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MINISTRY OF FOOD AND AGRICULTURE

Ghana Commercial Agriculture Project (GCAP)

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

FINAL REPORT

November, 2011

EXECUTIVE SUMMARY

Introduction

The Government of Ghana has received an advance on the proceeds of a credit from the International Development Agency (IDA – World Bank Group) to finance the preparation of the proposed Ghana Commercial Agriculture Project (GCAP). The project preparation is under the overall responsibility of Ministry of Food and Agriculture (MoFA). The development objective of GCAP is to improve the investment climate for agri-business and establish inclusive PPPs aimed at increasing on-farm productivity and value addition in selected value chains in the Accra Plains and the Northern regions (SADA). The activities will trigger the environmental assessment policy (OP.4.01). The impacts here will range from small scale and site specific to larger infrastructure investment projects associated with category A projects of the World Bank as well as trigger sections of the Environmental Assessment Regulations of the Ghana Environmental Protection Agency (EPA). Since the GCAP is evolving, the appropriate instrument at this stage is the Environmental and Social Management Framework (ESMF)[1].

Purpose of the ESMF

The general framework for the assessment and management of environmental and social safeguards of developments/projects in Ghana is provided in the Environmental Assessment (EA) Regulations - Legislative Instrument (LI) 1652. Some development partners however, have their respective Environmental and Social (E&S) safeguards procedures and policies which must be followed for projects funded by them. As part of the funding arrangements for the GCAP therefore, the World Bank's E&S safeguards policies (OP/BP 4.01) applies. This requires the preparation of an Environmental and Social Management Framework (ESMF) along with an Environmental and Social Management Plan (ESMP). The features of the GCAP which make an ESMF the appropriate requirement under the Bank's OP/BP 4.01 are listed below. The GCAP has:

- A number of sub-projects and components;
- Various developmental stages to be carried out in modules;
- Sub-projects spread over a wide geographic area
- Implementation phases and duration spread over 5 years; and
- Design of the sub-projects and exact locations for implementation, as well as impacts are not yet determined at this stage.

The ESMF spells out the E&S safeguards, institutional arrangements and capacity required to use the framework. This ensures that sub-projects under the GCAP

[1] - **This report is prepared by SAL Consult Limited, P. O. Box GP20200, Accra-Ghana**

meet the national and local E&S requirements, and also consistent with OP/BP 4.01 and OP/BP 4.12 (of the Bank). The ESMF sets out basic principles and processes within which the sub-projects are implemented agreeable to all parties. The other objectives of the ESMF include:

- Assessment of potential adverse E&S impacts commonly associated with the sub-projects and the way to avoid, minimize or mitigate them;
- Establishment of clear procedures and methodologies for the E&S planning, review, approval and implementation of sub-projects;
- Development of an ESA screening/initial assessment system to be used for sub-projects; and
- Specification of roles and responsibilities and the necessary reporting procedures for managing and monitoring sub-project E&S concerns.

The Proposed Project

The proposed project would have two components, with the first being focused on improving the overall investment climate for agricultural development in Ghana, and the second more directly targeting private sector led agricultural investment involving smallholder farmers through PPP arrangements. The second component would initially be focused in the Northern and Accra Plains regions but, depending upon outcomes, could be extended to other areas.

Policy, Legal and Administrative Framework

The policy, legislation and institutional procedures of Ghana and those of the World Bank, which are relevant to the sector and GCAP and therefore considered included:

- National environmental requirements;
- National labour, safety and health requirements;
- International and regional requirements; and
- World Bank operational Safeguards requirements.

The major national policy documents comprise the Medium Term National Development Policy Framework (Ghana Shared Growth and Development Agenda- GSGDA)), 2010 to 2013 and the PPP Policy Document (MoFEP, 2011). The regulatory framework is underpinned by the Constitution of the Republic of Ghana 1992, and the Ministry of Food and Agriculture is spearheading the institutional effort.

The EPA Act 1994 (Act 490) and Environmental Assessment Regulations 1999 LI1652 establish procedures for an ESIA process in Ghana. The World Bank is guided by policies/ procedures to ensure the safe development of projects it is funding. The relevant WB safeguards policies triggered by the projects include :**OP/BP**, **4.01 Environmental Assessment , OP/BP 4.04 Natural Habitats**, **OP/BP 4.09 Pest Management ,**

OP/BP4.11 Physical Cultural Resources , OP/BP 4.12 Involuntary Resettlement , OP/BP 4.36 Forests , OP/BP 4.37 Safety of Dams , and OP/BP 7.50 Projects on International Waterways .

The World Bank safeguard policies override the Ghana policies should there be any discrepancy.

Project Areas

The project location is within the Savannah Accelerated Development Authority (SADA) Regions and Accra Plains Regions of Ghana. The SADA Regions comprise Upper East Region, Upper West Region, Northern Region and northern parts of the Volta and Brong Ahafo Regions.

Accra Plains Project Area

The project area called Accra Plains is located south of the country. It is bounded on the west by the river Dechidaw crossing Dawhenya that extends to Kpong dam. On the south, it is bounded by Accra-Ada Highway and on the North and East by Volta region. The plains are an advantageous area for irrigation because of its proximity to major agricultural products markets and also its easy access to the port and airport facilitates export. In addition, Accra plains are drained from their eastern border by Volta River downstream of Kpong hydropower dam. The Districts concerned by Accra Plains Irrigation Project are: Yilo Krobo District, South Tongu District, North Tongu District, Dangbe East District and Dangbe West.

The entire project area of 11,000 ha falls under two customary settings. They are; the Osudoku Traditional Area and the North Tongu Traditional Area. Customary land ownership in the form of family lands is the main type of land ownership within the project area. Family lands are vested in the head of the family and is not under government control. They are governed by customary laws prescribed by the local community. Other forms of land ownership within the project area include public land and individual land owners.

The SADA Regions

The Northern Savanna forms more than half of the total Ghana land surface cover of about 239,000 square km (23.9 million ha). The project area lies between latitudes 8^0 and 11^0 N and longitude 1^0 E and 3^0W. Togo bound it to the east, Burkina Faso to the north, Cote d'lvoire to the west and the high forest ecological zone to the south. The economy of the northern savanna ecological zone is based mainly on agriculture, which is the basis of livelihood for a majority of the population. The small-scale family holding is the basic unit of production. Most of the project area falls within the Guinea Savanna zone, although activities may extend into a small area of Sudan Savanna in the extreme northeast corner of the country.

Gender Issues

As part of the STUDI study in 2009, a gender survey was conducted in the Accra Plains project area which concluded that the main challenges women face are in respect of Access to credit, Land acquisition, high illiteracy rate among women, and disparity in education between boys and girls, Reproductive health issues, Market for produce, Storage, and Property rights. These concerns are even more important in the SADA regions. Some recommendations made were in respect of: women farmers to be fully involved in the planning and implementation of the project, Chiefs and elders of the community to be sensitised to involve women in decision making; Various land policies should be gender friendly and accessible, and Special credit scheme with focus on women.

Potential Environmental and Social Impacts

The following major stakeholders were consulted for role identification and for potential environmental and social impacts likely to arise from the GCAP implementation:

- Environmental Protection Agency (EPA);
- Affected District and Municipal Assemblies;
- Ministry of Health (MoH);
- Project catchment communities;
- Lands Commission (LC);
- Ministry of Food and Agriculture (MoFA);
- Forestry Commission/Wildlife Division (WD);
- Ministry of Environment, Science and Technology (MEST); and
- NGOs. CBOs
- GIDA

The potential GCAP facilities to be provided and associated activities will include provision of irrigation facilities, post harvest infrastructure and agro- processing. The likely associated activities will comprise dam and road construction, extension of power supply from the existing national grid river diversions, water abstraction, construction of irrigation canals, plantation development (agricultural fields), construction of storage facilities, installation of machinery and waste disposal.

The impacts have been categorized into beneficial and adverse impacts.

Beneficial impacts include:

- Flood Control,
- Water Resources Conservation,
- Improved soil conservation,
- Increased farm incomes from crop output, Food Security,
- Poverty Alleviation,

- Raised Rural Income,
- Improved nutrition,
- Employment creation for community members, and Empowerment of farmers

Adverse impacts and their significance:

Some of the major potential environmental issues/impacts arising from project activities and their impacts significance are listed in the table below.

