+233-030-274-1132 , +233-244-313-530(M)	allen@usaid.gov	http://www.usaid.gov/gh
22-Feb-11	USAID	John Mullenax	Economic Growth Office, Advisor, Presidential Initiative to End Hunger in Africa	+233 030 274 1403, +233 024 431 3543 (M)	jmullenax@usaid.gov	http://www.usaid.gov/gh
22-Feb-11	Ghana EPA	Mr. Apombwe	Head of National Climate Change Unit			www.epa.gov.gh
Begin Field Trip to Northern Region, Mole NP, Tamale February 23-25, 2011 Trip Included the following meetings and interviews:						
23-Feb-11	Mole National Park	Enoch Ashie	Manager of Natural Resources		valueseaa@yahoo.com	www.touringghana.com/ecotourism/mole.asp
23-Feb-11	Mognori	17 individuals, 1 interpreter	Chief, Male Community Members, and others			www.savannatourism.com/mognori.html
24-Feb-11	University for	William Jasper	Professor	+233-24-420-6175	wjasante@yahoo.com	www.uds.edu.gh

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
	Development Studies	Asante				
24-Feb-11	University for Development Studies	Esther Ekua Amoako	Professor	+233-24-420-6175	ekubee@yahoo.com	www.uds.edu.gh
24-Feb-11	University for Development Studies	Bernard Batuuwie	Professor			www.uds.edu.gh
24-Feb-11	CARE International	David Sumbo	Program Coordinator, Tamale	+233-071-25700, +233-24-489-4018	david.sumbo@co.care.org,	www.care.org
24-Feb-11	CARE International	Romanus Gyang	Project Manager (ALP)	+233-24-353-3686		www.care.org
24-Feb-11	Catholic Relief Services	Kris H. Ozar	Program Quality Manager, Ghana	+233-24-431-7869	kris.ozar@crs.org	www.crs.org/ghana
24-Feb-11	Zasilari Ecological Farms Project (Walewale)	Issifu Jobila Sulemann		+233-20-828-3225	zasilari@yahoo.com	www.zefp.org/
24-Feb-11	Zasilari Ecological Farms Project (Walewale)	David Agongo	Coordinator	+233-20-828-3225	zasilari@yahoo.com	www.zefp.org/
25-Feb-11	SARI	Matthew Fosu	Scientific Officer, Northern Region Farming Systems Research Group	+233-071-22411 +233-071-23257	matthewfosu@yahoo.co.uk	www.csir.org.gh/index1.php?linkid=117&sublinkid=73
25-Feb-11	SARI	Mohammed Abdul Razak		N/A	aweetauk@yahoo.co.uk	www.csir.org.gh/index1.php?linkid=117&sublinkid=73
25-Feb-11	UDS	Dr. Francis Obeng	Lecturer, Ghana Ecological Network	N/A	N/A	www.uds.edu.gh
25-Feb-11	UDS	Mr. Conrad A. Weobong	Lecturer, Ghana Ecological Network	N/A	N/A	www.uds.edu.gh
25-Feb-11	USAID ADVANCE (Agricultural Development and Value Chain Enhancement Program)	Catherine Phiri	Agri Business Advisor	+233-03720, +233-27569, +233-37-202-7570	cphiri@acdivocaghana.org	www.acdivoca.org/site/ID/ghanaADVANCE
26-Feb-11	SAAI - Sustainable African Agricultural	Jan Hepburn	Chief Executive Officer	+27(0)836606569 (M), +27(0)126431225	shepagricnig@yahoo.com	N/A

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
	Initiative (Pty) Ltd					
End field trip to Northern Region						
27-Feb-11	Winneba Fisherman	Collins Impraim	Lead Fisherman	N/A	N/A	N/A
28-Feb-11	USAID	Cheryl Anderson	Mission Director	N/A	N/A	www.usaid.gov/gh
28-Feb-11	USAID	Peter Argo	Deputy Director	N/A	N/A	www.usaid.gov/gh
28-Feb-11	USAID	Nino Nadiradze	Office of Economic Growth, Senior Env. Officer	+233-24-431-3526	nnadiradze@usaid.gov	www.usaid.gov/gh
28-Feb-11	USAID	Allen Fleming	Economic Growth Office, Office Director	+233 030-274-1132, +233-24-431-3530(M)	allen@usaid.gov	www.usaid.gov/gh
28-Feb-11	USAID	Justice Odoi	Environmental Specialist	N/A	jodoi@usaid.gov	www.usaid.gov/gh
28-Feb-11	USAID	Emil R. Stalis	Democracy & Special Project Coordinator	+233-030-274-1756, +233-24-431 1936(M)	estalis@usaid.gov	www.usaid.gov/gh
28-Feb-11	USAID	Susan Wright	RH & CSID Advisor (Health)	N/A	N/A	www.usaid.gov/gh
28-Feb-11	USAID	Luis Tolley	Education Advisor	N/A	N/A	www.usaid.gov/gh
28-Feb-11	USAID	Alfred Osei	Food Security Specialist	N/A	N/A	www.usaid.gov/gh
28-Feb-11	USAID	John Mullenax	Economic Growth Office, Advisor, Presidential Initiative to End Hunger in Africa	+233-030-274-1403, +233-24-431 3543 (M)	jmullenax@usaid.gov	www.usaid.gov/gh
28-Feb-11	USAID	Fenton Sand	Agriculture Advisor, Feed the Future Advisor	N/A	N/A	www.usaid.gov/gh
28-Feb-11	State Department	Aaron Fishman	Regional Environment, Science, and Technology Officer for West & Central Africa, U.S Embassy Ghana	+233-21-741-417	FishmanAD@state.gov	http://ghana.usembassy.gov
28-Feb-11	Ghana Statistical Service	N/A	Statistician	+233-24-388-8570	N/A	www.statsghana.gov.gh
1-Mar-11	UNDP- United Nations Development	Stephen Duah Yentumi	Head, Env. & Energy Unit (Programme Specialist)	+233-21-773890	stephen.duah-yentumi@undp.org	www.undp-gha.org

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
	Program					
1-Mar-11	CICOL (Civil Society Coalition on land)	Lillian Bruce	CICOL Coordinator	+233-030-224-0891, +233-24 -461-4303 (M), +233-20-589-1920	mail@cicolghana.org, cicolghana@gmail.com	N/A
1-Mar-11	IUCN (International Union for the Conservation of Nature)	Samuel Kofi Nyame	Project Coordinator (for NTFP)	+233-20-821-2486, +233-24-699-6552, +233-27-175-2502	samuel.kofi.nyame@iucn.org, samknyame02@yahoo.com	www.iucn.org
1-Mar-11	World Bank	Flavio Chaves	Natural Resources Management Specialist, Africa Environment and Natural Resources Management Unit	+233-30-221-4166, +233-54-675-1033 (M)	fchaves@worldbank.org	http://web.worldbank.org
1-Mar-11	Ghana MEST - Ministry of Environment, Science, and Technology	Dr. Nicholas K. Iddi	National Project Coordinator, Ghana Environmental Conventions Coordinating Authority	+233-21-662-626, +233-21-662-626 (M)	nicholasiddi@yahoo.com	www.ghana.gov.gh/index.php?option=com_content&view=article&id=329:ministry-of-environment-science-a-technology&catid=74:ministries&Itemid=224
1-Mar-11	Ghana MEST - Ministry of Environment, Science, and Technology	Dr. Raymond Babanawo	Project Technical Assistant, Ghana Environmental Conventions Coordinating Authority	+233-21-662-626, +233-24-059-5584 (M)	babsraymond@yahoo.ca	www.ghana.gov.gh/index.php?option=com_content&view=article&id=329:ministry-of-environment-science-a-technology&catid=74:ministries&Itemid=224
2-Mar-11	Civic Response-Forest Watch	Abdul-Razak Saeed	Programmes Officer (Climate Governance)	+233 21 521905, +233 244 686 548	saeed@civicresponse.org razymac@yahoo.com	N/A
2-Mar-11	Rainforest Alliance	Emmanuel Owusu	Sustainable Forestry Division, Project Administrator, FCAA/TREES Program, Ghana	+233 302 502210, +233 244 238252 (M)	eowusu@ra.org	www.rainforest-alliance.org
2-Mar-11	Rainforest Alliance	Elvis Kuudaar	Community Forestry & Enterprise Development Specialist, TREES Program	233 30 250 2210	ekuudaar@ra.org	www.rainforest-alliance.org
2-Mar-11	Rainforest Alliance	Emmanuel Owusu	Project Administrator	233 30 250 2210	eowusu@ra.org	www.rainforest-alliance.org
2-Mar-11	Ministry of Lands & Natural Resources	Joseph Osiakwan (Josky)	Policy Coordinator/Senior Planning Officer	+233 21 687346, +020 8182556 (M), +024 922 7796 (M)	josephosiakwan@yahoo.com	www.ghana-mining.org/ghweb/en/ma/mlnr.html

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
3-Mar-11	Ministry of Lands & Natural Resources	Mathew Ababio	Policy Planning Director	N/A	abab64math@yahoo.com	www.ghana-mining.org/ghweb/en/ma/mlnr.html
4-Mar-11	Ministry of Lands & Natural Resources	Tabi Agyariw	National Coordinator	N/A	tabimlfl66@yahoo.com	www.ghana-mining.org/ghweb/en/ma/mlnr.html
3-Mar-11	Embassy of the Kingdom of the Netherlands	Dr Ton van der Zon	First Secretary, Environment and Water Resources	+233 302 214362, +233 248894652 (M)	ton-vander.zon@minbuza.nl	www.ambaccra.nl/
3-Mar-11	Forestry Commission, Climate Change Unit	Robert K. Bamfo	Head, Climate Change	+233 302 401210, +233 302 7010033, +233 28 9516504, +233 20 8237777(M)	bamforobert@yahoo.com	www.fcghana.com
3-Mar-11	Forestry Commission, Climate Change Unit	Roselyn Fosuah Adjei	Assistant Programme Manager	021-401210/028 9115496, 024 453 5772 (M)	yafossy@yahoo.com	www.fcghana.com
3-Mar-11	Forestry Commission, Wildlife Division	Cletus K. Nateg	Operations Manager (Protected Area)	028 9115489, 0244 722152(M)	kcnateg@ymail.com	www.fcghana.com
3-Mar-11	Forestry Commission, Wildlife Division	Cornelia Danso	Assistant Wildlife Officer	021 401249	ilacorne@yahoo.co.uk	www.fcghana.com
3-Mar-11	Forestry Commission, Wildlife Division	Sandra Olsen	Commercial Development	+233 21 401210, 401227, 401216, 401231 / 3 / 9	info@wd.fcghana.com	www.fcghana.com
3-Mar-11	Forestry Commission, Wildlife Division	Mohammed Issa	Manager	+233 21 401210, 401227, 401216, 401231 / 3 / 9	info@wd.fcghana.com	www.fcghana.com
3-Mar-11	Forestry Commission, Wildlife Division	Charles Amankwah	General services manager, wetlands conservation	+233 21 401210, 401227, 401216, 401231 / 3 / 9	camankwah@hq.fcghana.com	www.fcghana.com
3-Mar-11	Forestry Commission	Hugh Brown		N/A	hugh.brown@aya.yale.edu	www.fcghana.com
3-Mar-11	Forestry Commission	Kwakye Ameyew		N/A	N/A	www.fcghana.com
3-Mar-11	Forestry Commission	Francis S. Amoah		N/A	kwegyir2004@yahoo.com	www.fcghana.com
3-Mar-11	Canadian High	Romeo	Senior Environmental	+233 302 772861/773598	romeo.darteh@psu-	www.psu-ghana.org

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
	Commission, CIDA	Adonmah-Darteh	Analyst/Advisor, Program Support Unit	ext 1128, +233 26 3004820 (M), +233 24 4715772	ghana.org	
3-Mar-11	Canadian High Commission, CIDA	Janine Cocker	First Secretary, Senior Development Officer, Food Security Program	+233-30-221-1521 Ext. 3455	janine.cocker@international.gc.ca	www.acdi-cida.gc.ca
3-Mar-11	Canadian High Commission, CIDA	Loree Semeluk	Second Secretary, Development Officer	+233-30-221-1521 Ext. 3460	loree.semeluk@international.gc.ca	www.acdi-cida.gc.ca
3-Mar-11	Canadian High *Commission, CIDA*	Eunice Annan-Aggrey	International Development Assistant	+233-30-221-1521	eunice.annan-aggrey@international.gc.ca	www.acdi-cida.gc.ca
3-Mar-11	Water Resources Commission	Enoch Asare	Head, Groundwater Division	027 288 8499	enochasare@gmail.com	www.wrc-gh.org
3-Mar-11	Department of Commerce	Heather Byrnes	Commercial Attache to US Embassy in Ghana	N/A	heatherbyrnesh@state.gov	http://ghana.usembassy.gov
4-Mar-11	Stalwart Mining	Tom Powell	CEO	054 313 4679	N/A	www.stalwartmining.com
Begin Field Trip to Central/Western Regions, Cape Coast, Kakum NP, Takoradi March 5-9 Trip included the following meetings and interviews:						
5-Mar-11	Kakum National Park	Daniel Ewur	Park Manager			www.touringghana.com/ecotourism/kakum.asp
5-Mar-11	Abrafo Area Chiefs	5 Chiefs	Chiefs	N/A	N/A	N/A
5-Mar-11	Mbaaniaye Village	50+ Community Members	N/A	N/A	N/A	N/A
5-Mar-11	University of Cape Coast	Denis Worlanyo Aheto	Professor, Integrated Coastal Zone Management Program		worlaheden@yahoo.com	www.ucc.edu.gh
6-Mar-11	Center for Environmental Impact Analysis (CEIA)	Samuel Obiri	Executive Director	+233-24-470-8322	obirisamue@gmail.com sobiri@ceiagh.com	www.ceiagh.com
7-Mar-11	CEIA	Priscilla Achiaa	Program Officer	+233-24-470-8322		www.ceiagh.com
8-Mar-11	CEIA	Faustina Essuon	Administrative Secretary	+233-24-470-8322		www.ceiagh.com
7-Mar-11	Kakum National Park	Daniel Ewur	Park Manager			www.touringghana.com/ecotourism/kakum.asp
8-Mar-11	Ghana Primewood Products	Benjamin Adgei	Forest Certification Manager	+233-31-22593		N/A
8-Mar-11	Coastal Resource	Kofi Agbohah	Program Coordinator	+233 24 467 8007	kofi.agbogah@gmail.com	www.crc.uri.edu/index.php?projectid

Date	Organization	Interviewee	Position	Contact Tel.	Contact Email	Web Address
	Center					=110
8-Mar-11	Coastal Resource Center	Sally Deffor	Communications Officer	+233-31-2047163, +233 20 8177991, +233 261 197569	sallydeffor@yahoo.com	www.crc.uri.edu/index.php?projectid=110
End Field Trip to Central/ Western Regions						
10-Mar-11	USAID	Power Point Presentation				
11-Mar-11	Nature Conservation Research Center (NCRC)	John Mason	Founder CEO	233-21-231765 233 30 223 1765	info@ncrc-ghana.org jjmason999@yahoo.com	www.ncrc-ghana.org/
11-Mar-11	Nature Conservation Research Center	Martin Yelibora	Capacity-building Coordinator	233-21-231765	info@ncrc-ghana.org	www.ncrc-ghana.org/
11-Mar-11	The Katoomba Group	Rebecca Ashley Ashare	Coordinator West Africa Katoomba Grp.	+233 24 370 9369	rebashley@yahoo.com	www.katoombagroup.org
12- Mar-11	**Team Departs from Ghana (last date, various team members depart various dates)**					

APPENDIX 2. TEAM MEMBERS

Name	Role	Background
Frederick Armah	In-Country Coordination, Resource Specialist	BS (Hons) Chemistry, University of Cape Coast, Ghana 2000 MS Environmental Studies and Sustainability Science, Lund University, Sweden, 2008
Steve Brady	Team Leader	BS Forestry, University of Idaho 1973 BA Physics, University of Idaho 1973 US Forest Service 1970-2010: Forester, District Ranger, Forest Resource Staff Officer
Dr. Susan Charnley	Climate Change, Social Scientist	PhD Anthropology, Stanford University, 1994 MA Anthropology, Stanford University, 1989 BA Biology, University of California, Santa Cruz, 1981 BA Environmental Studies, UC Santa Cruz, 1981 US Forest Service, 1999-present: Research Social Scientist, National Program Leader for Human Dimensions
Joe Krueger	ETOA Specialist	B.S. Forestry, Cal Poly, 1990 US Forest Service, Environmental Planning Specialist, 1988-present
Yaw Nyako	In-Country Coordination Resource Specialist	B.Sc. Natural Resources Management, Kwame Nkrumah University of Science and Technology, 1997 M.Sc. Forest Science, Kochi University, 2007
Sophia Polasky	Climate Change, Social Scientist	B.A. Environmental Studies, College of St. Benedict 2006 Peace Corps Ghana, 2006-2008: Agro-forestry US Forest Service, 2009-present: Research Technician, Pacific Northwest Research Station,
Dr. John Stanturf	Climate Change, Group Leader	B.S., Plant and Soil Science, Montana State University, 1974 M.S., Soil Science, Cornell University, 1979 Ph. D., Forest Soils, Cornell University, 1983 Lady Davis Post-Doctoral Fellow, Technion, Haifa, Israel 1982-1983 Honorary Doctorate, Estonian University of Life Sciences, Tartu 2011 US Forest Service 1992-present, Research Ecologist
Dr. Melvin Warren	Climate Change, Research Biologist/Fisheries/Aquatic Ecology	B.S. Zoology, University of Tennessee 1974 M.S. Wildlife and Fisheries Science, University of Tennessee 1977 Ichthyologist and Project Coordinator, Kentucky Nature Preserves Commission, 1978-83 Ph.D., Zoology, Southern Illinois University, 1989 Post-doctoral Research Associate, Department of Fisheries and Wildlife Sciences, Virginia Tech, 1991-1992 US Forest Service 1992-2011: Research Biologist and Team Leader, Aquatic and Terrestrial Fauna Team

APPENDIX 3. SCOPE OF WORK

SCOPE OF WORK

February 7, 2011

USAID/Ghana

ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT (ETOA) WITH AN EMPHASIS ON TROPICAL FORESTRY, BIODIVERSITY CONSERVATION, WATER AND CLIMATE CHANGE VULNERABILITY AND ADAPTATION

1. PURPOSE

The purpose of this work is to deliver to USAID/Ghana a countrywide Environmental Threats and Opportunities Assessment with focus on Tropical Forestry and Biodiversity Conservation, Climate Change Vulnerability and Adaptation and Water that will constitute the Environmental Annex required in the Mission's Country Development Cooperation Strategy (CDCS). The last comparable Assessment of USAID Ghana was conducted in 2006 and focused mainly on tropical forests and biodiversity, with little emphasis on water resources management, climate change vulnerability and adaptation. Likewise, the ETOA will help identify concrete opportunities for incorporating and investing in natural resource management, including water, and climate change resiliency programming in the Feed the Future and other sectors of the USAID/Ghana portfolio as cross-cutting issues. The emerging oil and gas sector in Ghana also poses environmental challenges important to evaluate.