Potential project activities and associated potential adverse environmental and social impacts issues and its significance

No	Projects and Associated Activities	Potential Major Environmental and Social Impact Issues	Environmental Significance
1.	Dams	Water pollution Soil erosion Flooding Alteration of hydrological regime Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Land take Spread of disease Altered downstream water uses Micro climate changes Dam failure	Moderate Moderate Major Major Major Major Major Major Major Major Moderate Moderate
2	Diversion of rivers	Water pollution Flooding Alteration of hydrological regime Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Land take	Moderate Moderate Major Major Major Moderate Moderate
3	Irrigation canals	Water pollution Flooding Alteration of hydrological regime Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Water related diseases Land take	Moderate Moderate Moderate Moderate Moderate Moderate Major Moderate
4	Access roads	Dust and noise pollution Water pollution Solid waste disposal Waste oil/ fuel disposal Public health and safety Traffic congestion and delays Land take	Major Moderate Moderate Moderate Major Minor Minor
5	Power supply	Land take Resettlement related issues	Minor Minor

No	Projects and Associated Activities	Potential Major Environmental and Social Impact Issues	Environmental Significance
		Air quality deterioration	Minor
		Noise/ vibration	Moderate
		Public safety	Minor
		Fire management	Moderate
6	Plantation development (agricultural fields)	Water pollution	Major
		Soil erosion	Major
		Flooding	Moderate
		Alteration of hydrological regime	Moderate
		Destruction of flora and fauna habitat	Major
		Changes in biodiversity	Major
		Resettlement related issues	Major
		Soil and land degradation	Major
		Agro chemical usage	Major
		Pest management	Major
		Groundwater pollution	Moderate
		Micro climate changes	Moderate
		Salinization	Major
		Fire management (bush fire)	Major
7	Agro processing facilities	Land clearing- vegetation loss	Moderate
		Air quality deterioration	Minor
		Noise	Moderate
		Water pollution	Major
		Changes in aquatic life and habitat	Major
		Occupational safety	Major
		Public safety	Moderate
		Solid waste disposal	Major
Social Impact			
8	General	Livelihood loss	Major
		Community disruption	Moderate
		Cultural heritage site	Moderate
		Increase in women work burden	Moderate
		Loss of land for women	Moderate
		Loss of land for land-poor	Major
		Loss of access to non-cash or food crops- medicinal plots	Moderate
		Exclusion of community voice in transactions between investors and traditional authorities	Major

Environmental and Social Mitigation Principles

The ESMF considered a number of mitigation and enhancement measures and also principles for implementation to ensure that GCAP become socially acceptable, environmentally sound and sustainable. The measures include:

- Mitigation principles for the effects of land acquisition
- Rural economy enhancement principles;

- Population influx control principles;
- HIV/AIDS prevention and management principles;
- Socio-cultural conflicts prevention principles;
- Gender and vulnerable groups impacts mitigation principles;
- Air quality control principles;
- Health and safety principles;
- Water resources protection principles;
- Wildlife habitat protection principles;

ESMF Implementation

The successful implementation of the ESMF depends on the commitment of MOFA and related institutions, the capacity within the institutions and the appropriate and functional institutional arrangements among others. The MOFA, GIDA, Lands Commission, MEST, MoFEP and EPA have been involved in the preparation and the review of the ESMF. The key ESMF implementation areas and the relevant institutional roles as well as the institutional arrangement and collaboration for successful implementation of the ESMF of the GCAP have been determined and outlined. The E&S monitoring and reporting roles and responsibilities have within institutions and among the stakeholders have been mapped out.

Environmental and Social Management Plan

A social and environmental screening process, selection and evaluation of GCAP projects are required to manage both environmental and social aspects of these activities, preferably in a participatory manner with beneficiary communities, including women and vulnerable groups. MoFA will use this checklist to screen all potential projects and report accordingly as part of the usual project formulation (feasibility phase) exercise.

Summary of Environmental and Social Screening Process and Responsibilities

No.	Stage	Institutional responsibility	Implementation responsibility
1.	Screening of Environmental and Social Infrastructure Project to assist in project formulation using checklist	MoFA	Environmental and Social Officer
	Statutory Environmental and Social Registration of PPP project	MoFA	Environmental and Social Officer
2.	Determination of appropriate environmental and social assessment level/ category	EPA/ MoFA	Environmental and Social Officer
2.1	Selection validation	World Bank	Environmental and Social Officer

No.	Stage	Institutional responsibility	Implementation responsibility
3.	Implementation of environmental and social assessment	MoFA	Environmental and Social Officer
3.1	If ESIA is necessary		
3.1a	Preparation and Validation of terms of reference	MoFA/World Bank	Environmental and Social Officer
3.1b	Selection of Consultant	MoFA/ Procurement Office	Environmental Officer/ Procurement Officer/ Safeguards Specialist
3.1c	Realization of the ESIA, Public Consultation and Participation, Integration of environmental and social management plan issues/clauses in the tendering and project implementation,	MoFA/ Procurement Office/ Consultancy firm/ Contractor	Environmental and Social Officer/ Procurement Officer
4	Review and Approval	EPA/ World Bank	-
4.1	ESIA Approval (B1)	EPA/ World Bank	-
4.2	Approval simple measures (B2&c)	MoFA	Environmental and Social Officer/ Project Manager
5.	Participatory Public Consultation and disclosure	MoFA/EPA/ World Bank	EO/Contractor/Consultant
6.	Surveillance and monitoring	Implementing agency/EPA/ World Bank/ MoFEP	Environmental and Social Officer/ Safeguards Specialist
7	Development of monitoring indicators	MoFA	Environmental and Social Officer /Safeguards Consultant

Participatory Monitoring Plans and Indicators

Participatory Monitoring Plans have been developed to support the implementation at the project level. These are given in the report and include description of the impact issues, proposed mitigation actions, monitoring indicators, verification, and responsibilities by all parties involved in the GCAP projects.

Institutional capacity

The capacity building requirements will mostly be in the form of training programs. Training workshops/ seminars on the ESMF/RPF and the World Bank safeguard policies would be organized for MoFA and GIDA (head office and regional offices) as well as the Private sector (Project consultants/contractors). The following additional training areas have been identified:

- Environmental and Social Screening Checklist
- Completion of EPA EA Registration Forms

- Preparation of Terms of Reference for ESIA
- Environmental and Social Clauses in Contractors' contract and bidding documents.

The total cost is estimated at US$259,000.

Public consultation and Participation

Numerous persons and institutions were consulted in the project regions in the process of preparing this ESMF. In addition, two (2) public consultations and participation workshops were held in the Accra Plains and in Tamale (SADA regions) which were attended by over 105 stakeholders including farming communities and NGOs. The EPA was fully represented in these meetings and provided assurances of full support to the project. Capacity and gender including the poor and most vulnerable groups issues were highlighted and suggestions provided for technical training and developmental assistance.

LIST OF ABBREVIATIONS

EC	Energy Commission
ESIA	Environmental and Social impacts Assessment
EPA	Environmental Protection Agency
ESMF	Environmental and Social Management Framework
GCAP	Ghana Commercial Agriculture Project
GIDA	Ghana Irrigation Development Authority
GCAPC	Ghana Investment Promotion Council
GoG	Government of Ghana
IEA	Institute for Economic Affairs
IFF	Infrastructure Finance Facility
LVB	Land Valuation Board
MDAs	Ministries, Departments and Agencies
MOFA	Ministry of Food and Agriculture
MOFEP	Ministry of Finance and Economic Planning
NDPC	National Development Planning Commission
NGO	Non Governmental Organisation
PPP	Public Private Partnership
PURC	Public Utilities Regulatory Commission
RCC	Regional Coordinating Council
RPF	Resettlement Policy Framework
SADA	Savannah Accelerated Development Authority
VRA	Volta River Authority
WB	World Bank
WRC	Water Resources Commission

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1.0 INTRODUCTION

Modernizing agriculture' remains the overarching theme of Ghana's agricultural policy as well as the new Public Private Partnership (PPP) programme. It focuses on a stronger role for the private sector in transforming agriculture from a low-productivity subsistence-based sector to one characterized by high-productivity, integrated value chains, and extensive value addition. Government interventions are focused on the enabling environment and other targeted measures to facilitate such investment, alongside more direct interventions targeted at food insecure areas.

A major thrust of the new approach centres on enhancing the role of commercial agriculture and strengthening agricultural value chains. Under the programme the Government is seeking to broaden and deepen private sector investment in agriculture – noting that it is already occurring but can be augmented – in the following ways:

- Additional large-scale commercial farms in the cereals sector has the potential to utilize large tracts of unutilized land to meet domestic consumer demand (rice, white maize) and as lower-cost imports to the poultry industry (yellow maize) and, ultimately, for export to the region.
- There are additional opportunities for multinational investors to expand the horticulture sector, given Ghana's established market presence in Europe and favorable geographical position, to raise export revenues.
- Additional agro-processing especially in the horticulture sector can provide alternative markets to local production that is unable to meet European requirements (tastes or standards) and create jobs.
- More private input dealers can extend the availability of seeds and fertilizer to raise productivity across the sector.
- Additional private enterprises engaged in the marketing and processing of food staples for local consumption, for instance by aggregating output from small-holders for bulk distribution and processing to generate economies of scale in the value chain.

The Government of Ghana has received an advance on the proceeds of a credit from the International Development Agency (IDA – World Bank Group) to finance the preparation of the proposed Ghana Commercial Agriculture Project (GCAP). The project preparation is under the overall responsibility of the Ministry of Food and Agriculture (MoFA). The development objective of GCAP is to improve the investment climate for agri-business and establish inclusive PPPs aimed at increasing on-farm productivity and value addition in selected value chains in the Accra Plains and the Northern regions comprising the Savannah Accelerated Development Authority (SADA)

The activities will trigger the environmental assessment policy (OP.4.01). The impacts here will range from small scale and site specific to larger infrastructure investment projects associated with category A projects of the World Bank as well as trigger sections of the Environmental Assessment Regulations of the Ghana Environmental Protection Agency

(EPA). Since the GCAP is evolving, the appropriate instrument at this stage is the Environmental and Social Management Framework (ESMF).

The ESMF takes into consideration the range of project activities and institutional arrangements for project implementation. Specifically, the focus will be on project components and associated activities and institutional and implementation arrangements for the ESMF.

1.2 Purpose of the ESMF

The general framework for the assessment and management of environmental and social safeguards of developments/projects in Ghana is provided in the Environmental Assessment (EA) Regulations - Legislative Instrument (LI) 1652. Some development partners however, have their respective Environmental and Social (E&S) safeguards procedures and policies which must be followed for projects funded by them. As part of the funding arrangements for the GCAP therefore, the World Bank's E&S safeguards policies (OP/BP 4.01) must apply. This requires the preparation of an Environmental and Social Management Framework (ESMF). The features of the GCAP which make an ESMF the appropriate requirement under the Bank's OP/BP 4.01 are listed below. The GCAP has:

- A number of sub-projects and components;
- Various developmental stages to be carried out in modules;
- Sub-projects spread over a wide geographic area (at least regions components);
- Implementation phases and duration spread over years; and
- Design of the sub-projects and exact locations for implementation, as well as impacts are not yet determined at this stage.

These attributes are typical of a program-type undertaking for which the appropriate level of EA is the Strategic Environmental and Social Assessment (SESA) under the Ghana EA Procedures. The term ESMF is used by the World Bank to depict operations with multiple sub-projects, various phases and spread over a long period - similar in concept to SESA.

According to the EA Regulations of Ghana "provision of irrigation facilities, post harvest infrastructure and agro- processing and the likely associated activities will comprise dam and road construction, extension of power supply from the existing national grid, river diversions, water abstraction, construction of irrigation canals, plantation development (agricultural fields), construction of storage facilities, installation of machinery and waste disposal " is an undertaking that requires

registration and an environmental permit [LI 1652: Schedule 1, Regulation 1, Sub-Section 23 (a)]. Thus, the GCAP falls under Schedule 2 (EIA mandatory) of the EA Regulations. The GCAP is classified as Category A under the World Bank's EA Procedures.

The ESMF spells out the E&S safeguards, institutional arrangements and capacity required to use the framework. This ensures that sub-projects under the GCAP meet the national and local E&S requirements, and also consistent with OP 4.01 and OP 4.12 (of the Bank). The ESMF sets out principles and processes within which the sub-projects are implemented agreeable to all parties. The other objectives of the ESMF include:

- Assessment of potential adverse E&S impacts commonly associated with the sub-projects and the way to avoid, minimize or mitigate them;
- Establishment of clear procedures and methodologies for the E&S planning, review, approval and implementation of sub-projects;
- Development of an EA screening/initial assessment system to be used for sub-projects; and
- Specification of roles and responsibilities and the necessary reporting procedures for managing and monitoring sub-project E&S concerns.

1.3 Rationale for the ESMF

The Ghana Environmental Assessment Regulation 1999, LI 1652 provides the list of projects for which ESIA is mandatory. The projects under GCAP mostly falls under this category. In addition, they are also World Bank category A Projects. Specific projects have not been clearly identified at this stage, hence an ESMF provides a general impact identification framework to assist project implementers to screen the projects and institute measures to address adverse environmental and social impacts. Specific information on country- wide project locations, land requirements, bio- physical features etc when known at a later stage will trigger the preparation of Environmental and Social Impact Assessment (ESIA) reports.

1.4 Approach for the preparation of ESMF

The ESMF has been prepared in accordance with applicable World Bank safeguard policies and Ghana environmental assessment guidelines, and which involves the following activities:

- Data Gathering;
- Participatory Public consultations and discussions with relevant sector institutions, including non- governmental organizations (NGOs);

- Data collection and analysis, consisting of Literature reviews; Environmental and Social screening and scoping studies; Determination of potential impacts; Identification of impacts mitigation measures; Preparation of an Environmental and Social Management Plan; and Preparation of sub-project guidelines.
- Workshops
- Review of comments from stakeholders; and
- Preparation and Submission of reports.

2.0 DESCRIPTION OF THE GHANA COMMERCIAL AGRICULTURE PROJECT (GCAP)

2.1 Background

The Government of Ghana is adopting a new approach of public-private partnerships (PPPs) in which complementary and targeted public support serves to facilitate private investment in the agriculture sector. A major thrust of the new approach centres on enhancing the role of commercial agriculture and strengthening agricultural value chains. Under the program the Government is seeking to broaden and deepen private sector investment in agriculture – noting that it is already occurring but can be augmented in many ways.

Innovative institutional arrangements between large(r) scale investors and small-holders can generate mutual benefits and provide effective mechanisms for bolstering small-holder productivity. For instance, out-grower schemes provide linkages between vertically integrated plantations and surrounding small-holders. Contract farming arrangements can provide benefits for input and output dealers and small-holder farmers. To this end, the Government is keen to develop the Accra Plains Region and the SADA regions through public private partnership and provide support to encourage the development of nucleus investment arrangements for the benefit of local smallholder farmers.

2.2 Development Objective and Approach

The project development objective is to improve the investment climate for agri-business and establish inclusive PPPs aimed at increasing on-farm productivity and value addition in selected value chains. The main outcome of the project would be an improved investment climate that delivers more – and more inclusive – private sector investment in agriculture.

The proposed project would be based on four main concepts:

- Support and strengthen the Government's ability to promote a sound enabling environment for commercial agriculture investment (large and small; foreign and domestic)
- Address the fragmented nature of existing policy and capacity by consolidating core functions into a streamlined institutional structure (perhaps a one-stop-shop).

- Adoption of a 'transaction based approach' by seeking to identify, package, negotiate and secure specific investments, with a PPP element where necessary.
- Social and environmental issues to be at the core of the project, with all commercial agriculture investments to adhere to national and World Bank standards.

2.3 Project Scope

The proposed project would have two components:
Component One: Strengthening investment promotion infrastructure, facilitating secure access to land and project management.
This component would ensure that Ghana attracts investors willing and able to invest in strategic subsectors that contribute most positively to national development gains.