2. BACKGROUND AND JUSTIFICATION

2.1 Geography

The two major biomes represented in Ghana are the tropical forests (comprising various associations) and the savannas. The southern half of the country supports the closed forest while the northern half supports savanna vegetation. The closed forest, sometimes referred to as the high forest, is made up of different types of forest ranging from the wet evergreen, which experiences high amounts of rainfall throughout the year, to the dry semi-deciduous type which experiences low amounts of rainfall distributed only at certain times of the year and a well-defined dry season. The wet evergreen forest type, where rainfall averages 2000 mm. is found in the south-western corner of the country. Rainfall generally decreases from this forest type towards the north.

The moist semi-deciduous forest type averages 1,500 mm rainfall a year and there is also a more clearly defined dry season. This forest type may be divided into a north-western sub-type and a south-eastern sub-type. Together, these two sub-types contain most of the country's valuable timber species including the redwoods, the mahoganies and the cedars. A dry semi-deciduous forest type bordering the Guinea savanna may receive between 1,000-1,500 mm of rainfall a year and has a pronounced dry season with its associated high temperatures.

The greater part of the country is covered by savanna vegetation. Two (Guinea savanna and Sudan savanna) of the three major types of savanna are represented in Ghana. The Sahel savanna with much drier conditions is not represented in the country. The Guinea savanna occupies an area of about 148,542 square kilometers, and is further divided into two sub-divisions, northern and southern types, based on floristic composition. The Sudan savanna lies to the north of the Guinea savanna and is limited to the Navrongo-Bolgatanga-Bawku corridor, an area of about 1,955 square kilometers.

In addition to the two major biomes, other minor vegetation types are found in the southern part of the country. There is the coastal savanna, usually referred to as the Accra-Winneba Plains, in the south-eastern part of the

country, the coastline vegetation along the seashore, and the mangrove vegetation of the lagoons and estuaries distributed all along the coasts of Ghana, from Cape Three Points in the south-western part of the country to Denu in the south-eastern corner of the country.

2.2 Justification for this work: Updating the ETOA and revisiting the U.S. Foreign Assistance Act (FAA) Section 117/118/119 analyses are justified by three reasons:

1. The first reason is related to the **strategic and operational planning process** requirements. The ETOA is a useful programming tool which will help USAID/Ghana to update its data and assumptions on the status of the environment in Ghana as a whole and better integrate environmental concerns into its overall programming, annual operational planning process, and long-term strategic planning. The ETOA will facilitate donor collaboration as it will help USAID understand its comparative advantage vis-à-vis other donors and partners. It will also point to priorities for environmental impact analyses of both existing and planned USAID-funded programs.

2. The second reason is linked to the **environment requirements.** The core environmental requirements of USAID operating unit strategic plans are spelled out in 201.3.4.11.b Technical Analysis for Strategic Plans, Environmental Analysis, and are derived from provisions of the Foreign Assistance Act (FAA) of 1961:FAA 117 on "*Environment and Natural Resources,"* dictates that operating units will implement their programs with an aim toward maintaining (and restoring) natural resources upon which economic growth depends, and to consider the impact of their activities on the environment. USAID/Ghana recognizes that protection of the environment and wise management of the natural resources base are absolute requirements of any successful development program.

   Sections 118 *"Tropical Forests"* and 119 *"Endangered Species"* of the FAA codify the more specific U.S. interests in forests and biological diversity. These two provisions require that all USAID Missions conduct a periodic country analysis of the conservation and sustainable use of tropical forests and biological diversity. Specifically, FAA Sections 118 and 119 require that all country plans include: (a) an analysis of the actions necessary in that country to achieve conservation and sustainable management of tropical forests (118) and conserve biological diversity (119); and (b) the extent to which current or proposed USAID actions meet those needs. By mandating these analyses, Congress is recognizing the fundamental role that tropical forests and the conservation of biodiversity play in sustainable development.

   The legal requirements for environmental analysis are reflected in USAID's *ADS Chapter 204 "Environmental Procedures,"* which provides essential procedures and policy on the application of *22 CFR Part 216.* This regulation codifies the Agency's procedures "to ensure that environmental factors and values are integrated into the USAID decision making process." Further, 22 CFR 216.5 requires USAID operating units to conduct their assistance programs in ways that are sensitive to the protection of endangered or threatened species and their critical habitats.

3. The third reason concerns the **new developments** in Ghana's environmental context which need to be taken into consideration:

- An emerging oil and gas sector poses risks to the environment. The Jubilee oil field, discovered in 2007, holds an estimated 1.8 billion barrels of oil, and is forecast to produce around 55,000 barrels per day in early 2011. Oil production is expected, however, to rise to about 120,000 barrels over the coming months, making the country Africa's seventh largest oil producer. Ghana's government has not created new laws, regulations and institutions adequate to handle the billions of dollars in new investment. There is no National Petroleum Policy in place or a clear policy statement regarding oil and gas which would include discussion of environmental standards.

- Ghana has made remarkable progress in developing other environmental policies, but in spite of the existence of a number of institutions and departments, biodiversity management and conservation has been far from satisfactory (USAID, 2006). A major constraint has been the lack of coordination, collaboration and networking between and among policy-developing institutions on one side and policy-implementing institutions on the other side. The consequences have been overlaps, duplications, conflicts, unhealthy

competitions, disharmony, etc. Furthermore, there are undeniable weaknesses in the capacities and capabilities of some institutions and deficiencies in information management. In 2005 there was almost no resource management planning at any level (national, regional or community).

- Two key natural resource management issues in Ghana as of 2005 were deforestation and land degradation linked particularly to inappropriate farming practices and unplanned, unsustainable agricultural expansion. Related to these issues are the lack of enforcement of policies and the need for increased involvement of local communities.
- The major categories of land use in Ghana include agriculture, forestry, gathering forest resources, urban development, mining, tourism, transportation and infrastructure, energy, grazing and fishing. These categories of land uses have varying degrees of effect on biodiversity depending on the extent of macro/micro-habitat modification, technologies employed and the possibility of species introductions. Wilcock et al. (2003), in their assessment did not identify insurmountable problems in the areas of natural resource and environmental management in Ghana. However, it is also quite evident that the GOG and its development partners need to devote greater resources to protecting and enhancing Ghana's natural resource base for use by future generations (USAID, 2006).
- The role played by local community participation and traditional knowledge in resource use and biodiversity conservation, are recognized as a first step towards ensuring the implementation of policies and programs. Another innovative step that has been taken by the GoG is the development of an environmental education strategy being implemented under the leadership of the Environmental Protection Agency (EPA). Ghana also works with the convention secretariats and the multilateral and bilateral development institutions such as the World Bank, International Monetary Fund and the African Development Bank in various programs aimed at the sustainable development of the county's natural resources.
- Ghanaian engagement with the World Bank Forest Carbon Partnership Facility (FCPF) will include the implementation of the Ghanaian REDD readiness plan through development of a Readiness Preparation Proposal (R-PP). This R-PP should address the broad range of activities that have occurred in Ghana related to the forest sector, and which activities resulted in effective actions in relation to the overall impact on forests -- as well as the relationship of other sectors such as agriculture to the forest sector (USFS, 2011). Under the guidance of the USFS, a team of consultants consisting of one expatriate and two Ghanaians will study lessons learned from forest sector projects in Ghana over the past 25 years. The development of this report shall include a series of consultative meetings with key stakeholders of the Ghanaian forest sector.
- USAID/Ghana's new Country Development Cooperation Strategy is expected to incorporate existing and planned new initiatives and/or focus on food security, global health, global climate change, and governance. An ETOA, beyond the scope of the required 118/119, including climate vulnerability and a broader review of other key environmental issues affecting Ghana's resource base (including land, water, and energy) and potential linkages with the Mission's portfolio will be very useful for strategic planning and programming.
- The ETOA should give special attention highlighting issues and making pragmatic recommendations for integrating climate change adaptation, environmental, and conservation-related activities into an expanded USAID food security/agriculture program (as described in the Mission's Feed the Future multi-year strategy). This should include attention to key land tenure and property rights issues.

Identify and promote cross-sectoral linkages: Environment and natural resource issues are fundamentally linked to all development sectors. Therefore, this analysis will proactively examine linkages across USAID/Ghana's proposed CDCS portfolio with the intent to highlight potential entry points for incorporation of environmental management issues to enhance results across the Mission's integrated strategy. Cross-cutting themes/issues (such as nutrition, gender, land tenure, property rights and governance) identified by the Mission will also be examined for linkages with environment and natural resource issues.

3. USAID PROGRAMS IN GHANA

USAID/Ghana is currently developing a new Country Development Cooperation Strategy (CDCS) that will cover fiscal years 2012-2016. The CDCS outlines multi-year Development Objectives, Intermediate Results, and notional resource levels that will inform other planning and reporting processes. The new strategy being designed will build on USAID/Ghana's investments and achievements in its four current Assistance Objective (AO) areas which include Economic Growth, Health, Education, and Democracy and Governance. It will also reflect USAID Agency and Government of Ghana (GoG) priorities as reflected in the USAID Forward strategy and Ghana's Medium-Term Development Strategy (also known as the Ghana Shared Growth and Development Agenda - GSGDA), respectively.

Under USAID/Ghana's current 2006-2011 Strategy Statement, the Mission'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 2006-2011, USAID/Ghana has addressed these goals through four Strategic Objectives (now referred to as "Assistance Objectives"): Democracy and Governance, Economic Growth, Health, and Basic Education.

In FY 2012, U.S. assistance to Ghana will focus on consolidating democratic gains and sustaining the impact of significant U.S. investments under the President's Feed the Future (FtF) Initiative, Global Health Initiative (GHI), and Global Climate Change (GCC) Initiative, as well as the Millennium Challenge Corporation (MCC) Compact. The USAID program is expected to improve access to quality healthcare and education, support comprehensive agriculture-led economic growth strategies, and strengthen democratic institutions. The broad U.S. foreign policy goal is to help Ghana serve as a model and a catalyst for good governance and development in Africa and sustain its middle-income status by 2015. New programs will build on the successful performance of current and ongoing projects.

Current USAID/Ghana Assistance Objectives include:

Governing Justly and Democratically
The Democratic Governance Assistance Objective is defined as a program to "Strengthen Democratic and Decentralized Governance through Civic Involvement". USAID supports Ghana's efforts to consolidate democracy by strengthening civic participation in democratic processes and ensuring that local and national governments are responsive to the needs and interests of citizens. Ghana's decentralization efforts coupled with strong citizen participation will provide the foundation for better delivery of services. USAID programs ensure that local activities are harmonized with central government policies and that local governments increase their capacity to plan, budget, and implement effectively with citizen input. USAID also continues to enhance civil society's capacity to advocate and engage with government. USAID is undertaking initiatives in the Western Region that will be especially critical as oil and gas production will require heightened attention by local government.

Economic Growth
The current Economic Growth Assistance Objective is "increased competitiveness of Ghana's private sector in the global marketplace of goods and services, as measured by Ghana's share of world trade". Enhancing food security is the primary objective of the USG's economic growth assistance to Ghana, highlighted by Ghana's selection as a Feed the Future (FtF) Initiative country. By signing the Comprehensive Africa Agricultural Development Program (CAADP) Compact in FY 2010, Ghana became the first country in West Africa to commit to this formal set of goals and principles for achieving poverty reduction via accelerated agricultural investment and growth. USAID has played a leading role in building consensus around agricultural development and food security in Ghana. In coordination with the MCC program, USAID agricultural interventions increase agricultural productivity through the transfer of improved technology and management practices and increased access to finance and other business services. In collaboration with other USG agencies, USAID has submitted for approval a multi-year FtF strategy to further help Ghana attain its overall agricultural and food security objectives. USAID programs will focus on a set of interventions aimed at accelerating the competitiveness and growth of key value chains and enhancing the nutritional status and incomes of vulnerable populations.

Marine fishery products provide the main source of animal protein for more than 60 percent of the Ghanaian population and the source of livelihood for several hundred thousand poor households – and are particularly important for women's livelihoods. Fisheries stocks are being depleted and the GoG has made a commitment to improving the policy that governs the management of this critical resource. In FY 2010, USAID's integrated fisheries and coastal governance initiative completed a participatory survey of Ghana's Western Coast that identified the social, economic, and governance issues that negatively impact coastal marine resources and created coalitions necessary to improve marine fisheries management.

Ghana's June 2007 discovery of oil in commercial quantities provides the country with a possible revenue stream that could rapidly accelerate growth and move Ghana towards middle-income status. In FY 2010, USAID provided capacity-building and advisory services to the GoG in the oil, gas, and power sectors. This technical assistance reinforces the capacities of the GoG in defining and conducting institutional, regulatory, and commercial strategies in the development of these sectors. USG assistance has contributed to the creation of a gas master plan and alignment of Ghanaian oil and gas laws and regulations with international standards.

Health
USAID/Ghana's Health Assistance Objective is defined as a program that "ensures continued and increasing impact on improving health status while addressing issues of sustainability". The Health program provides technical and financial resources to address family planning, reproductive health, HIV/AIDS, maternal and child health, malaria, tuberculosis, water and sanitation and nutrition. It focuses on three regions to address weaknesses in service delivery and system performance. This AO aims to improve the health status of Ghanaians by reducing total fertility and under five mortality rates, and reducing HIV/AIDS prevalence. These results will be achieved together with USAID/Ghana's main partners, i.e., the Government of Ghana, other donors and implementing agencies. The health team is working on the BEST and Feed the Future (FtF) nutrition strategies, and already has in place the President's Emergency Plan For Aids Relief (PEPFAR) and Presidential Malaria Initiative (PMI) strategies.

Education (SO 8)
The Basic Education Assistance Objective is defined as a program that "improves the quality of, and access to, Basic Education". The purpose of this AO is to assure that Ghana's education system is able to reach a larger proportion of primary school-age children, and to assure that they read with understanding and acquire numeracy skills. The goal of the USAID Basic Education program is to ensure that at the end of primary school, children read with understanding and transition to junior high school. In FY 2010, USG activities included: 1) improving the quality of literacy instruction; 2) supporting retention of marginalized populations in school; 3) strengthening management capacity and systems for education delivery; and 4) building community capacity to advocate, contributing to student and teacher performance.

4. STATEMENT OF WORK

The assessment team shall develop report which will address the following three tasks:

4.1. Task Number 1: State of the Environment Report

This task should address the following areas of interest:

- Identify the underlying causes of environmental degradation and suggest strategic options to address them.
- Identify and describe approaches and interventions by all institutions (e.g., Government of Ghana, NGOs, private sector) and results (if any) under given enabling conditions, including the effectiveness of the existing legal and regulatory environment to enable effective environmental management.
- Analyze opportunities and constraints associated with all environmental elements (e.g., coastal management, forestry resources).
- Identify the potential impacts on marine flora, fauna and ecosystems as a result of oil and gas exploration.
- Identify, analyze and extrapolate ongoing trends in and/or affecting fisheries, including constraining and enhancing factors.
- Identify the key challenges, threats to and opportunities for maintaining the sustainability of marine fisheries, and identify options for addressing these challenges and threats.

- Identify the impact agricultural and mining activities on surface and groundwater resources.

The State of the Environment Report should provide information on:

- The major ecosystem types and protected areas in Ghana.
- Threats to ecosystems, including terrestrial, aquatic, coastal, wetlands and marine areas.
- Environmental and natural resource hazards and degradation (urban and rural).
- Environmental and other policies impacting natural resources and ecosystems.
- Institutions in the environment sector and affecting environmental status
- Underlying causes of environmental degradation .
- Approaches and interventions used by all institutions (e.g., NGOs, government, private sector) and results obtained under what enabling conditions including the legal and regulatory environment.
- Opportunities and constraints associated with all environmental elements (e.g., coastal management, water, forestry resources).
- Indicators of environmental damage/health and potential monitoring systems.
- Key links between economic growth, health and governance activities and environmental threats and opportunities.
- Recommendations for effecting improvements in the current system/institutional arrangements for environment management (including coastal zone land-based and marine resources).
- Recommendations for environmental management options to improve sustainable agricultural productivity and prevent environmental deterioration.

4.2. Task Number 2: Tropical Forests and Biodiversity Report (FAA Sections 118/119)

As required under the Foreign Assistance Act (Section 118 and 119), the assessment must include:

- A concise evaluation of the countrywide status of biodiversity and tropical forest resources, focusing on management issues and required actions for conservation; and
- Identification of the extent to which these required actions for conservation are satisfied by the current or proposed Mission programs.