Component Two: Securing PPPs and small- holder linkages
This component would involve the identification and realization of private investments in the value chain through PPPs. Investors could be local or international. Investments could be in production or processing and ancillary businesses. Two main sub-components are envisaged:

Northern Regions Sub-component. This would include support to warehousing and storage through the rehabilitation and concessioning of publically owned marketing infrastructure (including the development of warehouse receipts system). It would also include support for agri-business centres that provide essential services and inputs to small-holder farmers. In both cases, the project would encourage formal linkages with small-holders. This would initially focus on the Northern Regions comprising SADA.
Accra Plains Sub-component. This would provide assistance for the establishment of large commercial farms as nucleus farms with appropriate linkages under out-grower schemes. Support to the nucleus would include critical access infrastructure including roads, power connections and primary irrigation facilities. It would also include additional support to extend nucleus investments for the benefit of small-holders through various means including assistance to expand necessary infrastructure into out-grower lands as well as direct support to the smallholders to ensure they are capable out-growers. This component would focus on the Accra Plains, where an area of 11,000ha has been proposed (in general terms) for a substantial irrigation investment to be managed under a PPP and which would supply water to both large commercial farms and an out-grower scheme. The project would be responsive to similar opportunities in other regions, especially when put forward by the private sector themselves.

The savannah zone (in collaboration with the Savannah Accelerated Development Authority (SADA)) and the Accra Plains would be a particular focus for project interventions to attract private investment.

3.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The environmental policy and EA legislation and procedures of Ghana and those of the World Bank, which are relevant to the GCAP are outlined. In principle the two sets of policies and procedures on environmental and social assessment are similar in many respects.

3.1 National Environmental Requirements

3.1.1 Ghana's Environmental Policy

The environmental policy of Ghana formulated in the National Environmental Action Plan (NEAP) of 1993 hinges strongly on 'prevention' as the most effective tool for environmental protection. The policy aims at a sound management of resources and environment, and the reconciliation between economic planning and environmental resources utilization for sustainable national development. It also seeks among others, to institute an environmental quality control and sustainable development programs by requiring prior EA of all developments, and to take appropriate measures to protect critical eco-systems, including the flora and fauna they contain against harmful effects, nuisance or destructive practices. The adoption of the NEAP led to the enactment of the EPA Act 1994 (Act 490); and subsequently the passing of the Ghana EIA Procedures into the EA Regulations, 1999 (LI 1652).

3.2 National and Sector Policy Framework

Medium Term National Development Policy Framework (Ghana Shared Growth and Development Agenda- GSGDA)), 2010 to 2013

There have been several policies and programmes to accelerate the growth of the economy and raise the living standards of Ghanaians in the past which have been pursued with varying degrees of success. These include 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). In many respects, this medium-term development policy framework seeks to address the challenges and set-backs of the immediate past. It is also programmed to accelerate employment creation and income generation for poverty reduction and shared growth.

PPP Policy Document (MoFEP, 2011)

Ghana urgently requires to improve upon its infrastructure for the country to sufficiently fit into its middle income status. The required investments are vast and the involvement of the private sector to share in some of the traditional responsibilities of the public sector is therefore vital. The required infrastructure may include roads, power, rail, water and sanitation, sea and airports, among others.

National Environment Related Policies

Although no one comprehensive legislation exists in Ghana dealing with the protection of biodiversity, there are several pieces of biodiversity-related and natural/environment resources sector-based legislation. Since the 1990s Ghana has developed a number of policies and legislation, regulations and procedures aimed at ensuring that the management of biological resources and the environment is sound and sustainable. Among these are the Wildlife Conservation Regulations of 1971 (LI 685), National Environmental Policy (1991), National Environmental Action Plan (1991), Forestry and Wildlife Policy (1994), Environmental Protection Agency Act of 1994 (Act 490), Forestry Development Master Plan (1996), Draft National Biodiversity Strategy and Action Plan (1998), Environmental Assessment Regulations of 1999 (LI 1652), and National Land Policy (1999).

National Land Policy (NLP)

The National Land Policy is supportive of the Northern Savanna Biodiversity Conservation Project (NSBCP), providing a framework for most of the land conservation activities identified under the components of the project. The NLP provides for the full recognition of protected area systems (PAS) and lands outside PAS for ecosystem maintenance and biodiversity conservation.

Forest and Wildlife Policy

The Forest and Wildlife Policy of 1994 aims at 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. Specifically, the policy will, among others, ensure that the country's permanent estate of forest and wildlife resources are managed and enhanced for preservation of vital soil and water resources, conservation of biological diversity and the environment and sustainable production of domestic and commercial produce.

National Environmental Policy/Action Plan

The policy aims at ensuring a sound management of resources and the environment, and to avoid any exploitation of these resources in a manner that might cause irreparable damage to the environment. Specifically, it provides for maintenance of ecosystems and ecological processes essential for the functioning of the biosphere, sound management of natural resources and the environment, and protection of humans, animals and plants and their habitats. The policy objectives are clearly in line with the project component objectives.

Food and Agriculture Sector Development Policy (FASDEP II), 2007

The revised policy (FASDEP II) emphasizes the sustainable utilization of all resources and commercialization of activities in the sector with market-driven growth in mind. It however targets fewer commodities for food security and income diversification, especially of resource poor farmers. Enhancement of productivity of the commodity value chain, through the application of science and technology, with environmental sustainability is emphasized. Greater engagement of the private sector and collaboration with other partners will be pursued to facilitate implementation of policies.

Occupational Safety and Health Policy of Ghana (Draft)

The policy statement of the OSH Policy (draft 2004) is: 'to prevent accidents and injuries arising out of or linked with or occurring in the course of work, by minimizing as far as reasonably practicable the cause of the hazards in the working environment and, therefore the risk to which employees and the public may be exposed'. The policy is derived from provisions of the International Labour Organization (ILO) Conventions 155 and 161. The policy document has specific sections on objectives, scope, strategies, activities promotion and awareness creation.

National Workplace HIV/AIDS Policy

The broad objectives of the policy among others, are to provide protection from discrimination in the workplace to people living with HIV and AIDS; prevent HIV and AIDS spread amongst workers; and provide care, support and counselling for those infected and affected.

Medium Term Agriculture Sector Investment Plan (METASIP), 2010

The METASIP is the investment plan to implement the medium term (2011-2015) programs of the Agriculture Policy. The METASIP is consistent with the ECOWAS Agriculture Policy and NEPAD´s Comprehensive Africa Agriculture Development Program (ECOWAP/CAADP) which provide an integrated framework to support agricultural growth, rural development and food security in the African region.

National Irrigation Policy, Strategies and Regulatory Measures, 2011

This policy addresses the problems, constraints and opportunities, which cut across the whole irrigation sub-sector; and specifically for informal, formal and commercial irrigation towards ensuring putting an area of 50,000ha under irrigation in the medium term. Thus the policy is designed to open up the investment space for intensified and diversified irrigated crop production in Ghana where there is clear comparative and competitive advantage.

3.3 Regulatory Framework

Ghana Investment Promotion Centre Act 1994, Act 478

The Ghana Investment Promotion Centre Act 1994 (Act 478) requires that every investor wishing to invest in the country must in its appraisal of proposed investment projects or enterprises, "…have regard to any effect the enterprise is likely to have on the environment and measures proposed for the prevention and control of any harmful effects to the environment...".

Environmental Protection Agency Act 1994, Act 490

The Environmental Protection Agency (EPA) Act 1994 (Act 490) gives mandate to the Agency to ensure compliance of all investments and undertakings with laid down Environmental Assessment (EA) procedures in the planning and execution of development projects, including compliance in respect of existing ones.

Environmental Assessment Regulations 1999, LI 1652

The Environmental Assessment Regulations 1999 (LI 1652) enjoins any proponent or person to register an undertaking with the Agency and obtain an Environmental Permit prior to commencement of the project.

Environmental Assessment Regulations (Amendment) 2002, LI 1703

The Environmental Assessment Regulations (Amendment) 2002 (LI 1703) stipulates the fees and charges to be paid by proponents with respect to Environmental Permits and Certificates.

Water Resources Commission Act 1996, Act 522

The Water Resources Commission (WRC) Act 1996 (Act 522) establishes and mandates the WRC as the sole agent responsible for the regulation, management and utilization of water resources and for the co-ordination of any policy in relation to them. The Commission does this through the granting of water rights to potential water users.

Water Use Regulations 2001, LI 1692

The Water Use Regulations 2001 (LI 1692) enjoins all persons to obtain Water Use Permits from the Water Resources Commission for commercial water use. The Commission is also mandated to request for evidence that an environmental impact assessment or an environmental management plan has been approved by the EPA before issuance of the Water Use Permit.

Ghana Water Company Limited Act 1993, Act 461

The Ghana Water Company Limited (GWCL) Act 1993 (Act 461) mandates the GWCL to provide, distribute and conserve the supply of water in Ghana for public, domestic and industrial purposes

The Local Government Act 1993, Act 462
The Local Government Act 1993 (Act 462) empowers the Assemblies to establish Waste Management Departments to be responsible for the development and management of waste disposal sites within their areas of jurisdiction.

Factories, Offices and Shops Act 1970, Act 328
The Factories, Offices and Shops Act of 1970 (Act 328) requires all proponents to register every factory with the Chief Inspector of Factories Inspectorate Division.

The New Labour Act 2003, Act 651
Section 118(1) of the New Labour Act 2003 (Act 651) stipulates that it is the duty of an employer to ensure that every worker employed works under satisfactory, safe and healthy conditions.

The Fire Precaution (Premises) Regulations 2003, LI 1724
The Fire Precaution (Premises) Regulations 2003 (LI 1724) requires all premises intended for use as workplaces to have Fire Certificates.

The Constitution of the Republic of Ghana 1992
The Constitution of the Republic of Ghana 1992 makes provisions that protect the right to private property and sets principles under which citizens may be deprived of their property in the interest of the public.

The State Lands Act 1962, Act 125
The State Lands Act 1962 (Act 125) has vested authority in the President of the Republic of Ghana to acquire land for the public interest via an executive instrument.

3.3.1 Labour Act

The purpose of the Labour Act, 2003 (Act 651) is to amend and consolidate existing laws relating to labour, employers, trade unions and industrial relations. The Act provides for the rights and duties of employers and workers; legal or illegal strike; guarantees trade unions and freedom of associations, and establishes the Labour Commission to mediate and act in respect of all labour issues. Under Part XV (Occupational Health, Safety and Environment), the Act explicitly indicates that it is the duty of an employer to ensure that every worker works under satisfactory, safe and healthy conditions.

3.4 Institutional framework

Ministry of Food and Agriculture

The Ministry of Food and Agriculture (MoFA) is the ministry responsible for the development and growth of agriculture, including fisheries, in the country. The primary roles of this ministry are the formulation of appropriate agricultural policies, planning and coordination, monitoring and evaluation within the overall economic development. The Ghana Irrigation Development Authority (GIDA) falls under this ministry.

Ministry of Environment, Science and Technology

The Ministry of Environment, Science and Technology exists to establish a strong, national scientific and technology base for accelerated sustainable development of the country to enhance the quality of life for all. The EPA is part of this ministry.

The Environmental Protection Agency (EPA)

The EPA was established under the Environmental Protection Agency Act (Act 490 of 1994) as the leading public body responsible for the protection and improvement of the environment in Ghana. It is responsible for enforcing environmental policy and legislation, prescribing standards and guidelines, inspecting and regulating businesses and responding to emergency incidents. It is responsible for issuing environmental permits and pollution abatement notices for controlling waste discharges, emissions, deposits or others sources of pollutants and issuing directives, procedures or warnings for the purpose of controlling noise. The EPA has the authority to require an ESIA and is responsible for ensuring compliance with ESIA procedures.

Ministry of Local Government and Rural development

The Ministry of Local Government and Rural Development exists to promote the establishment and development of a vibrant and well-resourced decentralized system of local government for the people of Ghana to ensure good governance and balanced rural based development.

The National Sustainable Land Management Committee (NSLMC)

The National Sustainable Land Management Committee (NSLMC) was established in 2007 to have a policy leadership and coordination role for sustainable land management issues at the national level. It brings together senior technical representatives of the Ministry of Environment, Science & Technology (represented by the Environmental Protection Agency), the Ministry of Finance & Economic Planning, the Ministry of Food & Agriculture, the Ministry of Land & Natural Resources (represented by the Forestry Commission), the Water Resources Commission, the Ministry of Energy (represented by the Energy Commission), and an NGO representative from Friends of the Earth, Ghana. The Environmental Protection Agency acts as the Secretariat to the NSLMC.

Ghana Environmental Conventions Coordinating Authority (GECCA)

Ghana Environmental Conventions Coordinating Authority (GECCA) is being established under a UNDP GEF project to consolidate oversight and coordination of all international environmental conventions to which Ghana is party, including the United Nations

Convention on Combating Desertification. GECCA will consist of an operational secretariat within Ministry of Environment, Science & Technology, and a Project Advisory Committee (PAC), comprising representatives of 14 key stakeholders, including all key Ministries involved in implementing sustainable land management activities. PAC may establishment sub-groups for oversight of specific conventions or technical areas. At the senior policy level, the PAC will have recourse to the Inter-Ministerial Policy Committee on environment, including key ministers and chaired by the Vice President.

Savannah Accelerated Development Authority (SADA)

The Savannah Accelerated Development Authority (SADA) is to coordinate the Sustainable Development Initiative for the Northern Savanna. Following severe flooding in the north in 2007, 2008 and 2009, the NDI strategy was approved by Parliament in December 2009 as a comprehensive strategy for closing the development gap with the rest of the country whilst increasing resilience to climatic extremes. SADA is overseen by a Board with a small secretariat, and have a strategy, policy and coordination mandate within the savannah ecological zone, including the three northern regions and areas of Brong-Ahafo Region. An Act establishing the Authority, its mandate and working arrangements with other MDAs will be elucidated in an Act expected to be passed by Parliament before Project Approval.

Public Institutions involved in Land Administration

The institutions include:

- Land Commission
- Land Title Registry
- Survey Department
- Land Valuation Board
- Department of Town and Country Planning
- Office of the Administrator of Stool Lands
- Ministry of Lands and Natural Resources

Customary land

Land owned customarily is governed by customary laws prescribed by the local community and therefore varies greatly from place to place. Allodial titles to stool and skin lands are vested in customary authorities and it is the highest right to ownership of land. Revenues from stool lands are administered by the Office of the Administrator of Stool Lands (OASL). Family land is vested in the head of the family, and is not subject to oversight by OASL. More details on Land acquisition will be provided in the RPF.

Public land

State lands have been compulsorily acquired by government for public purposes or in the public interest and administered by the Lands Commission. Vested land is customarily owned but vested in the government which manages it on behalf of the owner (e.g. stool).

3.5 Environment and Social Assessment in Ghana

3.5.1 ESIA Procedures and Activities

The EPA Act 1994 (Act 490) provides for the establishment of an Environmental Protection Agency with functions among others, to 'advise the minister on the formulation of policies on all aspects of the environment and in particular make recommendations for the protection of the environment'. The other parts of the Act include Enforcement and Control which gives powers to the Agency to request for an ESIA; Part three establishes an Environment Fund and finally Part four describes the administration and general provisions of the Act.

Part 1 of the Environmental Assessment Regulations, 1999 LI 1652 on Environmental Permit describes undertakings requiring registration and issuance of environmental permit, as:
'1. (1) No person shall commence any of the undertakings specified in Schedule 1 to these Regulations or any undertaking to which a matter in the Schedule relates, unless prior to the commencement, the undertaking has been registered by the Agency and an environmental permit has been issued by the Agency in respect of the undertaking.
2. No person shall commence activities in respect of any undertaking which in the opinion of the Agency has or is likely to have adverse effect on the environment or public health unless, prior to the commencement, the undertaking has been registered by the Agency in respect of the undertaking.'
The list of undertakings requiring environmental assessment is provided in the **Annex 1** together with the list of environmentally sensitive areas **(Annex 2)** in which developments are to a large extent, prohibited.

The procedures establish an ESIA process to among others, provide enough relevant information to enable the EPA to set an appropriate level of assessment of any proposed undertaking, investment or programme for the necessary review and to facilitate the decision making process for the ESIA approval. The procedures comprise activities such as project Registration, Screening, Scoping, EIS preparation, and Public hearing. The administrative flow chart suggesting a total process time of 90 days is shown in the **Annex 3**. The procedures are statutorily recognised under the EPA Act 1994 (Act 490).

The Environmental Assessment (Amendment) Regulations, 2002 (LI 1703) is an amendment to LI 1652 and provides for the substitution of regulations relating to 'fees and charges for environmental permits and certificates'.