The Tropical Forests and Biodiversity Report should provide information on the following:

- For each sector in which USAID/Ghana is working, describe what actions are being taken/proposed that have an effect on the conservation of biodiversity and Tropical Forests and propose, where appropriate, actions that could improve conservation of biodiversity and/or tropical forests.
- Identify USAID's comparative advantage to address biodiversity and tropical forestry issues vis-à-vis other donors and partners.
- Describe biodiversity trends in Ghana associated with its management, biophysical condition, productivity and diversity.
- Identify and analyze key threats to biodiversity (e.g., pollution, on land and off-shore), policy environment, bushmeat consumption and markets, unsustainable timber extraction, plantation incursion into natural forests). The more noteworthy natural resources include: wildlife; forests and woodlands; marine and coastal systems; freshwater systems including shared watercourses, wetlands, rivers and lakes; soils (fertility and stability) as related to agricultural systems and other forms of land clearing; and energy resources such as biomass.
- Provide information regarding threatened and endangered plant and wildlife species in Ghana and activities underway and planned to protect these species.
- Identify and describe recent, current and planned conservation efforts in Ghana.
- Describe the scope and effectiveness of existing and past conservation efforts.
- Describe the relationship between biodiversity and agriculture-both as an opportunity to conserve biodiversity (e.g., sustainable tree crops) and as cause of biodiversity loss (e.g., unsustainable agricultural expansion, inappropriate land use, land tenure, and property rights incentives).

- Describe the relationship between biodiversity and other rural and off-shore development activities underway or planned (e.g., agriculture, forestry, mining, energy, coastal development, infrastructure development, policy reform). Identify opportunities to integrate biodiversity conservation into activities that the Mission is planning.
- Provide information regarding the effectiveness of government management authorities that are responsible for tropical forests and biodiversity in Ghana.
- Describe the legal and regulatory environment in Ghana and its implications for sound environmental management.
- Analysis of the current legislation and policies related to the environment, forestry, and biodiversity. This section should include identification of laws and policies related to protection and management of biological resources and endangered species. It should also point out any differences in laws and policies that require further harmonization. This section should also review international treaties signed and ratified, as well as those that Ghana needs to sign in order to conserve and manage its biological resources more efficiently.

4.3. Task Number 3: Climate Change Vulnerability and Adaptation Assessment Report

The team shall analyze climate change vulnerability and adaptation challenges with respect to land, water and forest resources, agriculture, energy, human health, human settlements, biodiversity, and coastal zone resource management (including marine fisheries and coastal land-based resources). The team shall also analyze the country's climate change policies, strategies and programs, and the outcomes and lessons learned from past and ongoing climate change programs in Ghana, including work supported by bilateral and multilateral agencies and donors. Special account should be taken of the USAID/West African Facility for Low-Carbon and Climate-Resilient Development, under design. This facility should be in a position to benefit the Mission and Ghana in specific services and information access. [Contact the USAID/EGAT GCC team].

This work shall be conducted to meet the following objectives:

- Identify the key land use, energy and climate change issues in Ghana
- Identify climate change vulnerabilities and adaptation challenges with an emphasis on ecosystems and biodiversity
- Identify the potential impact of climate change on surface and groundwater resources
- Assess status of REDD+ efforts in Ghana (GoG, Donor, NGO, Private Sector)
- Recommend options for future USAID programming (identifying opportunities for adjusting existing USAID/Ghana activities and building appropriate interventions into new programs) aimed at addressing the key challenges identified during the assessment, describing how and to what extent those actions may contribute to tackling such challenges.

This section of the report should provide information on the following.

- A description and analysis of present vulnerability, including representative vulnerable groups (for instance specific livelihoods at-risk of climatic hazards, and most vulnerable geographic zones)
- Descriptions of potential vulnerabilities in the future, including an analysis of pathways that relate the present to the future
- Identify mitigation measures being undertaken
- Identify mitigation options for climate change through natural resource management
- Propose suitable adaptation measures to offset adverse consequences
- Describe climate change policy framework in Ghana and determine policy implications of the estimated impacts of climate change
- Describe the state of Ghana's REDD +_Framework, policy and institutional capacity. What policies exist, what is the capacity of lead institutions, is there a national Monitoring Reporting and Verification (MRV) system in place? What is the extent of other donor investments/programs in REDD+
- Describe how climate change adaptation and mitigation interventions can be integrated into USAID programs, particularly and with as much geographic specificity as possible within its agriculture/food security (Feed the Future) and energy programs.

4.4. Data collection

4.4.1. Pre-travel informational meetings and information gathering.
Prior to traveling to the field, the assessment team is expected to:

- Gather and get acquainted with existing background information on Ghana such as the country's natural resources, geographical, ecological and biological specificities, current status of environment and biodiversity, institutional organization on entity and state level, key stakeholders and donors in environment and biodiversity, legislation related to the environment and biodiversity, and other relevant information required for the country assessment.
- Meet or speak with key stakeholders or managers at the World Bank, USDA Forest Service, and U.S.-based organizations, international conservation nongovernmental organizations such as Worldwide Fund for Nature, Conservation International, Flora and Fauna International that have been active in West Africa.
- Hold meetings with the Bureau Environmental Officer (BEO) and the Bureau Environmental Advisor (BEA) in the USAID Bureau for Africa and relevant EGAT/NRM staff to ensure full understanding of USAID environmental procedures, the role of the regional bureau in environmental compliance, and the purpose of this assignment.
- Hold a meeting with US Department of State, Office of Global Change and USAID/EGAT/ESP Global Climate Change Team to gain an idea of possible USG Climate Change activities in Ghana, the latest strategy for conducting climate change vulnerability analysis, and inter-agency coordination/collaboration potential.

4.4.2. After arrival in the field
The field team will conduct an overview and general analysis of the country's environment, forestry and biodiversity and their current status. Upon arriving in Ghana, the team will:

- Meet with USAID/Ghana to get a solid understanding of Mission program goals and objectives under its current strategy and evolving plans and programming; perspectives of this assignment and specific interests for the team, including advice and protocol on approaching USAID partners and host country organizations with respect to this assignment. The team shall be aware of sensitivities related to an assessment exercise (i.e., the potential for raising expectations, and the need to be clear about the purpose of the assessment) and respect Mission guidance. The team will discuss organizations to be contacted and any planned site visits with the Mission and coordinate as required.

- Hold meetings with Government of Ghana agencies, civil society organizations, and donor organizations including but not limited to DfID, World Bank, and the African Development Bank.
- Hold meetings with relevant actors concerning climate change issues including REDD activities and climate change mitigation and adaptation projects.
- Conduct at least two priority site visits which would supplement understanding of USAID's programs and environment and biodiversity issues that arise in interviews and literature or would confirm information in previous assessments. The site(s) for field visits will be determined by the team prior to the assessment in consultation with USAID.

4.5. General Guidance for the Final Report

This report will provide details on the threats and opportunities and major participants in the environment, biodiversity and forest conservation sectors of Ghana, as well as information on current U.S. Foreign Assistance and USAID programming, with recommendations on actions necessary to conserve environment, forests and biodiversity. This document would contribute to meeting the legal requirements of FAA 118/119. It shall include, *inter alia*, the following (see also specific task descriptions above):

- The current status of environment, biodiversity and tropical forests in Ghana based on current and available information. At the environment level, the report will document the state of key natural resources by quantifying trends in their management, biophysical condition, productivity, abundance, and distribution and by identifying threats (*e.g.*, degradation, depletion, pollution) to which they are subjected. The status of biodiversity will include major ecosystem types, highlighting important, unique aspects of the country's biodiversity, including important endemic species and their habitats, genetic diversity, agricultural

biodiversity, ecological processes and ecosystem services, and values and economics of biodiversity and forests.

- A map of potential natural vegetation and of land use or land/forest cover should be provided if available.
- Environmental issues should be identified such as pollution (on land and off-shore), bushmeat consumption and its resultant markets, unsustainable timber extraction, plantation incursion into natural forests, The more noteworthy natural resources include: wildlife; forests and woodlands; marine and coastal systems; freshwater systems including shared watercourses, wetlands, rivers and lakes; soils (fertility and stability) as related to agricultural systems and other forms of land clearing; and energy resources such as biomass.
- Opportunities to link environment subsectors (e.g., forestry, water resources, land) to existing or planned Mission activities (e.g., economic growth, education, health, agriculture, energy) should be explored.
- Identify USAID's comparative advantage to address biodiversity and tropical forestry issues vis-à-vis other donors and partners.
- Descriptions of natural areas of critical importance to biodiversity conservation, such as forests and wetlands critical for species reproduction, feeding or migration, if relevant. Particular attention should be given to critical environmental services and non-commercial services they provide (watershed protection, erosion control, soil, fuel wood, water conservation and amenity and recreation). It will also summarize how current land tenure arrangements affect conservation in Ghana.
- Describe the relationship between biodiversity and agriculture as an opportunity to conserve biodiversity (e.g., sustainable tree crops) and as cause of biodiversity loss (e.g., unsustainable agricultural expansion, inappropriate land use, land tenure, and property rights incentives).
- An overview table and map of the status and management of protected area system in Ghana including: an inventory of all declared and proposed areas (national parks, wildlife reserves and refuges, forest reserves, sanctuaries, hunting preserves and other protected areas).
- The inventory will identify the institution responsible for the protection and management of each decreed area, its date of establishment, area, and the protection status of each (i.e., staff in place, management plan published, etc.) In addition to this summary of the current protection and management status of each protected area, an overview of the major threats and challenges facing protected areas in Ghana including vulnerability of areas to predicted changes in climate, and a brief summary of any recognized economic potential of these areas (including productive assets, environmental services and recreation and tourism opportunities) should be provided. Descriptions of plant and animal species that are endangered or threatened with extinction. Endangered species of particular social, economic or environmental importance should be highlighted and described, as should their habitats. Technical information resources such as the IUCN red list and their websites should be referenced for future Mission access as required. This section should not emphasize species counts, but look at the relation of endangered species and important habitat conservation areas and issues, and evaluate the pressure on those areas, including vulnerability to predicted changes in climate, and current efforts to mitigate pressures, including the participation and compliance with CITES and other international efforts.
- Recent, current, and potential primary threats to environment and biodiversity, whether they are ecological (i.e., fire, pests), related to human use (i.e., agriculture, pollution contamination), or institutional (i.e., failed policy) or trans-boundary issues, as appropriate. These should emerge from a general assessment of national policies and strategies and their effectiveness, issues related to institutional capacity, trade, private sector growth, participation in international treaties, and the role of civil society.
- Conservation efforts, their scope and effectiveness. This section also should include recent, current and planned activities by donor organizations that support biodiversity and tropical forestry conservation, identification of multilateral organizations, NGOs, universities, and other local organizations involved in conservation, and a general description of responsible government agencies. A general assessment of the effectiveness of these policies, institutions, and activities to achieve biodiversity conservation should be included. Priority conservation needs that lack donor or local support should be highlighted.
- Analysis of the current legislation and policies related to the environment, forestry, biodiversity, and climate change. This section should include identification of laws and policies related to protection and management of biological resources and endangered species. It should also point out any differences in laws and policies that require further harmonization. This section should also review international treaties signed and ratified, as well as those that Ghana needs to sign in order to conserve and manage its biological resources more efficiently.

- An overview of the major environment, biodiversity and tropical forest conservation activities of the commercial private sector to identify ways to better foster private sector alliances. Of interest are the norms and standards followed by those commercial entities (including large commercial farms) most engaged in management and use of Ghana's natural resources. Consideration of policies promoted by the key relevant governmental ministries should also be included.
- An overview of climate change activities in Ghana: past, present and future. How they affect the development and conservation environment, strengths and weaknesses, gap analysis, REDD activities, potential synergies with USAID programming, opportunities for intervention for USAID and other donors, strategies to address climate vulnerable areas, etc.. A description and analysis of present vulnerability, including representative vulnerable groups (for instance specific livelihoods at-risk of climatic hazards). Descriptions of potential vulnerabilities in the future, including an analysis of pathways that relate the present to the future. Identify mitigation measures being undertaken. Propose suitable adaptation measures to offset adverse consequences. Describe climate change policy framework in Ghana and determine policy implications of the estimated impacts of climate change. Describe how climate change can be integrated into USAID programs, particularly its Feed the Future, energy, and coastal resource management initiatives.
- A brief overview and recommendations for environmental concerns related to USAID's health program (DDT, medical waste, condoms, etc). As the most significant portion of USAID's programming in Ghana, the health portfolio represents a not insignificant area in which USAID can affect the environment. This should include an analysis of how climate change variation might affect the health sector (drought, famine, flood, malaria outbreaks, etc) so that USAID/Ghana can better prepare its programs to adapt to these changes.
- An assessment of how USAID's programs and operational plans meet the needs for environment, biodiversity and tropical forestry conservation, and climate change consistent with Mission program goals and objectives, through strategic objectives. The assessment shall include recommendations on where U.S. comparative advantages and capabilities are likely to have the greatest impact. These issues and recommendations should be prioritized to identify those requiring the most immediate attention. This section shall identify opportunities and entry points for USAID/Ghana efforts that would positively influence the conservation of the environment, tropical forests and biodiversity and improve environmental management. Particular focus should be made on activities that hold the greatest potential for scalable positive impact, are commercially viable (sustainability), occur in population-dense areas (affect the most people possible), have market access (make use of the road networks), and have potential to contribute to sustainable agricultural sector growth and improved food security.
- A brief section of how USAID/Ghana could expand its inter-governmental collaboration and cooperation through other USG agencies (USFS, Dept State, USFWS, USGS, etc) in the areas of climate change, water, biodiversity, forestry, and conservation.

4.6. Illustrative Outline:

a) Introduction, describing the biophysical/human/economic contexts, environmental laws, policy and institutions, overview of environmental programs and initiatives, and the purpose of the present review
b) An overview of the state of the natural resources, including forests and terrestrial biodiversity, aquatic ecosystems, and agricultural resources
c) An analysis of past and current initiatives in Ghana
d) Climate Change Vulnerability and Adaptation
e) Opportunities and entry points for USAID/Ghana, including integrated threats analysis, optimal potential results areas, analysis of legal requirements under the FAA, interventions of other donors, recommendations of environmental experts and recommendations of opportunities and entry points.
f) All references used and cited in the report, including Web URLs, people consulted, and their institutional affiliation, endangered and protected species and authors' biographical data. Other references such as the SOW for the analysis, other background or supporting material, including maps and photographs should be included. Copies of key document, maps and images, and copies of photographs obtained during the assessment should also be appended in a CDROM with electronic versions of written materials.

5. EXPERTISE REQUIRED

An 8- person team with the following composition and expertise is required to conduct this analysis:

- **International Technical Assistance (6 persons):**

The international technical assistance team will include: Team Leader/Natural Resource Management Specialist, Environmental Policy Specialist, Climate Change Mitigation and Adaptation Specialists (2), and Social Scientists (2). Each team member is expected to spend about two weeks in Ghana within the period on/about February 21-March 11.

The combined team will have the following requisite expertise and skills:

- Senior Level Natural Resources and Environmental Management Specialists with post-graduate qualifications in biology, zoology, forestry or closely related field in natural resource management (including water), land tenure and property rights or natural resource economics.
- Senior Level Climate Change Mitigation and Adaptation Specialists with post-graduate qualifications in forestry, anthropology, zoology, conservation biology, or closely related field in natural resource management or natural resource economics.
- Background in tropical biodiversity and natural resource conservation.
- Knowledge of USAID Strategic Planning process related to related to Environmental Threats and Opportunities Assessment and Tropical Forestry and Biodiversity (FAA Sections 118 and 119).
- Knowledge of 22 CFR 216 and of FAA 117 is also desirable.
- Significant experience in integrating health, water, environment, population and poverty reduction issues is desirable.
- Demonstrated expertise in assessing development programs for impacts on environment and tropical ecosystems.
- Demonstrated expertise in the design and production of environmental impact assessments (EIA).
- Experience in West Africa and in Ghana desirable.

- **Local Technical Assistance (**2 **persons)**

  - Senior Level Natural Resource and Environmental Management Specialist (1) and Environmental Policy Specialist (1) with combined demonstrated experience in Ghanaian environmental law, the policy and legal frameworks governing environmental management and biodiversity/forestry conservation in Ghana and the analysis of relevant policies.
  - Good contacts within Ghana government agencies, NGOs, international donors, and private sector. Proficiency in English.

6. DELIVERABLES

The main deliverable is an Assessment Report (40 to 60) pages without appendices) for USAID/Ghana that examines the environmental threats and opportunities, the biodiversity and the tropical forests conservation and other management related issues and identifies contributions and/or potential contributions to meeting identified conservation needs by the Mission's programs. Other deliverables are the following:

- Work plan/schedule within two working days of start date.
- Oral debriefing within five working days preceding the departure date. The team shall meet with USAID/Ghana to provide them with a brief of the report findings. The exit brief shall be accompanied by a short written summary of initial key findings and recommendations.
- Following a two-week comment and review period, a revised final report incorporating all comments will be submitted within four weeks of the field work.
- Five copies of the bound final draft will be made available when the final is approved by the Mission.
- A short (10 pages) Environmental Annex to Annual Operational Plans, which consists of a summary and syntheses of the findings and recommendations of the full ETOA and FAA 118-119 analysis. The introduction to the Summary will include this statement: "The Environmental Annex is an analysis that examines environmental threats and opportunities inherent to the Mission's strategy and assesses the extent to which the Mission's strategy incorporates or addresses tropical forests and biodiversity concerns. This

assessment does not substitute for the Initial Environmental Examination (IEE). The Mission is responsible for ensuring that an IEE or a Request for a Categorical Exclusion is conducted for all activities funded by USAID."

8. ANTICIPATED LEVEL OF EFFORT

The consultancy will be carried out within the period of February 15, 2011 through April 30, 2011. A total of about 22 days will be in-country, 25 days preparation and wrap-up, and 4 days travel. The international consultants will oversee the work of the local-hire consultant. The international consultants will work under the technical direction of the USAID/Ghana Economic Growth Team Leader. The Bureau Environmental Officer, Senior Regional Environmental Officer based at USAID/West Africa, and the Mission Environmental Officer will have an advisory role.

9. SCHEDULE AND LOGISTICS

The team will coordinate logistical arrangements with the USAID/Ghana Mission Environment Officer. The Mission will assist the team by providing key references and contacts as well as logistical support where necessary. USAID/Ghana's Program Office will also help facilitate meetings with other Mission SO Team Leaders or their staff to fully brief the team on USAID's program and future vision for their strategy. Field work in Ghana will take place from on or about February 21 to March 11, 2011. The report is due within four weeks after the field work.