3.6 World Bank Safeguard Policies

The World Bank is guided by policies/ procedures to ensure the safe development of projects it is funding. The triggered WB safeguard policies are shown in **Table 1** and a

summary of their core requirements are also provided. The project triggers the following safeguards policies: OPs/BPs 4.01, 4.04, 4.36, 4.37, 4.09, 4.11, 4.12, and 7.50.

Table 1: Summary of World Bank Safeguard Policies

Policy	Summary of core requirements	Triggered
OP 4.01 - Environmental Assessment	Screen early for potential impacts and select appropriate instrument to assess, minimise and mitigate potentially adverse impacts	Yes
OP 4.04 – Natural Habitats	Do not finance projects that degrade or convert critical habitats. Support projects that affect non- critical habitats only if no alternatives are available and if acceptable mitigation measures are in place	Yes
OP 4.09- Pest Management	Support integrated approaches to pest management. Identify pesticides that may be financed under the project and develop appropriate pest management plan to address risks	Yes
OP 4.10 Indigenous peoples	Screen to determine presence of indigenous peoples in project area. Policy triggered whether potential impacts are positive or negative. Design mitigation measures and benefits that reflect indigenous peoples cultural preferences.	No
OP 4.11- Physical cultural resources	Investigate and inventory cultural resources potentially affected. Include mitigation measures when there are adverse impacts on physical cultural resources	Yes
OP 4.12- Involuntary Resettlement	Assist displaced persons in their effort to improve or at least restore their standards of living. Avoid resettlement where feasible or minimise. Displaced persons should share in project profits	Yes
OP 4.36- Forests	Support sustainable and conservation oriented forestry. Do not finance projects that involve significant conversion or degradation of critical forest areas	Yes
OP 4.37- Safety of dams	For large dams, technical review and periodic safety inspections by independent dam safety professionals	Yes
OP 7.50- Projects on international waterways	Ascertain whether riparian agreements are in place, and ensure that riparian states are informed of and do not object to project interventions.	Yes
OP 7.60- Projects in disputed areas	Ensure that claimants to disputed areas have no objection to proposed project.	No
Access to Information	The World Bank policy on *Access to Information* sets out the policy of the World Bank on public access to	Yes

	information in its possession. The policy supersedes the World Bank policy on disclosure of information, and takes effect on July 1, 2010. As the Bank has long recognized, a sound, open access to information policy is fundamental to fulfilling its many roles. At the same time, the Bank has an obligation to protect the confidentiality of certain information. This policy endeavors to strike an appropriate balance. It is based on five principles: maximizing access to information; setting out a clear list of exceptions; safeguarding the deliberative process; providing clear procedures for making information available; and recognizing requesters' right to an appeals process. Following an introduction, part two sets out the core policy, and part three sets out how the Bank handles information relating to member countries and other parties, and part four sets out the implementation aspects of the policy.	

3.7 WB Safeguard Policies and Ghana EPA Assessment Regulations

If policy discrepancy exists, the World Bank policies will override that of GoG policies and regulations. The World Bank safeguards policies will be binding when implementing WB funded projects.

3.8 IFC Performance Standards

International Finance Corporation (IFC) applies the Performance Standards to manage social and environmental risks and impacts and to enhance development opportunities in its private sector financing in its member countries eligible for financing.

The Performance Standards may also be applied by other financial institutions electing to apply them to projects in emerging markets. Together, the eight Performance Standards establish standards that the client is to meet throughout the life of an investment by IFC or other relevant financial institution:

Performance Standard 1: Social and Environmental Assessment and Management System
Performance Standard 2: Labor and Working Conditions
Performance Standard 3: Pollution Prevention and Abatement
Performance Standard 4: Community Health, Safety and Security
Performance Standard 5: Land Acquisition and Involuntary Resettlement
Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management

Performance Standard 7: Indigenous Peoples
Performance Standard 8: Cultural Heritage

In addition to meeting the requirements under the Performance Standards, clients must comply with applicable national laws, including those laws implementing host country obligations under international law.

4.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS OF PROJECT AREAS

This section presents a description of the existing environment, comprising the bio-physical and socio-economic conditions of the proposed project area.

4.1 Methodology for Data Collection

Various techniques were applied for collecting data on the project environment. These included document review, institutional consultations, focus group discussions and field surveys of the existing environment. An account of the existing physical and biological environment and socio-economic conditions (ethnic groups, culture, economic activities, etc.) were assembled. These formed part of the baseline information and the information obtained used in the environmental analysis/assessment. Samples of the questionnaires and the outcomes of the consultations and stakeholder involvements are attached in the Annex

The description of baseline information relevant to the project covers:

1. The project areas;
2. Land use categories;
3. Land acquisition and tenure system;
4. Socio-economic;
5. Cultural resources;
6. Health;
7. Natural resources;
8. Wildlife and biodiversity;
9. Climate; and
10. Air Quality.
11. Hydrology Of The Area
12. Physical environment

4.2 General

The Republic of Ghana is located between latitudes 5^{o} 36'N and longitudes 0^{o} 10'E. It has a total border of 2,093 km, including 548 km with Burkina Faso to the north, 688 km with Côte d'Ivoire to the west, and 877 km with Togo to the east. It has a coastline on the Gulf of Guinea, part of the Atlantic Ocean, measuring 539 km. It has an area of 239,540 sq km. The country is divided into 10 administrative regions and 170 districts.

The country is characterized by fairly low relief with few areas of moderate elevation in the north and east. The land is generally 600 meters above sea level. Physiographic regions include the coastal plains, the forest dissected plateau, and high hill tops which are important ecological subsystems in a generally undulating terrain. At the southern and northern margins of the Volta Basin, there are two prominent areas of highland – the

Kwahu Plateau, and the Gambaga Escarpment. On the eastern margins of the Volta Basin is a relatively narrow zone of high mountains running in a south-west to north-east direction with the Akwapim, Buem, Togo Ranges registering the highest point (Mt. Afadjato) in the country.

Average rainfall over the country is about 1,260 mm/ year, but ranges from 890 mm/year in the coastal zone near Accra to 2,030 mm/year in the southwestern rainforests. The rainfall is bi-modal in the southwestern forest zone, giving a major and a minor growing season; elsewhere, a uni-modal distribution gives a single growing season from May to October. Except for the southwestern zone, the reliability of the rainfall, particularly after crop germination, is a major factor affecting crop growth and agriculture in general.

Ghana is drained by three (3) main river systems comprising the Volta, South western and Coastal River Systems. The Volta in Ghana occupies nearly two thirds (70%) of the land area of Ghana, the south western 22% and the minor coastal 8%. The areas covered by the respective river basins are described in the Table below. Global water resources are estimated at 53.2 km^3 per year, consisting of 30.3 km^3/year of internally produced water resource, and 22.9 km^3/year of runoff from other countries.

4.3 Accra Plains Project Area

The project location is within the Accra Plains and the Savannah Accelerated Development Authority (SADA) Regions. The SADA Regions comprise Upper East Region, Upper West Region, Northern Region and Upper Volta Region, **Figure 1.**

The Accra Plains is bounded on the west by the river Dechidaw crossing Dawhenya that extends to Kpong dam. On the south, it is bounded by Accra-Ada Highway and on the North and East by Volta region. The plains are an advantageous area for irrigation because of its proximity to major agricultural products markets and also its easy access to the port and airport facilitates export. In addition, Accra plains are drained from their eastern border by Volta River downstream of Kpong hydropower dam.

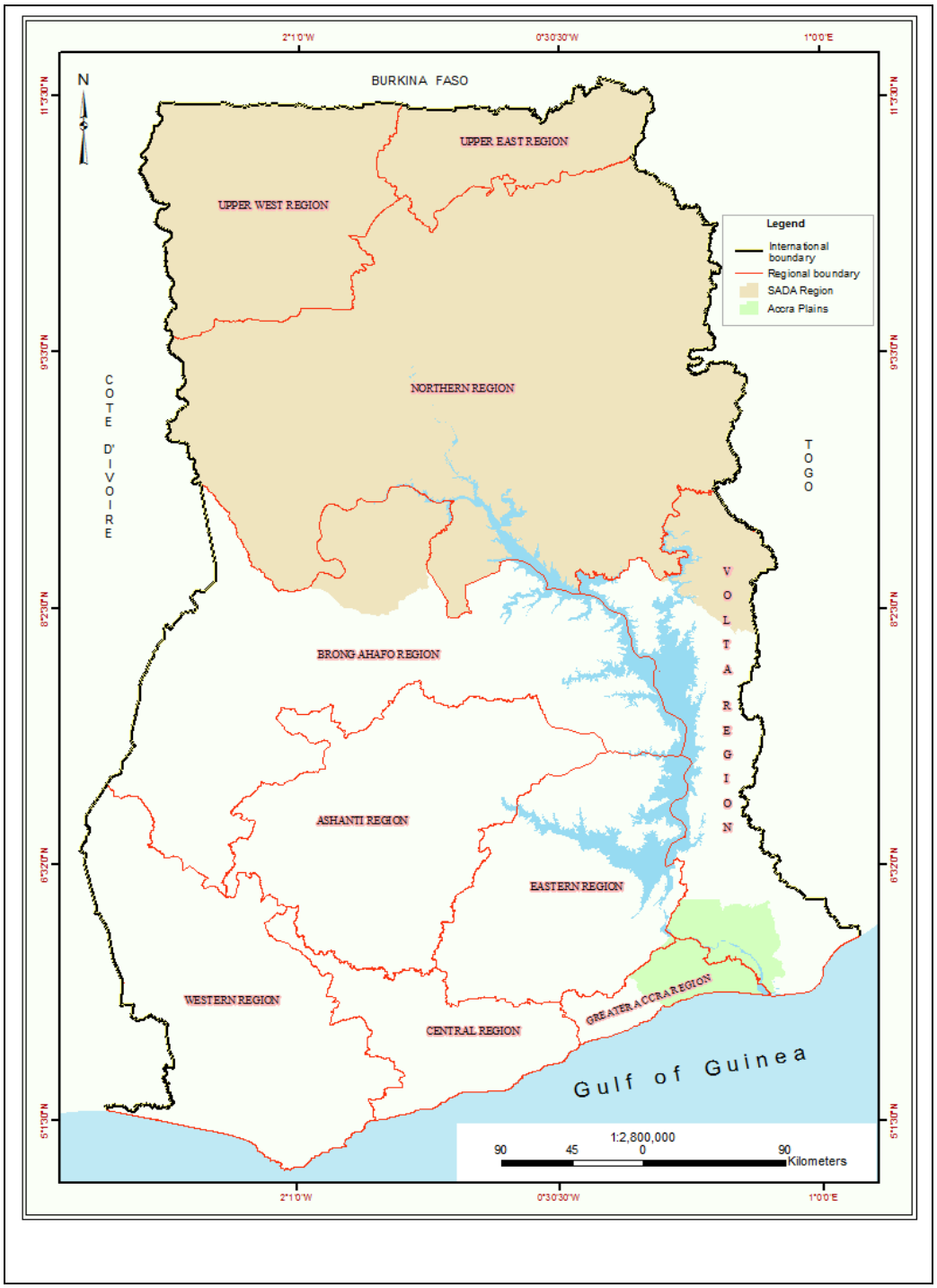

Figure 1: Project regions under GCAP

The Districts concerned by Accra Plains Irrigation Project are: Yilo Krobo District, South Tongu District, North Tongu District, Dangbe East District and Dangbe West.

Climatic Conditions

From Takoradi eastward to the Accra Plains, including the lower Volta region, rainfall averages only 750 millimeters to 1,400 millimeters a year. The average annual temperature for Ada and Akuse are 27.9°C and 22.4°C respectively. The warmest month is March with a mean monthly temperature of 29.4 ° C in Ada and 23.9 °C in Akuse. The coldest month is August, corresponding to the rainy season, with an average temperature of 25.5 °C for Ada and 21.8 °C for Akuse (see **Table 2**)

Table 2: Mean monthly temperature recorded in the project area (°C)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Ada	28.1	29.3	29.4	29.1	29.5	27.2	26.1	25.5	26.3	27.7	28.7	28.3	27.9
Akuse	21.5	23.4	23.9	23.8	23.3	22.5	22	21.8	21.9	21.9	21.9	21.3	22.4

The average annual evaporation decreases from coastal station (Ada) to Akuse. Evaporation is high March for Ada and April in Akuse. The least loss of water to the atmosphere occurs in June and July for Ada and Akuse respectively. Monthly variations are very low (around 1mm/day). These small differences indicate low seasonal variability.

Table 3: Monthly evaporation recorded in the project area (mm/day)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Ada	4.87	5.26	5.54	5.46	5.14	4.36	4.43	4.8	5.18	5.46	5.37	4.85	5.06
Akuse	4.11	4.59	4.87	4.9	4.77	4.11	3.94	4.06	4.3	4.75	4.62	4.15	4.43

Evapo-transpiration depends on several inter-dependant factors among which are sunshine duration, temperatures, vegetation, atmospheric circulation and continentality. The continental effect is very sharp between the coastal station (Ada) the continental stations (Akuse). The extent of the sea influence is limited to few kilometres inland (usually 6 to 9 km).

Table 4: Monthly potential evapotranspiration recorded in the project zone (mm/day)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Ada	159	159	183	169	161	134	136	140	151	173	165	155	1885
Akuse	125	131	150	139	131	107	112	118	116	125	119	115	1488

The annual average daily sunshine varies between 6 and 7 hours. The maximum is observed in March with 7.4 hours in Ada. The minimum occurs during the rainy season when nebulosity (cloud cover) and the relative humidity are maximum. The minimum, during the rainy season is 4.5 hours in July for Akuse and 5.4 hours in June at Akuse (see **Table 5**).

Table 5: Average monthly sunshine recorded by the project area synoptic stations (hours/day)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Ada	7.3	7.3	7.4	7.3	7.1	5.4	5.6	6.2	6.9	7.9	8.4	7.5	7
Akuse	6.5	6.8	6.7	6.7	6.8	5.1	4.5	4.5	5	6.8	7.5	6.8	6.1

The monthly relative humidity is consistent with the rainfall regime. It is highest (over 85%) during the major rainy season (July to September) for both weather stations as indicated in **Table 6**.

Table 6: Monthly relative humidity recorded in the project area (%)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Ada	80	80.5	81	82	83	85	86	86.5	85	82.5	81.5	81	82.9
Akuse	69	70	73	76	80	84	82	80	81	82	80	75	77.7

Over the 30 year period (1961-2007) annual rainfall for the Ada Station varies between 359.2 mm recorded in 1992 and 1695.0 recorded in 1968 (see **Figure 2**).

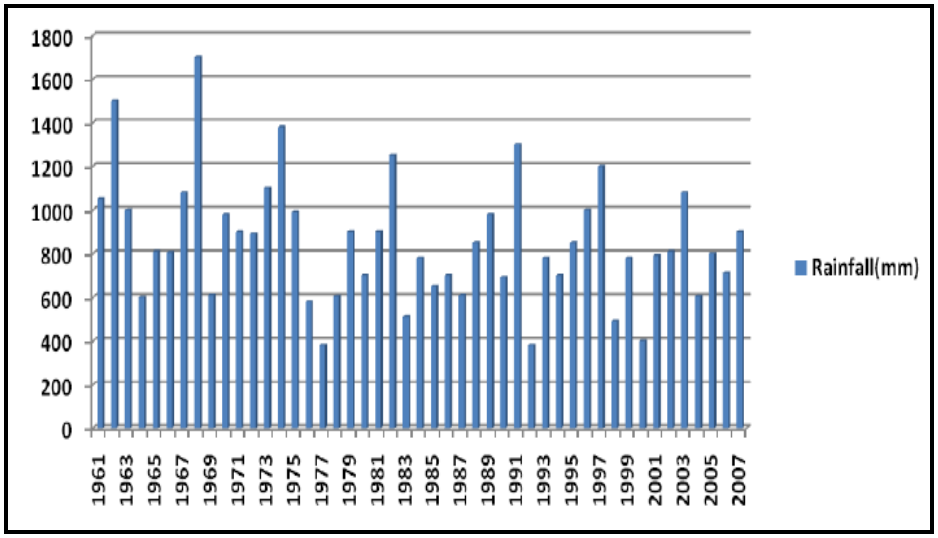

Figure 2: Annual Rainfall (1961-200) for Ada Station

The mean annual rainfall for the station is 853mm. From **Figure2** rainfall is unevenly distribution between years. The standard deviation from the mean is estimated to be 271.9 while the variation co-efficient and variability co-efficient are 0.32 and 4.72 respectively. There has been a general decline in annual rainfall recorded at the Akuse Station since 1998 with the notable exception being the year 2003 (see **Figure.3**).