APPENDIX 4. GHANA'S ENVIRONMENTAL INTERNATIONAL TREATIES AND CONVENTIONS

Definitions used for "Ratification" "Accession" and "Signature" are found at http://www.unicef.org/crc/files/Definitions.pdf

Treaty	Date Ratified Unless Noted Otherwise	Status
1. Convention on Biological Diversity	1994	Action Plan submitted 2002 4th Report Submitted 3/25/09
2. United Nations Convention to Combat Desertification	1996	Report submitted 2004
3. United Nations Convention on Climate Change	1995	Report Submitted 2003
4. Kyoto Protocol to the Framework Convention on Climate Change	2003	
5. Convention on International Trade in Endangered Species	1975	Report submitted in 2008 for 2007
6. World Heritage Convention	1975	2 Sites recorded, 6 Sites submitted
7. RAMSAR Convention on Wetlands	1988	6 Sites, 1 of which is a wildlife reserve
8. Abidjan Convention on Coastal and Marine Environments	1989	Draft Status report on file (EPA)
9. Stockholm Convention on Persistent Organic Pollutants	2003	No report on file for Ghana, reports were due 2007
10. Vienna Convention for the Protection of the Ozone Layer Montreal Protocol London Amendment Copenhagen Amendment Montreal Amendment Beijing Amendment	1989 (Accession) 1989 1992 2001 2005 (Accession) 2005 (Accession)	Reporting data available to 2009

11. Basel Convention on Control of Trans-boundary Movements of Haz. Waste	2003 (Accession)	
12. Bamako Convention Ban amendment to the Convention	2003 (Accession) 2005	 Ban not yet in force
13. International Tropical Timber Agreement	2008 (Definitive Signature)	2006 Agreement not yet in force See more detail below
14. Cartagena Protocol on Bio-safety	2003 (Accession)	Reporting data available (2006)
15. African Convention on the Conservation of Nature and Natural Resources 1968	1969	
16. Revised African Convention on the Conservation of Nature and Natural Resources 2003	2007	Revised Convention not yet in force
17. Memorandum of Understanding concerning Conservation Measures for the West African Populations of the African Elephant	2007 (Signature)	
18. Convention of the Law of the Sea (The Convention, concluded in 1982, replaced four 1958 treaties.)	1983	Ghana declared a reservation from the treaty in 2009. See notes below
19. 1992 Civil Liability Convention (oil) and the 1992 Fund Convention.	2004 (Accession)	
20. Convention on Fishing and Conservation of the Living Resources of the High *Seas*	1958 (Signature)	Replaced by 18. above

Sources are as cited below. Information is as of April, 2011.

Summary of Obligations under the Conventions/Protocols Listed Above

1. Convention on Biological Diversity: Conservation of biological diversity, sustainable use of the components of biodiversity, fair and equitable sharing of benefits from genetic resources (www.cbd.int/) (www.cbd.int/countries/?country=gh) (www.cbd.int/reports/search/)

2. UNCCD: Participants agree to combat desertification through sharing of resources, and adopting of integrated approaches to combat the physical, biological, and socio-economic aspects of the processes of desertification and drought (www.unccd.int/) (www.unccd.int/php/countryinfo.php?country=GHA)

3. UNCCC: Governments participating agree to gather and share information, launch national strategies to address greenhouse emissions including technical and financial support to developing countries, and agree to cooperate in preparing for adaptation to the impacts of climate change (http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php) Ghana's CC Technology Needs and Needs Assessment Report (http://unfccc.int/ttclear/pdf/TNA/Ghana/Ghana%20TNA%20Report%20January%202003.pdf)

4. Kyoto: Sets binding targets for 37 industrialized nations and EU for reducing greenhouse gases (http://unfccc.int/kyoto_protocol/items/2830.php) (http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php)

5. CITES: Governments participating agree to limit trade in listed species of wild plants and animals so as to not threaten their survival (www.cites.org/) http://www.cites.org/eng/resources/species.html)
   - Appendix I includes species threatened with extinction that are or may be affected by trade. Trade in Appendix-I specimens may only take place in exceptional circumstances.

- Appendix II includes species that are not presently threatened with extinction, but may become so if their trade is not regulated. It also includes species that need to be regulated so that trade in certain other Appendix-I or -II species may be effectively controlled; these species are most commonly listed due to their similarity of appearance to other related CITES species.
- Appendix III includes species listed by at least one country.

Ghana's listed species by type (http://www.cites.org/eng/resources/species.html) National Reporting Status, Bi-annual reports of Laws, Initiatives undertaken supporting CITES (none complete) http://www.cites.org/eng/resources/reports/biennial.shtml) National Reporting Status, Annual Reports filed of trade (2 filed) (http://www.cites.org/cms/public/common/resources/annual_reports.pdf)

6. World Heritage Convention: Participating Governments agree to the common importance to all nations of "cultural heritage" sites and "natural heritage" site. Such sites are to be managed under the terms of the Convention where a nation so adopts. Ghana sites submitted 6: http://whc.unesco.org/en/tentativelists/state=gh Ratification history: http://whc.unesco.org/pg.cfm?cid=246 Ghana sites currently on Register: 2., http://whc.unesco.org/en/statesparties/gh

7. Ramsar Convention on Wetlands: Participating Governments agree to maintain the ecologic character of their wetlands of international importance. Body of treaty is found at www.ramsar.org . Sites in Ghana: http://ramsar.wetlands.org/Database/Searchforsites/tabid/765/language/en-US/Default.aspx

8. Abidjan Convention: Participating Governments of West and Central Africa agree to this umbrella agreement for the protection and management of marine and coastal areas. Identifies management issues for cooperative efforts: coastal erosion, special protected areas, combating pollution in emergencies. Provisions for scientific and technological cooperation are established as are issues of liability and compensation. http://www.unep.org/AbidjanConvention/The_Convention/Contracting_Parties/index.asp Draft Status Report: http://www.unep.org/AbidjanConvention/docs/Ghana%20status%20report%20Report.pdf

9. Stockholm Convention: A global treaty to protect human health and the environment from the effects of chemicals that remain intact for a long period of time (Persistent Organic Pollutants (Pops). The agreement contains a list of chemicals agreed upon and the treaty lists specific actions and protocols for the elimination/reduction of these chemicals http://chm.pops.int/Countries/StatusofRatifications/tabid/252/language/en-GB/Default.aspx

10. Vienna Convention/Montreal Protocol/Amendments: The treaty is to protect human health and the environment from human activities which may adversely affect the ozone layer. The Montreal Protocol defines and places controls on productions of specific substances known to deplete the ozone layer. Various amendments have been added to the original conventions Treaty ratification status: http://ozone.unep.org/Ratification_status/ratif_by_country.shtml?cntryname=Ghana&submit_country=Submit+Query Status: http://ozone.unep.org/Data_Reporting/Data_Access/generate_report.shtml?calculated_field=ODS+Consumption&incl_baseline=1&cntry=GH&Yr1=1986&Yr2=2010&all_anxgrp=on&anxgrp=AI&anxgrp=AII&anxgrp=BI&anxgrp=BII&anxgrp=BIII&anxgrp=CI&anxgrp=CII&anxgrp=CIII&anxgrp=EI&summary=0

11. Basal Convention: This agreement limited the trans-boundary transportation and importation of certain hazardous substances into and among the participating Nations in Africa http://www.basel.int/ratif/convention.htm Reporting available as of 2006 http://www.basel.int/natreporting/2006/compI/q3.pdf

12. Bamako Convention: This convention followed the Basal Convention and was a further agreement among the participating nations to limit import of hazardous materials. http://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-3&chapter=27&lang=en

Amendment of the Convention(Ban) to ban certain exports has not yet been ratified by sufficient numbers of nations to be in force. http://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-3-a&chapter=27&lang=en

13. International Tropical Timber Agreement 1994: Participating countries belong to the International Tropical Timber Organization. The current agreement was adopted in 1994 and extended twice to 2006. The Int. Tropical Timber Agreement of 2006 has been negotiated and will replace the 1994 agreement when it enters into force. The 1994 Agreement remains in force until that time. The Agreement both promotes trade and established environmental protocols for harvest. http://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XIX/XIX-46.en.pdf For a summary of treaty see also http://www.itto.int/itta/#2006
14. Cartagena Protocol: The Governments participating agree to protocols relative to the transfer, handling and use of living modified organisms resulting from biotechnology that may have adverse affects on conservation, specifically focusing on trans-boundary movements. More information at: http://bch.cbd.int/protocol/parties The first report for this protocol is found at http://www.cbd.int/reports/biosafety/?report=NR-CPB-01

15. African Convention on the Conservation of Nature and Natural Resources 1968: Participating Governments agree to undertake to adopt the measures to ensure conservation, utilization and development of soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interests of the people http://www.ecolex.org/ecolex/ledge/view/RecordDetails?id=TRE-000492&index=treaties

16. Revised African Convention on the Conservation of Nature and Natural Resources 2003: This revision of the treaty above has not yet been ratified by sufficient nations to be in force. http://www.ecolex.org/ecolex/ledge/view/RecordDetails;DIDPFDSIjsessionid=183D840821C83472477BA0F962D3F953?id=TRE-001395&index=treaties

17. Memorandum of Understanding concerning Conservation Measures for the West African Populations of the African Elephant. Signatory nations agree to take steps to conserve and, when and where appropriate, to strictly protect the African Elephant and to conserve and sustainably use the habitats essential for its survival http://www.ecolex.org/ecolex/ledge/view/RecordDetails;DIDPFDSIjsessionid=183D840821C83472477BA0F962D3F953?id=TRE-144933&index=treaties

18. Convention of the Law of the Sea. The Law of the Sea Convention defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources, It supersedes earlier conventions signed in 1958. Ghana has made the following reservation to this treaty 15 December 2009: Declaration relating to Article 298: "In accordance with paragraph 1 of Article 298 of the United Nations Convention on the Law of the Sea of 10 December 1982 ('the Convention'), the Republic of Ghana hereby declares that it does not accept any of the procedures provided for in section 2 of Part XV of the Convention with respect to the categories of disputes referred to in paragraph 1 (a) of article 298 of the Convention." http://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=UNTSONLINE&mtdsg_no=XXI~6&chapter=21&Temp=mtdsg3&lang=en#Participants

19. 1992 Civil Liability Convention (oil) and the 1992 Fund Convention: These conventions establish protocols and a liability fund for oil pollution (Revised several earlier protocols) http://www.itopf.com/spill-compensation/clc-fund-convention/documents/DateTable10.pdf , http://www.admiraltylawguide.com/conven/protocivilpol1992.html

20. Convention on Fishing and Conservation of the Living Resources of the High Seas An agreement that was designed to solve, through international cooperation, the problems involved in the conservation of living resources of the high seas, considering that, because of the development of modern technology, some of these resources are in danger of being overexploited. A series of conventions on the seas signed in 1958 were subsequently replaced by the United Nations Convention of the Law of the Sea. (See 18 above) http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_1_1958_fishing.pdf , http://treaties.un.org/Pages/ViewDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=XXI-1&chapter=21&lang=en#Participants

APPENDIX 5. PROTECTED AREAS OF GHANA

A. Forest Reserves by Region and Forest District with Area and Date of Designation

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
WESTERN	**Asankrangwa**	**1.Fure Headwaters**	**169.60**	**1940**	**WE**
		2.Bura River	103.10	1932	ME
		3.Angoben Shelterbelt	34.71	1948	ME
		4.Totua Shelterbelt	63.50	1941	ME
		5.Tano Anhwia	153.10	1935	ME
		6.Mamiri	45.33	1949	ME
		7.Tano Nimiri	205.90	1935	WE
-		8.Fure River	158.20	1939	WE
SUB TOTAL		8	933.44		
	Bibiani	9.Afao Hills	34.71	1940	MSSE
		10.Tano Suraw	28.50	1934	MSSE
		11.Tano Suraw Ext	124.30	1935	MSSE
		12.Anhwiaso East	34.71	1926	MSSE
		13.Anhwiaso South	22.30	1920	ME
		14.Anhwiaso North	3.60	1939	MSSE
		15.Sumtwitwi	3.63	1925	MSSE
		16.Upper Wassaw	100.80	1926	ME
SUB TOTAL		8	352.55		
	Enchi	17.Boi - Tano	128.50	1968	WE
		18.Jema Assamkrom	66.05	1977	WE
		19.Boin River	277.65	1932	WE/ME
		20.Yoyo River	235.70	1932	ME
		21.Disue River	23.60	1943	WE/ME
SUB TOTAL		5	731.50		

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
	Sefwi Wiawso	22.Suhuma	358.50	1935	MSNW
		23.Tano Ehuro	176.10	1967	ME
		24.Santomang	21.20	1944	ME
		25.Sui River	335.90	1930	ME
		26.Muro	63.50	1951	MSNW
		27.Tano Suhien	84.42		MSNW
SUB TOTAL		6	1,039.62		
	Juabeso	28.Bodi	173.34	1967	ME
		29.Krokosua Hills	481.70	1935	MSNW
		30.Bia Tawya	678.60	1965	ME
		31.Sukusuku	147.60	1963	ME
		32.Bia North Tributaries	356.13	1940	MSNW
		33.Dadieso	171.20	1977	WE/ME
		34.Manzan	305.60	1972	MSNW
		35.Bia South Tributaries	305.60	1940	ME
SUB TOTAL		8	2,619.77		
	Takoradi	36.Subri River	587.93	1949	WE
		37.Cape Three Points	51.02	1950	WE
		38.Pra Suhien I	83.10	1928	ME
		39.Sekondi w'works catchment area I & II	10.10	1938	MSSE
SUB TOTAL		4	732.15		
	Tarkwa	40.Bonsa River	160.60	1932	ME
		41.Ben West	55.70	1954	ME
		42.Draw River	235.40	1937	WE
		43.Ebi River Shelterbelt	25.90	1941	WE
		44.Ndumfri	72.50	1937	WE
		45.Nueng	157.73	1954	WE
		46.Nkotonben	14.50	1950	ME

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
SUB TOTAL		7	722.33		
TOTAL	7	46	7,131.36		
CENTRAL	Cape Coast				
		47.Pra Suhien II	104.12	1933	ME
		48.Brimso	10.62	1951	SM/DS
		49.Ankaful Fuelwood	2.10	1934	SM
		50.Komenda Fuelwood	2.10	1946	SM
		51.Inchaban	2.54	1954	SM/DS
SUB TOTAL	-	5	121.48		
	Assin Foso	52.Assin Attandanso	143.60	1928	
		53.Supong	35.74	1954	MSSE
		54.Wawahi	138.90	1929	MSSE
		55.Baku	13.00	1929	MSSE
		56.Bimpong	104.12	1937	ME
		57.Ochi Headwaters I	3.40	1940	ME
		58.Ajueso	9.60	1943	
		59.Assin Apinmanim	11.40	1927	
		60.Krochua	10.62	1932	ME
		61.Ochi Headwaters II	9.32	1940	ME
SUB TOTAL		10	489.70		
	Dunkwa				
		62.Ben East	25.38	1954	ME
		63.Nkotonben	14.50	1950	ME
		64.Bowiye	120.18	1930	ME
		66.Opon Mansi	116.55	1930	ME
		66.Tonton	146.30	1936	ME
		67.Bonsa Ben	155.40	1939	ME
		68.Minta	21.76	1938	ME

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
SUB TOTAL		7	600.07		
	Winneba	68.Opimbo I & II	1.04	1927	DSIZ
		70.Ahirasu I & II	1.00	1927	SM
		71.Abasumba	1.04	1927	SM
		72.Obotumfu Hills	1.60	1930	SM
		73.Akrabong	2.60	1930	SM
		74.Gomoa Akyemfo	2.66	1961	
		75.Senya Bereku	1.04	1961	
		76.Winneba Fuelwood	1.60	1949	
		77.Yenku I & II	21.20	1937	SM
		78.Aprah Hills	2.37		
SUB TOTAL		10	36.09		
TOTAL	4	32	1,247.34		
EASTERN	Begoro	79.Pusupusu River	0.87		
		80.Southern Scarp (Akim)	154.60	1935	MSSE
		81.Apedwa	4.14	1926	MSSE
		82.Atewa Range Ext.	26.40	1936	UE
		82Atewa Range	232.32	1926	UE
		83.Boti Falls	1.30	1969	MSSE
		84.Dede	51.10	1955	DSFZ
		85.Worobong South (Akim)	106.20	1927	MSSE
		86.Worobong North "	14.60	1927	DS
SUB TOTAL		9	565.13		
	Mpraeso	87.Southern Scarp	146.75	1927	MSSE
		88.Northern Scarp East	49.21	1935	DS
		89.Northern Scarp West	64.75	1935	DS
		90.Esukawkaw	122.20	1939	MSSE
		91.Kade Bepo	16.84	1930	MSSE

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		92.Nkawanda	8.00	1939	MSSE
		93.Abisu	9.10	1939	DSIZ
		94.Worobong North (Kwahu)	13.31	1927	DS
		95.Worobong South (Akim)	41.80	1927	MSSE
		96.Jade Bepo	0.80	1932	MSSE
		96.Jade Bepo Ext	5.20		MSSE
SUB TOTAL		11	477.14		
	Akim Oda	97. Pra Anum Government	123.30	1908	MSSE
		98. Bemu I	9.61		ME
		99. Bemu II	13.19	1950	ME
		100. Bemu III	20.90		ME
		101. Birim	39.10	1927	MSSE
		102. Birim Ext	21.80	1940	MSSE
		103. Pra Birim North	14.35	1937	MSSE
		104. Pra Birim South	9.17		MSSE
		105. Esen Epam	46.10	1936	MSSE
		106. Oboyow	63.70	1927	MSSE
		107. Esuboni	28.50	1927	MSSE
SUB TOTAL		11	389.72		
	Kade	108. Mamang River	54.40	1938	MSSE
		109. Ajenjua Bepo	5.70	1930	MSSE
		110. Nsuensa	65.70	1929	MSSE
		111. Aiyaola	34.71	1929	MSSE
		112. Bediako	6.99	1928	MSSE
		113. Kajease	26.70	1932	MSSE
		114. Kwasi Anyinima	1.80	1930	MSSE
		115. Kwekaru	11.70	1929	MSSE
		116. Auro River	8.50	1948	MSSE

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
SUB TOTAL		9	216.20		
	Donkorkurom	119. Obuorkrowa	26.71	1991	
		120. Fah	20.78	Not Pillared	
		121. Bubu	10.17	1991	
SUB TOTAL		3	57.66		
	Somanya	122. Aboben Hills	7.30	1962	
		123. Sapawsu	15.30	1957	
		124. Volta River Blk I & II	50.50	1928	
		125.Yogaga	0.80		
		126. Yongwa	7.80	1957	
SUB TOTAL		5	81.70		
TOTAL	6	48	1,787.55		
GREATER ACCRA	Tema	127. Achimota Plantation	4.04		
		128. Dechidaw	3.68		
		129. Fiankonya	5.52		
		130. Chipa Tributaries	24.14		
SUB TOTAL		4	37.38		
TOTAL	1	4	37.38		
ASHANTI REGION	Bekwai	131. Oda River	164.20	1939	ME
		132. Nkrabia	100.20	1940	ME
		133. Subin Shelterbelt	22.53	1940	ME
		134. Apamprama	34.70	1952	MSSE
		135. Green Shelterbelt	12.10	Proposed	ME
		136. Denyau Shelterbelt	12.40	1939	ME
		137. Supuma Shelterbelt	25.00	1938	ME
		138. Dampia Range	80.30	1937	ME/MS
		139. Pompo Headwaters	12.20	1930	MSSE
		140. Bosumtwi	78.70	1931	MSSE

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		141. Jeni River	21.50	1937	MSSE
		142. Obuasi C' Area	0.44	1952	MSNW
		143. Fum Headwaters	72.50	1932	MSSE
SUB TOTAL		13	636.77		
	New Edubiase	144. Onuem Bepo Blk I	32.00	1930	MSSE
		145. Onuem Bepo Blk II	2.68	1930	
		146. Kokotintin	9.10	1940	MSSE
		147. Afia Shelterbelt	21.00	1940	MSSE
		148. Numia	50.20	1938	MSSE
		149. Onuem Nyamibe S'Belt	24.90	1936	MSSE
		150. Nyamibe Bepo	22.30	1933	MSSE
		151. Chiremoasi Bepo	6.00	1931	MSSE
		152. Kunsimoa Bepo	10.10	1937	MSSE
SUB TOTAL		9	178.28		
	Offinso	153. Afram Headwaters	201.20	1928	DSFZ
		154. Afrensu Brohuma	77.50	1934	DSFZ
		155. Asubima	78.70	1945	DSFZ
		156. Asufu Shelterbelt East	11.40	1950	DSIZ
		157. Asufu Shelterbelt West	13.47	1951	
		158. Gianima	17.10	1939	DSIZ
		159. Kwamisa	82.90	1928	MSNW
		160. Mankrang	85.45	1933	DSFZ
		161. Opro River	129.20	1929	DS
SUB TOTAL		9	696.92		
	Nkawie	162. Asenanyo	227.90	1938	MSNW
		163. Jimira & Extension	62.94	1932	MSNW
		164. Desiri	151.00	1954	MSNW
		165. Ofin Shelterbelt	60.30	1951	MSNW

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		166. Tano Ofin	402.20	1929	MSNW
		167. Tinte Bepo	115.51	1928	MSNW
SUB TOTAL		6	1,019.85		
	Juaso	168. Asonari Hills	1.60	1928	DSIZ
		169. Bandai Hills	160.80	1928	DSFZ
		170. Bandai Hills North	66.50		DSFZ
		171. Bobire	54.60	1939	MSSE
		172. Dome River	80.50	1929	MSSE
		173. Kronwan	5.70	1928	DSIZ
		174. Onyimso	8.50	1940	MSSE
		175. Mirasa Hills	67.30	1937	MSSE
		176. Prakaw	9.80	1942	MSSE
		177. North Fomangsu	42.70	1925	MSSE
		178. South Fomangsu	41.40	1925	MSSE
SUB TOTAL		11	539.40		
	Kumawu	179. Anumsu North	43.80	1928	MSSE
		180. Anumsu South	12.69	1950	MSSE
		181. Bomfoum	294.70	1928	DS
		182. Kumawu Waterworks	1.00	1945	
SUB TOTAL		4	352.19		
	Mampong	183. Aboma	45.60	1932	DSFZ
		184. Abrimasu	26.20	1940	DSFZ
		185. Awura	133.90	1940	DSFZ
		186. Chirimfa	114.40	1932	DSFZ
		187. Ofin H' waters	13.00	1927	DSIZ
		188. Pru Shelterbelt	92.70	1940	DSFZ
		189. Ongwam I	0.30		DSIZ
		190. Ongwam II	8.91	1951	DSIZ

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		191. Ongwam III	21.87		DSIZ
SUB TOTAL		9	456.88		
TOTAL	7	61	3,880.29		
BRONG AHAFO	Goaso	192. Subim	238.30	1956	MSNW
		193. Goa Shelterbelt	23.80	1940	MSNW
		194. Bia Tano	194.30	1937	MSNW
		195. Ayum	112.93	1940	MSNW
		196. Bomsam Bepo	124.32	1934	MSNW
		197. Aboniyere Shelterbelt	41.20	1940	MSNW
		198. Bia Shelterbelt	29.53	1940	MSNW
		199. Bonkoni	75.11	1934	MSNW
SUB TOTAL		8	839.49		
	Sunyani	200. Nsemere	18.10	1939	DSFZ
		201. Sawsaw	62.94	1976	DSFZ
		202. Tain Tributaries I	30.60	1932	DSFZ
		203. Yaya	51.30	1930	DSFZ
		204. Amama Shelterbelt	44.03	1940	MSNW
		205. Asukese	265.00	1934	MSNW
SUB TOTAL		6	471.97		
	Kintampo	206. Buru	302.30		
		207. Bosomoa	170.94	1930	
SUB TOTAL		2	473.24		
	Bechem	208. Bosumkese	138.31	1937	MSNW
		209. Aparapi Shelterbelt	19.17	1939	MSNW
SUB TOTAL		2	157.48		
	Dormaa Ahenkro	210. Mpameso	322.50	1937	MSNW
		211. Pamu Berekum	189.10		MSNW
		212. Tain Tributaries II	509.20		DSFZ

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
SUB TOTAL		3	1,020.80		
TOTAL	5	21	2,962.98		
VOLTA	Ho	213. Togo Plateau	150.00	1929	
		214. Kpando Plantation	0.44	1947	
		215. Kpando Range West	35.50	1947	
		216. Kpando Range Dayi Block	30.30	1951	
		217. Klemu Headwaters	10.88	1947	
		218. Kabakaba Hills	13.86	1947	
		219. Abutia Hills	8.99	1939	
		220. Ho Hills Station	0.20	1946	
SUB TOTAL		8	250.17		
	Jasikan	221. Apepesu	60.60	1954	
		222. Odomi	16.06	1931	
		223. Kabo	135.98	1931	
SUB TOTAL		3	212.64		
	Nkwanta	224. Asukookoo	116.03	1939	
		225. Chai River	182.30	1962	
SUB TOTAL		2	298.33		
TOTAL	3	13	761.14		
NORTHERN	Tamale	226. Tamale Fuelwood Blk I & II	2.20	1953	
		227. Tamale Waterworks	1.41	1954	
		228. Sinsangblewini	73.80	1956	
		229. Education Plantation	2.60	1960	
SUB TOTAL		4	80.01		
	Yendi	230. Biligu	56.70	1955	
		231. Daka Headwaters	145.56	1952	
		232. Kulupene	2.20	1951	
		233. Yendi Town Plantation	0.80	1954	

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		234. Karaga	24.50	1954	
SUB TOTAL		5	229.76		
	Damongo	235. Bombi	1.48	1963	
		236. Damongo Scarp	39.37	1956	
		237. Damongo Teak Plantation Blk I, II, III	0.45	1963	
		238. Kenikeni	512.98	1954	
		239. Nyembong	4.66	1954	
		240. Yerada	424.81	1972	
		241. Yakombo	1,210.95	1974	
SUB TOTAL		7	2,194.70		
	Bimbila	242. Kumbo	164.49	1956	
		243. Lambo	113.39	1956	
SUB TOTAL		2	277.88		
	Gambaga	244. Gambago East	127.53	1948	
		245. Gambaga South West I	115.00	1954	
		246. Gambaga South West II	222.22	1968	
		247. Morago River	88.06	1956	
SUB TOTAL		4	552.81		
	Walewale	248. Nasia Tributaries	314.69	1956	
SUB TOTAL		1	314.69		
TOTAL	6	23	3,649.85		
UPPER EAST	Bawku	249. Bumbuga	4.14	1954	
		250. Bumbuga Extension Blk I	0.41	1958	
		251. Morago West	39.76	1951	
		252. Basua Bridge (Proposed)	2.18	1958	
		253. Red Volta East	217.61	1953	
		254. Zamse Hills Blk I & II	10.13	1954	

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		255. Zawse Plantation	2.28	1954	
		256. Upper Tamne Blk I & II	17.25		
SUB TOTAL		8	293.76		
	Navrongo	257. Asebilika	38.85	1939	
		258. Bepena	61.75	1948	
		259. Chasi Hills	72.52	1940	
		260. Chiana Hills	43.59	1945	
		261. Dedoro	3.11	1947	
		262. Gia	21.70	1948	
		263. Kandembali	23.85	1948	
		264. Kanjarga / Fumbisi	12.95	1948	
		265. Kologu - Naga	45.33	1945	
		266. Pogi	26.06	1951	
		267. Saboro Government	0.28	1934	
		268. Sissili Central	155.09	1947	
		269. Sissili North	82.88	1940	
		270. Tankara	4.82	1951	
		271. Wiaga	9.84	1950	
		272. Wiaga Kandema	67.34	1941	
SUB TOTAL		16	669.96		
	Bolgatanga	273. Red Volta West	281.59	1962	
		274. Tankwiddi East	193.21	1951	
		275. Tankwiddi West	119.14	1941	
		276. Nyokoko Plantations	0.41	1951	
SUB TOTAL		4	594.35		
TOTAL	3	28	1,558.07		
UPPER WEST	Lawra	277. Bagwon Bawo	64.73	1959	
		278. Kanba Tributaries	37.56	1953	

REGION	FOREST DISTRICT	NAME OF RESERVE	AREA (KM2)	DATE OF RESERVATION	VEGETATION ZONE
		279. Lawra Station	1.27	1956	
		280. Nandom / Lambussie	1.86		
		281. Polli	35.61		
		282. Tapania	46.62		
SUB TOTAL		6	187.65		
	Wa	283. Ambalara	99.95		
		284. Bambule	204.09		
		285. Kulpawn Tributaries	99.95		
		286. Nuale	51.80	1954	
		287. Wa Plantation	2.49	1957	
SUB TOTAL		5	458.28		
	Tumu	288. Chira Headwaters	41.44		
		289. Kulpawn Headwaters	155.30		
		290. Mawbia	129.50		
		291. Puda Hills	51.80		
		292. Pulumbugala	39.21		
		293. Tumu	54.39		
SUB TOTAL		6	471.64		
TOTAL	3	17	1,117.57		
GRAND TOTAL	**(Districts) 45**	**(Reserves) 293**	**24,133.53**		

Source: Forest Services Division, Forestry Commission

B. Wildlife Protected Areas Managed by Wildlife Division with Conservation Values and Constraints

NAME OF PA	YEAR GAZ-ZETED	SIZE(KM²)	LOCATION	CATEGORY OF PA IN GHANA	KEY CONSERVATION VALUE	CONSTRAINTS TO MANAGEMENT OF PA
ANKASA CONSERVATION AREA/ NINI- SUHIEN NATIONAL PARK	1976	509 (Park 160 KM² within above)	N 5°14′ 49′ W 2°36′ 08′	IUCN Category II	Ecosystem Protection, Recreation Purpose	Insufficient budgetary allocation
						Inadequate staff
						Illegal resource exploitation
BIA CONSERVATION AREA BIA CONSERVATION AREA	1974	306	Bia and Juabeso Districts(Northern part of Western Region)	National Park (77.7km²)	1.The best example of transition Moist Evergreen / Moist Semi-deciduous forest ecosystem in Ghana	1.Inadequate Funding
					2.The richness of the vegetation in terms of tree species, size and endemism	2.Inadequate staff levels
					3.Extensive range of mammals (especially primates), reptiles, amphibians and invertebrates with most still to be identified	3.Poor road infrastructure
					4.The Presence of suitable habitat for Ghanaian endangered animals e.g. Forest Elephant, Chimpanzees, Olive Colobus, Black white Colobus, Leopard and Bongo	4.Unstable communication network
					5. Wealth of birds, including nearly of all of Ghana's known forest species	5.Convoluted boundary which makes penetration for poaching easy
					6. Watershed protection	Inadequate weapons and ammunitions
						Illegal entry for poaching and seasonal collection of snails
						Confrontations / conflict among the Park and some communities
						Elephant -Human conflict
						Many communities around the Park
BOMFOBIRI WILDLIFE SANCTUARY	1975	53	Sekyere, Afram Plains District Assembly	Category "IV" per IUCN Classification Park C as per	1. Scientific Research	1. Funding
					2. Ecotourism	2. Infrastructure
					3. Recreational	

NAME OF PA	YEAR GAZ-ZETED	SIZE(KM ^{2})	LOCATION	CATEGORY OF PA IN GHANA	KEY CONSERVATION VALUE	CONSTRAINTS TO MANAGEMENT OF PA
				Local Classification	4. Aesthetic	
BUI NATIONAL PARK	1971	1821	Bui-Tain/Bole District	Category "C"	1. Largest population of Hippopotamus in Ghana (about 400)	1. Poaching of wildlife
					2. Riverine forest and wooded savanna intact	2. Agricultural encroachment
					3. Migratory water flow	3. Illegal mining(Galamsey)
					4. Moderate number of large mammals' e.g. water bucks, kobs, bush bucks, monkeys etc.	4. Inadequate logistics e.g fire arms, tents, protective wear etc
						5. Inadequate budgetary allocation of funds
DIGYA NATIONAL PARK	1971	3478	Brong Ahafo Region, part of Eastern (Donkokrom) and some part of Volta as it runs along the volta lake	National Park	Protection of endangered spp and part of the volta lake	1. Encroachment
						2. Inadequate and below standard weapons
						3. Inaccessibility to most of the interesting parts
						4. General conditions in camps are deplorable
						5. Lack of funds to carry out major works/projects
GBELE RESOURCE RESERVE	1975	565	Latitudes 10° 22	A resource reserve	Undisturbed Guinea Savanna ecosystem containing key animal species such as Roan antelope, Hartebeest, Aardvark, Black and White Colobus	1. Uncooperative attitude of some communities resulting in poaching and staff molestation.
						Ageing field staff and difficulty of updating data on flora and fauna resources of the reserve which affects planning
						Inadequate housing facilities for staff, tourist facilities and lack of portable water at tented camp for tourists.

NAME OF PA	YEAR GAZ-ZETED	SIZE(KM ^{2})	LOCATION	CATEGORY OF PA IN GHANA	KEY CONSERVATION VALUE	CONSTRAINTS TO MANAGEMENT OF PA
						Inadequate means of transport and lack of access routes through the reserve
						Inadequate and untimely release of funds.
KAKUM NATIONAL PARK/ ASSIN-ATTANDANSO RESOURCE RESERVE	1991	350	33km north of Cape Coast	National Park/Resource Reserve	Protection of animals and plant spp.	1. Farmers have been advised to construct pepper fences to protect their farms from marauding elephants to mitigate crop raids but some have not done that causing Human-Wildlife conflicts around the Park.
						1. Lack of reliable communication networks.
						2. Worn out Personal Protective Equipments (PPEs).
						3. Logistics and Finance
KALAKPA RESOURCE RESERVE	1975	325	20 Km South of Ho in the Volta Region	Resource Reserve	Savanna. Among the species of animals found are buffaloes, duikers, wild cats as well as numerous birds. The kob antelope is the symbol for Kalakpa.	Poaching, brush fires, expansion of internal occupancy, charcoal production
KOGYAE STRICT NATURE RESERVE	1971	368	Sekyere Central District, Afram Plains	Park 'C' (Resource Reserve)	1. To retain vegetation and faunal types	1. Lack of water for the animals and access road
					2. For research and monitoring purpose	2. Settler famers in the "zone of influence"
					3. Protect watershed of tributaries of River Sene and Afram	3. Poaching which is being contained
					4. To protect the historical battle ground of the Kwamans Agogo and Kumawu people in their last battle with the Chumbulus	
KYABOBO NATIONAL PARK	1993	220	Nkwanta South District in Volta Region	Category 11 in the IUCN system of PA classification	1. Mosaic vegetation due to its high altitude and transitional location (Savanna, semi-deciduous forest, montane and riparian forests)	1. Inadequate funds for park operations
					2. Main watershed area in Ghana	2. Non-gazettement of park i.e. Legislative Instrument (wildlife reserve laws)

NAME OF PA	YEAR GAZ-ZETED	SIZE(KM ^{2})	LOCATION	CATEGORY OF PA IN GHANA	KEY CONSERVATION VALUE	CONSTRAINTS TO MANAGEMENT OF PA
					3. High endemism eg. New butterfly named after Park(*Kyabobo laurencis*)	3. Low salaries and low motivation
					4. Home to some endangered species eg. Bongo, black & white colobus, giant pangolin, broad fronted crocodile etc	4. Irregular supply of field equipments, uniform etc
					5. Trans-boundary park (i.e linked to Fazao Malfakassa N.P. in Togo)	5.Poor roads leading to park
MOLE NATIONAL PARK	1971 (LI 710)	4,577	Damongo, Northern Region	National Park (IUCN PA Category II)	1. Preservation of representative sample of fairly undisturbed Guinea savanna ecosystem and natural habitats for wildlife.	1. Inadequate funds and logistics for park operations and equipments for field operation
					2. Protection of wildlife and physical features for recreation, education, scientific study.	2. Indiscriminate burning practices
					3. Protection of part of White Volta River catchment (Kulpawn, Mole and Lovi Rivers).	3. Weak coverage by park staff due to large size
						4. High incidence of poaching
						5. Inadequate research to improve management decisions.
						6. Poor internal and external road system.
						7. Demand for park land by Traditional Authority
						8. Weak private sector participation in wildlife management
OWABI WILDLIFE SANTUARY	1971	13	Owabi, Kumasi	Wildlife sanctuary and Ramsar Site	Tourism, Breeding grounds for migratory birds	Lack of funds and manpower Note Ramsar designation is 7260 ha.
SHAI HILLS	1971	51	Shai Hills(Doryumu-Dangbe West District)	"Park B" (Resource Reserve) Fits well into the Category IV Protected Areas (Habitat / Species Managed Area) of the current	1.To Preserve Representative Sample of Coastal Savanna / Accra Plains as one of the ecological vegetation zones in Ghana	1. Inadequate and Irregular logistics and funding, hampering operational activities.
					2.To ensure the maintenance of natural conditions necessary for populations of significant species and to provide for sustained production of wildlife products.	2. Broken down fence resulting in Domestic Cattle Invasion and hence conflicts with communities and cattle Owners

NAME OF PA	YEAR GAZ-ZETED	SIZE(KM ^{2})	LOCATION	CATEGORY OF PA IN GHANA	KEY CONSERVATION VALUE	CONSTRAINTS TO MANAGEMENT OF PA
				IUCN Protected Area Management Categories	3.To provide opportunities for research, education, recreation and tourism.	
					i.31 Mammalian Species (4 Bats, 3 Primates, 10 rodents, 7 Antelopes,)	
					ii. 13 Reptiles	
					iii. 175 Bird Species	
					4 Main Vegetation Types: i Short- Grass Savanna ii. Tall – Grass Savanna iii. Dry evergreen Forest iv.thickets (*Commiphora dalzielii; Grewia megalocarpa*)	
RAMSAR SITES: *						
DENSU DELTA RAMSAR SITE	1999	46.2	11 km West of Accra	Ramsar Site	1. Internationally important site for waterbirds of conservation value;	1. Inadequate funding
					2. Important breeding site for three (endangered) species of marine turtles i.e. *Lepidochelys olivacea, Chelonia mydas* and *Dermochelys coriacea.*	2. Lack of infrastructure for visitor use
						3. Under staffing / reduced capacity
ANGLO-KETA LAGOON COMPLEX RAMSAR SITE	1999	1277.8	Akatsi, South Tongu, Keta & Ketu districts of Volta Region	Ramsar Site	1. Internationally important site for waterbirds of conservation value	1. Inadequate funding
					2. Important breeding site for three (endangered) species of marine turtles i.e. *Lepidochelys olivacea, Chelonia mydas* and *Dermochelys coriacea.*	2. Lack of infrastructure for visitor use
						3. Under staffing / reduced capacity
MUNI-POMADZE RAMSAR SITE	1999	86.7	Awutu/Efutu/Senya and Gomoa district of Central Region	Ramsar Site	1. Internationally important site for waterbirds of conservation value;	1. Inadequate funding
					2. Important breeding site for three (endangered) species of marine turtles i.e. *Lepidochelys olivacea, Chelonia mydas* and *Dermochelys coriacea.*	2. Lack of infrastructure for visitor use
					3. Significant cultural value (grounds for live capture of bushbuck *Tragelaphus Scriptus* by Effutu people for annual traditional *Aboakyir* Festival) linked to preservation and ecological character of the wetland	3. Under staffing / reduced capacity

NAME OF PA	YEAR GAZ-ZETED	SIZE(KM ^{2})	LOCATION	CATEGORY OF PA IN GHANA	KEY CONSERVATION VALUE	CONSTRAINTS TO MANAGEMENT OF PA
SAKUMO RAMSAR SITE	1999	13.4	West of Tema	Ramsar Site	1. Internationally important site for waterbirds of conservation value	1. Inadequate funding
					2. Important breeding site for three (endangered) species of marine turtles i.e. *Lepidochelys olivacea, Chelonia mydas* and *Dermochelys coriacea.*	2. Lack of infrastructure for visitor use
						3. Under staffing / reduced capacity
SONGOR RAMSAR SITE	1999	287.4	Dangme East district of Greater Accra Region	Ramsar Site	1. Internationally important site for waterbirds of conservation value	1. Inadequate funding
					2. Important breeding site for three (endangered) species of marine turtles i.e. *Lepidochelys olivacea, Chelonia mydas* and *Dermochelys coriacea.*	2. Lack of infrastructure for visitor use
						3. Under staffing / reduced capacity

* Note Owabi Wildlife Sanctuary is also a RAMSAR site but is listed in the Wildlife Reserve Table. Listed size for this site with RAMSAR is 7260 ha.

INFORMATION ON WILDLIFE BASED TOURISM

WITHIN WILDLIFE PROTECTED AREAS

NAME OF PA	NUMBER OF VISITORS	VISITOR FACILITIES	REVENUE GENERATION (GH¢)	ON GOING RESEARCH	THREATS TO THE PA
ANKASA CONSERVATION AREA	2007 - 1172	Restaurant	2007 - 2907.15	Research on primates (WAPCA)	-
	2008 - 1088	Visitor Reception	2008 - 2376.15		-
	2009 - 743	Chalets	2009 - 4,034.05		-
		Nature trails			-
		Bridge over Ankasa river			-
		Picnic Areas			
BIA CONSERVATION AREA	2005 - 71	1.Guest house	2005 - 244.10	1.Chimps and other primates	1.Clearing of buffers
	2006 - 67	2.Satellite Camps for Camping	2006 - 121.45	2.Impact of logging on wildlife resources	2.High demand for bush meat
	2007 - 19	3.Availability of tourist trails, Historic site (Apaso)	2007 - 102.90	3.Mammal populations and distribution	3.Conflict between the Park and the communities
	2008 - 21	4.Road in the Park	2008 - 74.20		4.Increasingly demand of fresh land for cocoa cultivation
	2009 - 16		2009 - 303.00		5.Fast growing population around the Park
BOMFOBIRI WILDLIFE SANCTUARY	2001-2009: 1030	Nil	?	Nil	1. Poaching
					2. Bushfires
					3. Agricultural Expansion
BUI NATIONAL PARK	2007-255	6- bedroom facility	2007-1114.30	Nil	1.Bui hydro dam project
	2008-280		2008-1993.50		2.Wildfires
	2009-221		2009-4461.00		3.Logging around park
					4.Agricultural activities close to the Park
DIGYA NATIONAL PARK	2005-4	N/A	2005-10.40	N/A	Encroachment
	2006-4	N/A	2006-12.00	N/A	Encroachment
	2007-4	N/A	2007-10.00	N/A	Encroachment

NAME OF PA	NUMBER OF VISITORS	VISITOR FACILITIES	REVENUE GENERATION (GH¢)	ON GOING RESEARCH	THREATS TO THE PA
	2008-2	N/A	2008-7.00	N/A	Encroachment
	2009-2	N/A	2009-2.00	N/A	Encroachment
GBELE RESOURCE RESERVE	2005 - 2009: 36	A nine man tented facility with kitchen.	2005-2009: 701.05	N/A	-
KAKUM NATIONAL PARK	2007 - 65752	1. Canopy Walkway	2007 - 52904.32	Bush meat trading.	1. Hunting
	2008 - 73 611	2. Hiking Trails	2008 - 55154.81		2. Encroachment
	2009 - 135870	3. Visitor Reception Centre	2009 - 77733.82		3. Chainsaw Operation
		4. Tree Platforms			
		5. Camping Sites			
KALAKPA RESOURCE RESERVE	Estimate: less the 500 year				Expansion of internal illegal settlement (app 2500 occupants), farming, brush fires, poaching, charcoal production, livestock grazing
KOGYAE STRICT NATURE RESERVE	Not opened to tourist	Nil		Birds B4; British Trust for Ornithology and Wildlife Society	Poaching and Perennial bushfires
KYABOBO NATIONAL PARK	2006-40	1.A camp site	2006-74.25	Nil	1.Non-gazettement of the Park
	2007-84	2.Two guest houses	2007-210.15		2.demand for bush meat
	2008-228	3.Tree hide and Picnic site	2008-239.40		3.possibility of local conflict (conflict zone)
	2009-154	4.Game viewing platform	2009-192.25		4.Alien plants and wildfires
MOLE NATIONAL PARK	2007-13734	1. Motel (Bed Tax)	2007-47742.17	1. Status of carnivores (lions) in Mole National Park	1. Poaching
	2008-16870	2. Guided Walk	2008-58126.37	2. Visitor Satisfaction	2. Burning

NAME OF PA	NUMBER OF VISITORS	VISITOR FACILITIES	REVENUE GENERATION (GH¢)	ON GOING RESEARCH	THREATS TO THE PA
				Survey	
	2009-14760	3. Information Centre	2009-127604.20	3. Check list of Lepidoptera of Ghana-*Tortricidae*	3. Land conversion
		4. Camp sites	2010-49049	4. Comparing Butterfly feeding habits at Mole National Park.	4. Demand by Traditional Authorities for part of the PA to be de-gazetted
		5.Viewing platforms		5. Phylogeny of green monkeys	
		6.Tree hides		6. Intestinal parasites in baboons, warthogs and school children in Mole National Park	
		7.Bird Watching			
		8. Car rental and entrance gate			
OWABI MONKEY SANCTUARY	2009-159	None	?	None	1. Urbanization and firewood collection
SHAI HILLS	2001-2365	Gate/Reception	2001-330.00	Ad-hoc and Non-Directional, mostly student - based dissertation/thesis	1. Fast and uncontrolled, incompatible development activities on lands immedeately fringing PA: Quarry Activity, Cattle Ranches, Estate Development, Large Scale Irrigation Programme (Proposed)
	2002-4875	4-Bedroom Staff Quarters(with kitchen and hall) converted to Guest house	2002-2651.70		2.Non payment of Compensation Land Claim Issues
	2003-4554	2 - Room Apartment used as a Dormitory capable of Housing up to 30 students	2003-3133.85		
	2004-5485		2004-6553.03		
	2005-5323		2005-6516.35		
	2006-6110		2006-7995.65		
	2007-7861		2007-43883.50		
	2008-9175		2008-52189.50		
	2009-9241		2009-47131.00		

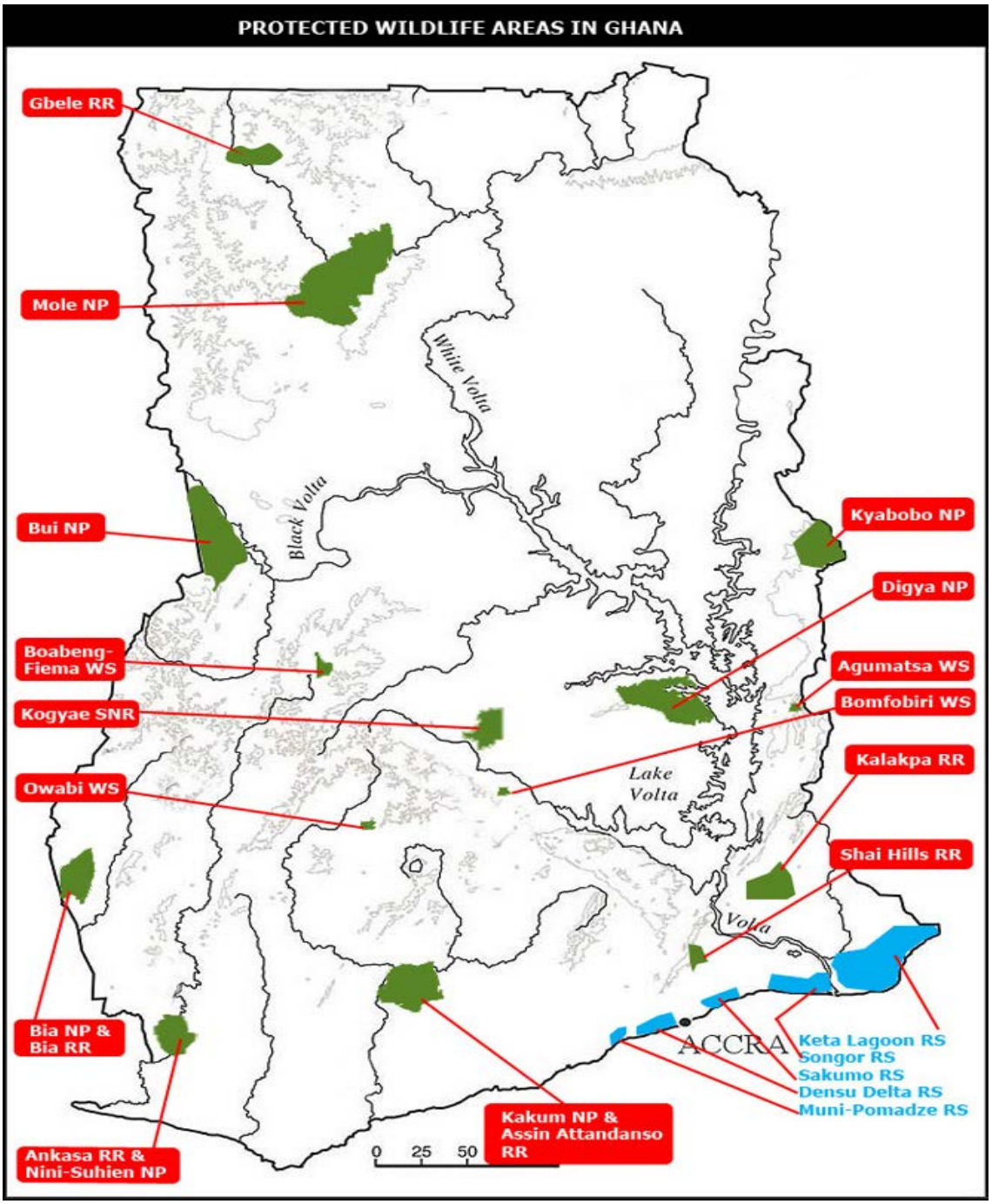
NAME OF PA	NUMBER OF VISITORS	VISITOR FACILITIES	REVENUE GENERATION (GH¢)	ON GOING RESEARCH	THREATS TO THE PA
RAMSAR SITES:					
DENSU DELTA RAMSAR SITE	Open access	1 Old Observation Post	Nil	Waterbird identification & counting	Urbanization / encroachment / pollution
KETA LAGOON COMPLEX RAMSAR SITE	Open access	2 Old Observation Post	Nil	Waterbird identification & counting	Increasing human settlement and commercial related activities including light industries, cattle grazing, stone quarrying and illegal hunting of marine turtles.
MUNI-POMADZE RAMSAR SITE	Open access	2 Old Observation Post	Nil	Waterbird identification & counting	Increasing human settlement and commercial related activities including light industries, cattle grazing, stone quarrying and illegal hunting of marine turtles.
SAKUMO RAMSAR SITE	Open access	2 Old Observation Post	Nil	Waterbird identification & counting	Urbanization / encroachment / pollution
SONGOR RAMSAR SITE	Open access	2 Old Observation Post	Nil	Waterbird identification & counting	Increasing human settlement and commercial related activities including light industries, cattle grazing, stone quarrying and illegal hunting of marine turtles.

Source: Wildlife Division, Forestry Commission

C. Forest Reserve Areas Classified in Total or in Part As Globally Significant Biodiversity Areas

Total Coverage - Moist Forest		
Ebi River Shelterbelt	2,600	2,600
Atewa Range	23,200	23,200
Apedwa	400	400
Dadiaso	17,100	17,100
Yogaga	100	100
TOTAL	43,400 ha	43,400 ha
Partial Coverage- Moist Forest		
Tano Ofin	40,200	10,752
Cape 3 points	2,000	1,000
Neung North	4,500	2,688
Ndumfiri	7,300	3,768*
Boi Tano	12,900	3,328
Boin River	27,800	7,552
Jema Assemkrom	6,600	2,048
Fure River	15,800	4,736
Fure Headwaters	17,000	2,304
Subiri River	58,800	5,120
Bonsa River	16,100	2,304
Tano Nimiri	20,600	3,456
Disue River	2,400	384
Draw River	23,500	12,800
Neung South	11,300	7,304*
TOTAL	266,800 ha	69,544 ha
Southern Dry Forest		
Abasuma	100	100
Abonben	700	700
Ahirasu 1&11 (2 areas)	100	100
Obotomfo	200	200
Akrobong	300	300
Bandai Hills	16,100	1,403
Southern Scarp	27,800	10
Yongwa	800	640
Sapawsu & others In E/R	1500	925
TOTAL	47,600 ha	4,378 ha
GRAND TOTAL	357,800 ha	117,322 ha

Table Courtesy of Forestry Commission, Division of Forestr



Map 7: Protected Wildlife Areas of Ghana

APPENDIX 6. THREATENED AND ENDANGERED SPECIES

A. CITES Listings for Ghana

The CITES species database is found at http://www.cites.org/eng/resources/species.html . In the table below, if viewed electronically, press "control" while clicking on a particular species to find out specific data on its distribution and other information contained in the CITES database.

- Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances. Appendix 1 is also listed by species where a reservation on the species has been made to CITES by specific countries. Where this occurs the code /r = reservation entered by the named Party is shown. Where a reservation had been made but is withdrawn the code /w = reservation withdrawn by the named Party is shown. Any Party (member State) of CITES may make a unilateral statement that it will not be bound by the provisions of the Convention relating to trade in a particular species listed in the Appendices (or in a part or derivative listed in Appendix III). These statements are called reservations and may be made in accordance with Articles XV, XVI and XXIII of the Convention. Detail on who has made reservations or withdrawals can be found on the website. Ghana, however, has not submitted any such.

- Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. Those species include 166 species of animals and 18 plants in Ghana, but are not individually listed below.

Ghana has ratified the CITES treaty and in so doing has agreed to the protection of the following Appendix 1 species within the country:

Appendix I Plants:	**Common Name**
Encephalartos barteri Carruth. ex Miq. ssp. ***barteri***	Cycad
Appendix I Animals	**Common Name**
Cercopithecus roloway (Schreber, 1774)	Roloway Monkey
Pan troglodytes (Blumenbach, 1775)	Chimpanzee
Caracal caracal (Schreber, 1776)	African Caracal; Asian Caracal; Caracal; Desert Lynx
Panthera leo (Linnaeus, 1758)	Lion
Panthera pardus (Linnaeus, 1758)	Leopard; Panther
Picathartes gymnocephalus (Temminck, 1825)	Bare-headed Rockfowl; White-necked Picathartes;
Crocodylus cataphractus Cuvier, 1825	African Sharp-nosed Crocodile
Crocodylus niloticus Laurenti, 1768	African Crocodile; Nile Crocodile
Osteolaemus tetraspis Cope, 1861	African Dwarf Crocodile; West African Dwarf Crocodile
Bufo superciliaris Boulenger, 1888 "1887"	Cameroon Toad; Zaire Toad
Pristis pectinata Latham, 1794	Comb shark (Guyana); Smalltooth Sawfish (Australia)
Pristis pristis (Linnaeus, 1758)	Common Sawfish

Appendix I/r and w Animals:	Reservation Status	Common Name
***Physeter macrocephalus* Linnaeus, 1758**	r	Cachelot; Pot Whale; Sperm Whale
Megaptera novaeangliae (Borowski, 1781)	r	Hump Whale; Humpback Whale
Caracal caracal (Schreber, 1776)	r	African Caracal; Asian Caracal; Caracal; Desert Lynx;
Falco peregrinus Tunstall, 1771	r	Duck Hawk; Peregrine; Peregrine Falcon
Chelonia mydas (Linnaeus, 1758)	r	Turtle
Eretmochelys imbricata (Linnaeus, 1766)	r	Hawksbill Turtle
Dermochelys coriacea (Vandelli, 1761) ;	r	Leatherback; Leatherback Turtle;
Lepidochelys olivacea (Eschscholtz, 1829)	w	Olive Ridley; Pacific Ridley Sea Turtle

Source: UNEP-WCMC. 19 April, 2011. UNEP-WCMC Species Database: CITES-Listed Species (r=a country reservation made, w= country reservation withdrawn

B. International Union for the Conservation of Nature, RED List, Ghana

The following table is a list of plants and animals in Ghana listed as Endangered (EN) or Critically Endangered (CR) by the IUCN. Detail on each species is available at the following web site: http://www.iucnredlist.org/apps/redlist/search/link/4dacd210-1cd2dd9f. The IUCN lists 57 species of plants or animals on the following list of critically threatened or endangered species. Of these, 22 are plants and 35 are animals. Habitats were these plants and animals are normally found are listed in the website above.

Species ID	Kingdom	Class	Family	Genus	Species	Common names (Eng)	Red List status	Red List criteria	Red List criteria .	Year assessed	Population trend	Petitioned
174591	ANIMALIA	AMPHIBIA	ARTHROLEPTIDAE	Arthroleptis	krokosua		EN	B1ab(iii)	3.1	2010	unknown	N
32193	PLANTAE	MAGNOLIOPSIDA	SAPOTACEAE	Aubregrinia	taiensis		CR	B1+2c	2.3	1998		N
2477	ANIMALIA	MAMMALIA	BALAENOPTERIDAE	Balaenoptera	musculus	Blue Whale, Pygmy Blue Whale, Sibbald's Rorqual, Sulphur-bottom Whale	EN	A1abd	3.1	2008	increasing	N
182800	ANIMALIA	ACTINOPTERYGII	CYPRINIDAE	Barbus	bawkuensis		EN	B1ab(iii)+2ab(iii)	3.1	2006	unknown	N
182403	ANIMALIA	ACTINOPTERYGII	CYPRINIDAE	Barbus	subinensis		EN	B2ab(iii,v)	3.1	2006	decreasing	N
182745	ANIMALIA	ACTINOPTERYGII	CLAROTEIDAE	Chrysichthys	walkeri		EN	B1ab(iii)+2ab(iii)	3.1	2006	decreasing	N
34652	PLANTAE	MAGNOLIOPSIDA	SAPOTACEAE	Chrysophyllum	azaguieanum		EN	B1+2c	2.3	1998		N
33895	PLANTAE	MAGNOLIOPSIDA	STERCULIACEAE	Cola	boxiana		EN	B1+2c	2.3	1998		N
58253	ANIMALIA	AMPHIBIA	PETROPEDETIDAE	Conraua	derooi		CR	B2ab(iii)	3.1	2004	decreasing	N
174090	ANIMALIA	REPTILIA	AMPHISBAENIDAE	Cynisca	kraussi	Ghana Worm Lizard	EN	B1ab(i,iii)	3.1	2009	unknown	N
34837	PLANTAE	MAGNOLIOPSIDA	CHRYSOBALANACEAE	Dactyladenia	hirsuta		EN	B1+2c	2.3	1998		N
32187	PLANTAE	MAGNOLIOPSIDA	LEGUMINOSAE	Dalbergia	setifera		EN	B1+2c	2.3	1998		N
161495	ANIMALIA	CHONDRICHTHYES	DASYATIDAE	Dasyatis	margarita		EN	A2bd+3bd+4bd	3.1	2004	decreasing	N
6494	ANIMALIA	REPTILIA	DERMOCHELYIDAE	Dermochelys	coriacea	Leatherback, Leathery Turtle, Luth, Trunkback Turtle	CR	A1abd	2.3	2000	decreasing	N
7857	ANIMALIA	ACTINOPTERYGII	SERRANIDAE	Epinephelus	itajara	Goliath Grouper, Jewfish	CR	A2d	3.1	2006	unknown	N

Species ID	Kingdom	Class	Family	Genus	Species	Common names (Eng)	Red List status	Red List criteria	Red List criteria	Year assessed	Population trend	Petitioned
7859	ANIMALIA	ACTINOPTERYGII	SERRANIDAE	Epinephelus	marginatus	Dusky Grouper	EN	A2d	3.1	2004	decreasing	N
32206	PLANTAE	MAGNOLIOPSIDA	CONNARACEAE	Hemandradenia	chevalieri		EN	B1+2c	2.3	1998		N
32186	PLANTAE	MAGNOLIOPSIDA	APOCYNACEAE	Hunteria	ghanensis		EN	A1c, B1+2c	2.3	1998		N
58200	ANIMALIA	AMPHIBIA	RANIDAE	Hylarana	occidentalis		EN	B2ab(iii)	3.1	2004	decreasing	N
10591	ANIMALIA	MAMMALIA	MURIDAE	Hylomyscus	baeri	Baer's Hylomyscus, Baer's Wood Mouse	EN	B2ab(iii)	3.1	2008	decreasing	N
32188	PLANTAE	MAGNOLIOPSIDA	LEGUMINOSAE	Hymenostegia	gracilipes		EN	B1+2c	2.3	1998		N
56118	ANIMALIA	AMPHIBIA	HYPEROLIIDAE	Hyperolius	bobirensis		EN	B1ab(iii)	3.1	2004	decreasing	N
56215	ANIMALIA	AMPHIBIA	HYPEROLIIDAE	Hyperolius	torrentis		EN	B1ab(iii)+2ab(iii)	3.1	2004	decreasing	N
182333	ANIMALIA	ACTINOPTERYGII	SCHILBEIDAE	Irvineia	voltae	Butterfish	EN	B1ab(ii,iii)+2ab(ii,iii)	3.1	2006	decreasing	N
32189	PLANTAE	MAGNOLIOPSIDA	SAPINDACEAE	Lecaniodiscus	punctatus		EN	B1+2c	2.3	1998		N
182617	ANIMALIA	ACTINOPTERYGII	CICHLIDAE	Limbochromis	robertsi		EN	B1ab(iii)+2ab(iii)	3.1	2006	decreasing	N
12436	ANIMALIA	MAMMALIA	CANIDAE	Lycaon	pictus	African Wild Dog, Cape Hunting Dog, Painted Hunting Dog, Wild Dog	EN	C2a(i)	3.1	2008	decreasing	N
182248	ANIMALIA	ACTINOPTERYGII	MALAPTERURIDAE	Malapterurus	murrayi		EN	B1ab(ii,iii)+2ab(ii,iii)	3.1	2007	unknown	N
32185	PLANTAE	MAGNOLIOPSIDA	ANNONACEAE	Monocyclanthus	vignei		EN	B1+2c	2.3	1998		N
182111	ANIMALIA	ACTINOPTERYGII	MORMYRIDAE	Mormyrus	subundulatus		EN	B1ab(iii)+2ab(iii)	3.1	2006	decreasing	N
34806	PLANTAE	MAGNOLIOPSIDA	SAPOTACEAE	Neolemonniera	clitandrifolia		EN	B1+2c	2.3	1998		N
144347	ANIMALIA	AVES	Accipitridae	Neophron	percnopterus	Egyptian Vulture, Egyptian Eagle	EN	A2bcde+3bcde+4bcde	3.1	2008	decreasing	N

Species ID	Kingdom	Class	Family	Genus	Species	Common names (Eng)	Red List status	Red List criteria	Red List criteria	Year assessed	Population trend	Petitioned
15933	ANIMALIA	MAMMALIA	HOMINIDAE	Pan	troglodytes	Chimpanzee, Common Chimpanzee, Robust Chimpanzee	EN	A4cd	3.1	2008	decreasing	N
33191	PLANTAE	MAGNOLIOPSIDA	LEGUMINOSAE	Pericopsis	elata	African Teak, Afromosia, Afrormosia	EN	A1cd	2.3	1998		N
58092	ANIMALIA	AMPHIBIA	PHRYNOBATRACHIDAE	Phrynobatrachus	annulatus		EN	B2ab(iii)	3.1	2004	decreasing	N
58112	ANIMALIA	AMPHIBIA	PHRYNOBATRACHIDAE	Phrynobatrachus	ghanensis		EN	B1ab(iii)	3.1	2004	decreasing	N
32190	PLANTAE	MAGNOLIOPSIDA	SAPINDACEAE	Placodiscus	attenuatus		EN	A1c, B1+2c	2.3	1998		N
34817	PLANTAE	MAGNOLIOPSIDA	SAPINDACEAE	Placodiscus	pseudostipularis		EN	B1+2c	2.3	1998		N
18175	ANIMALIA	CHONDRICHTHYES	PRISTIDAE	Pristis	pectinata	Smalltooth, Wide Sawfish	CR	A2bcd+3cd+4bcd	3.1	2006	decreasing	N
18176	ANIMALIA	CHONDRICHTHYES	PRISTIDAE	Pristis	perotteti	Largetooth Sawfish	CR	A2abcd	3.1	2007	decreasing	N
18177	ANIMALIA	CHONDRICHTHYES	PRISTIDAE	Pristis	pristis	Common Sawfish, Common Sawfish	CR	A2abc+3cd	3.1	2005	decreasing	N
18240	ANIMALIA	MAMMALIA	CERCOPITHECIDAE	Procolobus	badius	West African Red Colobus, Bay Colobus, Red Colobus, Western Red Colobus	EN	A2cd	3.1	2008	decreasing	N
32200	PLANTAE	MAGNOLIOPSIDA	COMBRETACEAE	Pteleopsis	habeensis		EN	A1c, B1+2c	2.3	1998		N
45873	PLANTAE	MAGNOLIOPSIDA	ICACINACEAE	Pyrenacantha	cordicula		EN	B2ab(iii)	3.1	2004	decreasing	N
161425	ANIMALIA	CHONDRICHTHYES	RAJIDAE	Raja	undulata	Undulate Ray	EN	A2bd+3d+4bd	3.1	2003	decreasing	N
63132	ANIMALIA	CHONDRICHTHYES	RHINOBATIDAE	Rhinobatos	cemiculus	Blackchin Guitarfish	EN	A4bd	3.1	2007	decreasing	N
63131	ANIMALIA	CHONDRICHTHYES	RHINOBATIDAE	Rhinobatos	rhinobatos	Common Guitarfish, Violinfish	EN	A4cd	3.1	2007	decreasing	N

Species ID	Kingdom	Class	Family	Genus	Species	Common names (Eng)	Red List status	Red List criteria	Red List criteria .	Year assessed	Population trend	Petitioned
60180	ANIMALIA	CHONDRICHTHYES	RHYNCHOBATIDAE	Rhynchobatus	luebberti	African Wedgefish, Guitarra, Lubberts Guitarfish, Spikenose Wedgefish	EN	A2ad+3d+4ad	3.1	2006	decreasing	N
61408	ANIMALIA	CHONDRICHTHYES	RAJIDAE	Rostroraja	alba	Bottlenose Skate, Spearnose Skate, White Skate	EN	A2cd+4cd	3.1	2006	decreasing	N
39508	PLANTAE	MAGNOLIOPSIDA	CELASTRACEAE	Salacia	fimbrisepala		CR	A1c+2c	2.3	2000		N
143239	ANIMALIA	AVES	Strigidae	Scotopelia	ussheri	Rufous Fishing-owl, Rufous Fishing Owl, Ussher's Fishing Owl	EN	C2a(i)	3.1	2008	decreasing	N
33915	PLANTAE	MAGNOLIOPSIDA	RUBIACEAE	Sericanthe	toupetou		EN	B1+2c	2.3	1998		N
39385	ANIMALIA	CHONDRICHTHYES	SPHYRNIDAE	Sphyrna	lewini	Scalloped Hammerhead	EN	A2bd+4bd	3.1	2007	unknown	N
33061	PLANTAE	MAGNOLIOPSIDA	LEGUMINOSAE	Swartzia	fistuloides		EN	A1cd	2.3	1998		N
32201	PLANTAE	MAGNOLIOPSIDA	LEGUMINOSAE	Talbotiella	gentii		CR	A1c, B1+2c	2.3	1998		N
33063	PLANTAE	MAGNOLIOPSIDA	SAPOTACEAE	Tieghemella	heckelii	Cherry Mahogany	EN	A1cd	2.3	1998		N
32202	PLANTAE	MAGNOLIOPSIDA	RUTACEAE	Vepris	heterophylla		EN	A1c, B1+2c	2.3	1998		N

IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4. <www.iucnredlist.org>. Downloaded on **19 April 2011**.

APPENDIX 7. TABLE OF POTENTIAL COLLABORATORS AND THEIR FOCUS AREAS

Key
Type: N=NON GOVERNMENTAL ORGANISATION G= GOVERNMENTAL
Relationship to USAID: I=IMPLEMENTER D=DEVELOPMENT PARTNER N= None

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
Government Institutions																		
Environmental Protection Agency (Climate Change focal point)	Ensure environmentally sound and efficient use of both renewable and non-renewable resources in the process of national development; Create awareness to mainstream environment into the development process at the national, regional, district and community levels; To apply the legal processes in a fair, equitable manner to ensure responsible environmental behaviour in the country	G	I	Daniel Amlalo www.epaghana.gov.gh	√	√					√		√	√	√		√	
Forestry Commission	Regulation of utilization of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them	G	I	Robert Bamfo www.fcghana.com	√	√			√	√								
Water Resources Commission	Processing of water rights and permits; Planning for water resources development and	G	I	www.wrc-gh.com			√				√							

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
	management with river basins (catchments) as the natural units of planning; Collating, storing and disseminating data and information on water resources in Ghana; Monitoring and assessing activities and programmes for the utilisation and conservation of water resources																	
Energy Commission	Recommend national policies for the development and utilization of indigenous energy resources; advice the Minister responsible for Energy on national policies for the efficient and safe supply of electricity, natural gas, and petroleum products having regard to the economy; provide the legal, regulatory and supervisory framework for providers of energy in Ghana(i.e. licensing, prescription of uniform rules of practice by legislative instrument, inspection, monitoring and compliance of rules); secure a comprehensive database for national decision making as regards the development and utilization of energy resources available to the nation; promote competition in the energy market and enforce standards of performance.	G	I	http://new.energycom.gov.gh/							√			√				

					CURRENT FOCUS AREAS														
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
Fisheries Commission	Rebuild and maintain robust fisheries resources through policy reforms, cooperative regulatory planning; Develop and implement appropriate management frameworks that ensure fisheries resources are harvested sustainably, improved intra-regional and international trade of fish and fishery products and maximum economic and social benefits are obtained from the fisheries. Develop the capacity of Small-scale fishers and other operators to create sustainable livelihoods for their people from the sustainable harvest, processing and marketing of their fisheries resources	G	I				√	√			√	√		√				
Minerals Commission	Formulate recommendations of national policy for exploration and exploitation of mineral resources. Emphasis on setting national priorities cognizant of the national economy. Advise the Minister on matters relating to minerals; Monitor the implementation of Government Policies on minerals and report to the Minister; Monitor operations of all bodies or establishments with responsibility for minerals and report to the Minister; Receive and access public agreements relating to minerals and report to Parliament; Secure comprehensive data on national mineral resources and technologies of exploration and exploitation for national decision making	G	I	http://www.ghana-mining.org/ghweb/en/ma/mincom.html							√				√				

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
Resource Management Support Centre (RMSC)	Provide technical mapping services to the Forestry Commission	G	I	Edward Obiaw info@rmsc.fcghana.com					√	√								
NGOs																		
Civic Response		N	N	Kyeretwie Opoku www.civicresponse.org	√	√			√	√	√						√	
Nature Conservation Research Centre	Assist communities/ private sector manage lands to maximize carbon sequestration and biodiversity conservation; Facilitate introduction of more sustainable methods for domestic charcoal trade in rural Ghana; Provide expertise on protecting endangered plant and animal species to communities, private sector and govt.; Promote carbon trading and payments for ecosystem services in the sub-region, as well as solar energy solutions linked to conservation initiatives for rural communities ; Build expertise within the West African sub-region regarding climate change and carbon issues	N	I	John Mason http://www.ncrc-ghana.org/	√	√			√	√							√	
Arocha Ghana	Environmental action through community-based conservation interventions; promote community, conservation, cross-cultural cooperation and via underlying Christian principles to sensitize people to care for the world's natural resources	N	N	Baba Abubakari		√			√	√							√	

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
Coalition of Civil Society on Land (CICOL	The CICOL is a network of Civil Society Organizations working and advocating equitable land tenure practices, policies and management in Ghana.	N	N	Lillian Bruce cicolghana@gmail.com												√		
KASA-Care International	A natural resource and environment sector specific civil society support mechanism in Ghana; Builds on and strengthens existing non state actors' coalitions and experiences and seeks to promote direct engagement between Ghanaian civil society organizations, the media and government at all levels	N	I	Zakaria Yakubu www.kasa.co.care.org					√	√	√	√			√		√	
New Energy Ghana	Working in partnership with local communities and other stakeholders to improve access to social services, infrastructure and other development opportunities to the underserved in Ghana. Supports the development, testing and dissemination of a wide range of appropriate technologies for water and sanitation, energy services, and small-holder agriculture.	N	N	Thomas Imoro info@newenergygh.org							√		√				√	
SEND Foundation	Advocacy on development that provides men and women with equal opportunities to actively participate in and contribute to political, economic and social transformation of communities; promote community-driven development initiatives, economic literacy and policy	N	N	Country Director www.sendwestafrica.org			√											√

					CURRENT FOCUS AREAS														
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
	advocacy; Forge strong partnerships with state and non-state actors characterized by mutual accountability, openness and effective communi cation. Provide an enabling environment for innovative development.																	
Kumasi Inst of Tech and Environment (KITE)	Conducting evidence-based and comparative research to generate relevant knowledge that informs and influences policy formulation and implementation for poverty reduction and economic growth; promote enterprise-centered approaches and models through technical support and financing as a sustainable option for the delivery of energy services.	N	N	Ishmael Edjekumhene www.kiteonline.net									√	√			√	
Coastal Resources Center	Mobilizes governments, business and communities around the world to work together as stewards of coastal ecosystems. With our partners we strive to define and achieve the health, equitable allocation of wealth, and sustainable intensities of human activity at the transition between the land and the sea	N	I	Mark Fenn www.crc.edu			√	√		√	√	√		√			√	
Catholic Relief Services	Support water and sanitation, agribusiness, and peace-building reach some of Ghana's most vulnerable communities, in addition to building a solid network of committed and experienced partners.	N	N	Kris Ozar www.crs.org			√				√							

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
Rain Forest Alliance	Conserve biodiversity and ensure sustainable livelihoods by transforming land-use practices, business practices and consumer behaviour	N	I	Elvis Kudaar www.rainforest-alliance.org	√	√	√		√	√								
Centre for Environmental Impact Analysis	Undertake information dissemination and advisory services through an international, national and local environmental information network; Independently monitor and assess the levels of pollutants in the environment; Advocate for sound environmental practices in all aspects of Ghana's economy	N	N	Samuel Obiri http://www.ceiagh.com					√	√	√	√	√	√	√		√	
Zasilari Ecological Farms	Support Ghana's efforts at developing the agricultural base which is the backbone of local economy through the use of Organic Agriculture (for food security) and, promoting sound and sustainable use of natural resources in the districts of Northern Region.	N	N	David Agongo www.zefp.org			√		√	√								
Friends of the Nation	Serves as a catalyst for increased action for sustainable natural resource management and health environment; Service to wetland and forest dependent communities as well as poor urban communities through education, training, networking and advocacy	N	N	Donkris Mevuta				√	√	√	√	√		√				
WACAM	Network for the protection of the environment, natural resources and the rights of marginalized mining communities through advocacy, campaign and representation within a legal	N	N	Daniel Owusu-Koranteng www.wacamghana.com					√	√	√	√		√	√			√

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
	framework that is sensitive to the concerns of mining communities.																	
Working Group on Forest Certification (WGFC)	Guaranteeing the functioning of forest and chain of custody certification in Ghana through setting and promoting internationally acceptable standards, facilitation of certification processes and monitoring the implementation of the standards with recognized arbitration procedures for forest, industry and community sectors operators.	N	N	Ernest Abeney www.workinggroupgh.org					√	√								
Association of Jasikan Civil Society Organizations (AJADSCO)	Address the issues of illegal logging, bushfire menace. Strengthening CSOs on environmental issues in the Project area. Addressing specific NREG issues such as effective law enforcement under the forestry sub sector and strengthening functional partnerships and participation in environmental management under the environmental protection sub sector.	N	N	Kofi Asare Baffour					√	√								
Development Institute	Enable African communities confront their development challenges with passion and commitment towards social stability and care for nature. Policy research, dialogue, advocacy and capacity building for sustainable community development	N	N	Ken Kinney www.thedevin.org				√	√	√	√							
Forest Watch Ghana	Deepen the political economic analysis of grassroots groupings	N	N	Kingsley Bekoe	√	√			√	√							√	

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
	and to facilitate their networking towards the emergence of articulate social movements that could lead in the democratization and development of African societies and in international development struggles			www.forestwatchgh.org														
Friends of the Earth	Conservation and sustainable use of the world's natural resources to improve the economic and social well-being of present and future generations. Emphasizes on the need to integrate environmental sustainability with gender equity	N	N	Noble Wadzah www.foeghana.og	√				√	√	√							
ISODEC	works in solidarity with those striving for social justice towards a life of dignity by promoting rights and accountability; defending and promoting public goods (water, education and health) and basic human rights	N	N	Bishop Akologo www.isoc.org.gh					√	√					√		√	√
TWN-Africa	Research and Advocacy on issues of social and economic policy that advances the needs and interests of peoples of African and other third world countries (especially marginalized social groups), a fair distribution of world's resources, and forms of development which are sustainable and fulfill human needs	N	N	Yao Graham www.twnafrica.org					√	√					√		√	√
International Union for Conservation of Nature	International Union for Conservation of Nature, helps the world find pragmatic solutions to our most pressing	N	N	Samuel Nyame www.iucn.org	√	√	√		√	√							√	√

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
(IUCN)	environment and development challenges. IUCN supports governments, NGOs, international conventions, UN organizations, companies and communities to develop laws, policy and best-practice.																	
Friends of Rivers and Water Bodies	an advocacy group for Integrated Water Resource Management (IWRM) by using a combination of traditional and contemporary technologies to provide a sustainable solution to the depletion of this precious natural resource – WATER	N	N	www.waterfriendsgh.org														
Ghana Wildlife Society	he Society is a non-governmental, non-political, non-profit making environmental organization which seeks to conserve wildlife in all its forms to ensure a better environment and improved quality of life for all people.	N	N	www.ghanawildlifesociety.org					√	√								
Civil Society Platform on Oil and Gas	Is a forum for civil society to share knowledge about oil and gas exploration and governance, strengthen civil society voice and forge a common strategy for engaging with other stakeholders such as the Government of Ghana, Petroleum Companies and frontline oil communities.	N	N	Mohammed Amin Tabat15@yahoo.co										√				√
Climate Focus	Independent expert in international and national climate law, policies, project design and finance; pioneering carbon markets since their inception; services range from the development of policies to	N	N	Charlotte Streck www.climatefocus.com	√	√			√	√								

					CURRENT FOCUS AREAS													
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
	protect the rainforest to structuring greenhouse gas mitigation projects in energy sector.																	
Tropenbos International	A platform supporting the forest and development agenda in developing countries for improving knowledge, personal capacity and institutional capacity for better governance and management of tropical forest resources. We operate partnership programs between research institutions in the North and the South to build capacity that meets the needs of forest stakeholders.	N	N	Samuel Nketsia www.tropenbos.org	√	√			√	√								
Conservation Alliance	Assisting fringe communities in Africa in creating economic opportunities that result in improved wildlife and habitat management, and wealthier healthier communities.	N	N	Yaw Osei-Owusu www.conservealliance.org	√	√			√	√	√							
Conservation International	Empowerment of societies to responsibly and sustainably care for nature, global biodiversity, for the well-being of humanity.	N	N	Nicholas Jengre http://www.conservation.org/Pages/default.aspx	√	√			√	√								
Katoomba Group	An international network of individuals working to promote, and improve capacity related to, markets and payments for ecosystem services (PES); a forum for the exchange of ideas and strategic information about ecosystem service transactions and markets, as well as site for collaboration between	N	N	Rebecca Ashley Asare www.katoombagroup.org	√	√			√	√								

					CURRENT FOCUS AREAS														
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
	practitioners on PES projects and programs.																	
Development Partners																		
Netherlands Development Organisation (SNV)	The development goal of SNV Ghana is to contribute to the national development agenda as espoused in the Millenium Developement Goals (MDGs).	D	D	Southern Portfolio Team ghana@snvworld.org			√		√				√		√		√	√
Canadian International Development Agency (CIDA)	CIDA's mission is to lead Canada's international effort to help people living in poverty.	D	D	Romeo Adomah-Darteh www.psu-ghana.org			√		√	√	√						√	√
UK Department for International Development (DFID)	- Ensuring that the government of Ghana's resources are well managed for the benefit of all citizens - Encouraging enterprise and wealth creation - Ensuring quality education services - Reducing maternal mortality and child death	D	D	Sean Doolan www.dfid.gov.uk	√	√											√	
Norwegian Agency for Development Cooperation(NORAD)	The Norwegian Agency for Development Cooperation (Norad) is a directorate under the Norwegian Ministry of Foreign Affairs	D	D	Arne Olsen www.emb-norway.com.ng										√			√	
Netherlands Embassy	Represent the Government of the Netherlands in developing and maintaining productive relations with the GoG and its people	D	D	Ton van der Zon http://ghana.nlembassy.org		√			√	√	√			√				√
United Nations Development Program	The UN's global development network, an organization advocating for change and connecting countries to	D	D	Stephen Yentumi www.undp-gha.org		√												√

					CURRENT FOCUS AREAS														
Organization Name	**Institutional objective/ mission**	**Type**	**Relationship**	**Contact**	**REDD**	**CDM**	**Agriculture**	**Fisheries**	**Forestry**	**Biodiversity**	**Water**	**Coastal**	**Bio-energy**	**Oil & Gas**	**Mining**	**Land Tenure**	**Research**	**Gov/ Health**
(UNDP)	knowledge, experience and resources to help people build a better life																	
WaterAid	WaterAid has been working in Ghana since 1985 helping the most vulnerable in society gain access to safe water supplies, sanitation and hygiene education	D	D	Abdul-Nashiru Mohammed www.wateraid.org							√							√
Oxfam America	Oxfam America is an international relief and development organization that creates lasting solutions to poverty, hunger, and injustice	D	D	Wendy Sherman www.oxfamamerica.org	√		√		√	√	√			√	√		√	
GTZ/GIZ	GTZ (now GIZ) implements programmes and projects there on behalf of the German Federal Ministry for Economic Cooperation and Development	D	D	Fred Brandl www.gtz.de			√				√							
DED is now also GIZ	The DED Ghana promotes complex reforms and change processes. Its corporate objective is to improve people's living conditions on a sustainable basis and to transfer knowledge to our partner countries. It provides viable, forward-looking solutions for political, economic, ecological and social development	D	D	Kay Andraschka www.ghana.ded.de			√				√							
World Bank	The World Bank is a source of financial and technical assistance to developing countries around the world	D	D	Flavio Chaves www.worldbank.org	√	√			√					√	√			√

This page is intentionally left blank

APPENDIX 8. KEY REFERENCE WEBSITES

Amansuri Wetlands: http://www.birdlife.org/datazone/sitefactsheet.php?id=6341

Buffer Zone Policy Draft, Water Resources Commission: http://www.wrc-gh.org/Final_draft_wrc.pdf

Coastal Resources Center: http://www.crc.uri.edu/index.php?projectid=110

Cocoa Industry of Ghana report: http://siteresources.worldbank.org/AFRICAEXT/Resources/258643-1271798012256/ghana_cocoa.pdf

Codjoe, Samuel Nii Ardey, Population growth and agricultural land use in two agro-ecological zones of Ghana, 1960-2010, *Regional Institute for Population Studies, University of Ghana*
http://paa2007.princeton.edu/download.aspx?submissionId=7018

Conservation of Biodiversity, Country Profile, Ghana:
http://www.cbd.int/countries/profile.shtml?country=gh#status

Division of Wildlife, Ghana, CREMA briefing paper:
http://www.fcghana.com/publications/wildlife_issues/collab_resource_mgt_briefing.pdf

Earth Trends database: (http://earthtrends.wri.org/searchable_db/index.php?theme=7)

FAO database, Ghana:
http://www.fao.org/ag/AGP/agpc/doc/Counprof/Ghana/Ghana.htm#3.%20CLIMATE%20AND%20AGRO-ECOLOGICAL%20ZONES

Food and Agriculture Sector Development Policy (FASDEP II): http://www.mofa.gov.gh/FASDEP%20II

FishBase Fish Species Overview: http://www.fishbase.org/Country/CountryChecklist.php

Forest Resource and Land Tenure: http://www.fao.org/forestry/12505-01d2e95c6b96016463fe58818c7e9c29d.pdf

Forest Tree Ownership in Ghana, FAO Report: ftp://ftp.fao.org/docrep/fao/006/y7210e/y7210e00.pdf

Forestry Commission, Forest deforestation estimates: www.fcghana.com/programmes/nfpdp/index.html

Food and Agriculture Organization of the United Nations:

Grazing and Agriculture:
http://www.fao.org/ag/AGP/agpc/doc/Counprof/Ghana/Ghana.htm#8.%20REFERENCES

Country Brief: http://www.fao.org/countries/55528/en/gha/

Fishing: http://www.fao.org/fishery/countrysector/FI-CP_GH/en

Ghana Butterfly Report: http://abdb-africa.org/user/biblio/2195.pdf

GSBA, Case Study: http://www.mgi-forests.org/media/AA/AI/mgi-forests-org/downloads/76841/Globally_Significant_Biodiversity_Areas__GSBAs__Designation_and_their_Impacts_on_Livelihoods.pdf

GSBA Information, Forestry Commission: http://www.fcghana.com/programmes/nrmp/bio.html

IUCN Ghana Endangered Species Web Listing: http://www.iucnredlist.org/apps/redlist/search/link/4dacd210-1cd2dd9f

Kalakpa Resource Reserve, Environmental Goods and Services: http://www.waldbau.uni-freiburg.de/Download/pdf/pdf_bil_vortrag/Livelihoods/T.%20v.%20d.%20Sluis.pdf

Kalakpa Resource Reserve, Resources and People in Crisis: http://www.moongateassociates.com/documents/KalakpaFinal.pdf

Livestock Sector Brief, FAO 2005: http://www.fao.org/ag/againfo/resources/en/publications/sector_briefs/lsb_GHA.pdf

Land Rights and Tree Tenure: http://redd-net.org/files/Ghana%20Case%20Study.pdf

National Biodiversity Strategy for Ghana (Ministry of Environment, Science and Technology): http://www.cbd.int/doc/world/gh/gh-nbsap-01-en.pdf

Oil, Final Environmental Impact Statement for Jubilee Oil Field: http://www.tullowoil.com/ghana/index.asp?pageid=14

Nature World Wide, The National Parks and Nature Reserves of Ghana: http://www.nationalparks-worldwide.info/ghana.htm

Park and Wildlife Reserve data for Ghana: www.fcghana.com/forestry_commission/wildlife.htm

Parliamentary Bills: http://www.parliament.gh/bills/bills.html

Sweetening the Deal for Shade-Grown Cocoa: A Preliminary Review of Constraints and Feasibility of 'Cocoa Carbon' in Ghana: http://www.katoombagroup.org/~foresttr/documents/files/doc_2352.pdf

World Bank Data Base forest cover estimates: http://data.worldbank.org/indicator/AG.LND.FRST.ZS/countries

World Bank, Ghana Country Environmental Assessment: http://siteresources.worldbank.org/INTRANETENVIRONMENT/3635842-1175696087492/21919456/Ghana_CEA.pdf

APPENDIX 9. ETOA BIBLIOGRAPHY

Afriyie, Matilda Akua, Globally Significant Biodiversity Areas (GSBAs) Designation and their Impacts on Livelihoods: A case study of the Tano Offin GSBA in the Atwima Mponua and Ahafo Ano Districts of the Ashanti Region of Ghana. Case Study Report, July 2010

Atta-Kesson, Rowland and Atuguba, Raymond *A.:* Of Fish, Fishing, Fisherfolk, the Law and Fishing Institutions

Boakye, K. Akyeampong and Baffoe, K. Affum, Trends in Forest Ownership, Forest Resource Tenure and Institutional Arrangements, Case Study from Ghana

Codjoe, Samuel Nii Ardey, Population growth and agricultural land use in two agro-ecological zones of Ghana,1960-2010, *Regional Institute for Population Studies, University of Ghana*

Integrated Regional Information Networks (IRIN), *Ghana: Police crackdown on migrant Fulani herdsmen*, 29 April 2010, available at: http://www.unhcr.org/refworld/docid/4bdfdae18.html [accessed 10 April 2011]

FAO, *Woodfuels use in Ghana: social, economic and energy dimensions*

Ghana Country Environmental Analysis, World Bank, Report No: 36985-GH, September 2006

Ghana Shared Growth and Development Agenda (GSGDA), National Development Planning Commission, December, 2010

Larsen – Ghana Butterfly Report, 1994

Ministry of Food and Agriculture: Food and Agriculture Sector Development Policy (FASDEP II), August 2007

Ouagadougou, BF, UICN/PACO (2010). *Parks and reserves of Ghana: Management effectiveness assessment of protected areas.*

Osafo, Yaw B., A Review of Tree Tenure and Land Rights in Ghana and their Implications tor Carbon Rights in a National REDD+ Scheme, 2010

Opoku-Agyemang ,Maxwell: The role of the district assemblies in the management of trans-district water basins in Ghana, 2005

Oppong-Anane, Kwame, FAO, Country Report, Pasture/Forage Resource Profiles

Palmer, R. (2006), Natural *resource* and land *use* assessment of *Kalakpa Resource Reserve* and surrounding areas. Wildlife Division & SNV Netherlands

Rai, Neena and Henshaw,Caroline , *Indonesia, Ghana May Fill Cocoa Void,* Wall Street Journal, April 6, 2011

Report No: 36985-GH, Ghana Country Environmental Analysis September 06, 2006, The World Bank, Agence Française de Développement, Royal Netherlands Embassy, Document of the World Bank

Sweetening the Deal for Shade-Grown Cocoa: A Preliminary Review of Constraints and Feasibility of 'Cocoa Carbon' in Ghana, Katoomba XV, October 2009

Water Resources Commission Final Draft Buffer Zone Policy for Managing River Basins in Ghana, August 2008

Wuver, A. M. and D. K. Attuquayefio, The Impact of Human Activities on Biodiversity Conservation in a Coastal Wetland in Ghana, 2006

This page is intentionally left blank

This page is intentionally left blank

U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Tel: (202) 712-0000
Fax: (202) 216-3524
www.usaid.gov