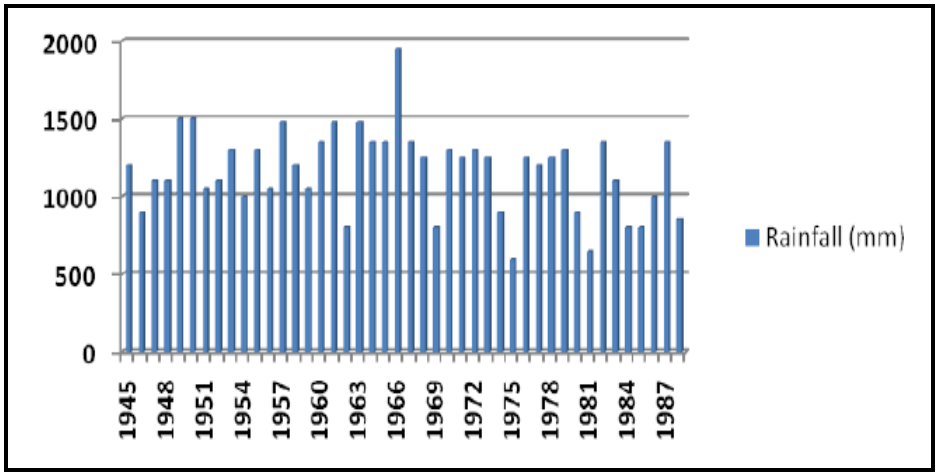

Figure 3: Annual Rainfall Akuse (1945-1990)

The mean annual rainfall over the period 1961-2007 is 1,148.4mm. The maximum and minimum annual rainfall is 1,961mm (1966) and 563mm (1975) respectively. The standard deviation, variation co-efficient and variability co-efficient are 254, 0.22 and 3.34 respectively. Based on Figures 2 and 3 there is a general decline in annual rainfall since 1960s. Annual rainfall recorded for both stations showed wide variations from the mean as indicated by the measures of dispersion. This implies an erratic rainfall pattern in the project catchment area. Under such erratic rain fall conditions irrigation systems become extremely important for crop production. Irrigation will reduce the vulnerability of farmers to crop failure associated with unpredictable rainfall distribution.

Hydrological Conditions

The project area is well drained by account of the hydrological conditions. Major water bodies in the project sphere of influence are the Volta River, Lake Mlangui, Lake Keli, Lake Aklamador, Lake Blanor and Lake Blaque. There are a few seasonal brooks within the defined project zone with the most visible being one being River Gbabavum. The brooks are seasonal in nature. The construction of the Kpong and Akosombo dams upstream reduced the tidal level of the Volta River living behind lakes and creeks in natural depression within the original river bed.

The water bodies are drying up due to lack of flood water from the Volta River. The rivers, creeks and lakes are sources of fish, water for domestic purposes and a means of transportation for the local population. The water bodies which are infested with *biomphlaria sails* and other disease vectors serve as a source of drinking water for some households in the project zone. This is against the background that potable water is supplied to all the communities in the project area by the Community Water and Sanitation Agency (CWSA). *Nymphae spp.* (water lillies), *Murdannia keisak* (mash dayflower) and other aquatic weeds are invading the water bodies in the project area.

The command area is located along the Volta river with its stretch of about 86 km from immediately downstream of Kpong dam to the river mouth. Akosombo dam is located at 25km upstream of the Kpong dam site. The river discharge is dominant with released water for hydro power generation. The released water volume of both the Akosombo and Kpong dams is almost the same to efficiently generate electric power. Water level data observed at the Kpong dam and Volta river immediately downstream of the dam indicates that:

Water level of the Kpong dam reservoir

- Inflow of the Kpond dam is about 1,200 m3/sec.
- Water level of the Kpong dam is almost constant, but slightly fluctuated corresponding to inflow and outflow balance. The highest and lowest water level is 16.97 m (2010) and 13.92 m (1998), respectively.
- Lower water level period of the Kpong dam reservoir was recorded in 2007.

Water level of the Volta River

- Water level of the Volta River was constantly fluctuated from 2.5 m to 4.0m in the observation period of 1984 to 2010.
- Higher water level was observed at WL. 6.28m in November 4, 2010 and continued for 21 days with water level of 4.0 m or higher. The rising of water level was mainly caused by flood inflow to the Akosombo dam as well as the Kpong dam.

Geology and Soils

Dahomenyian formations mostly unit underlie the project corridor. Rocks belonging to this formation include schist and gneiss. These rocks weather to form clay and silty soils.

Types of Soils

The soil types in the project zone are:

i. Soils Developed over the Acidic Gneiss and Schist

a. Doyum series (Hapli-skeletic Luvisol WRB 2006)

The series occurs on gently sloping uplands over coarse grained granite gneiss. The top soil is made up of about 30cm grayish brown, sandy loam, underlain by brown to yellowish brown, sand, merging into pale yellowish brown, mottled reddish brown, sand containing iron stained quartz gravel and stones.

b. Agawtaw series (Calci mollic stagnic solonetz WRB, 2006)

Agawtaw series occur on middle to lower slope sites on very gentle to almost flat topography. The soil profile consists of poorly drained, dark grayish brown to grey, sandy loam overlying sandy clay loam with a hard clay plan at shallow depth. The topsoil consists of about 15cm of dark grayish brown, loamy sand to sandy loam with weak fine crumb structure. This overlies grey sandy clay loam to a depth of about 35cm, which in

turn is underlain by a very hard compact sandy clay pan with a columnar structure. Below this, is a dark grayish brown to light grey, slightly mottled brownish yellow sandy clay loam to sandy clay containing common to frequent manganese dioxide and iron concretions and frequent lime coated quartz gravels.

c. Pejeglo series (Calci stagnic solonetz WRB, 2006)
Pejeglo series has a deep, poorly drained, dark grey sandy loam topsoil. This overlies a subsoil made up of very deep, dark grey clay loam to clay, exhibiting no hard clay pan as in *Agawtaw series*. It however, contains calcium carbonates and manganese dioxide concretions.

ii. Soil Developed over Old Terrace.

Aveyime series (Ferric Luvisol WRB, 2006)
Aveyime series are very deep (>100cm), reddish brown, porous silty or fine sandy loam and sandy clay loams, developed on the higher parts of the old river terrace remnants along the outer edge of the Volta floodplains. The general profile consists of 10 to 20cm of dark grey brown, sandy loam overlying 60cm of dark brown to yellowish brown, sandy clay loam to sandy clay; grading into uniform reddish brown to yellowish red, sub-angular blocky structure, firm, with loam or sandy clay loam extending to over 100cm.

iii. Soils Developed over Recent Mixed Alluvium

These soils occupy the Volta floodplain and adjoining intermittent streams of the area. These are alluvial materials transported from the higher catchments areas of the Volta basin and local tributaries from the black clay belt. Soils in this category are:

a. Amo series (Dystri-vertic Cambisol, WRB 2006)
Amo series are deep, gray mottled brown or red clays, occurring on lower levees. The profile is made of dark grayish brown, silty loam, underlain by 100cm of grayish brown, mottled prominent yellowish brown, silty clay, overlying silty clay mottled reddish brown and gray. The Amo series cover 60-70% of the project area.

b. Tefle series (Eutric Vertisol WRB, 2006)
Tefle series consists of dark gray brown, silty clay top soil which cracks vertically when dry. It overlies clay, mottled yellowish and olive brown, containing Manganese dioxide concretions and stains having moderate and medium very hard prismatic structure which breaks into sub-angular and angular blocks.

Soil Suitability

Amo series are deep, medium to heavy textured, fairly fertile, very suitable for maize and cowpea, and moderately suitable for rice, cotton, cassava, sweet potato and vegetables.

For irrigated rice production the major limitation is its medium surface and sub soil texture which results in a moderate to moderately rapid infiltration rate. Puddling will help to reduce infiltration rate and retains water for a longer time for rice production.

Tefle series is heavy clay in both top and sub soil and are very poorly drained. The soils are moderately suitable for irrigated rice production but not suitable for the other selected crops due to the poorly drained conditions of the soil.

Hake series soils are not suitable for irrigated rice but are suitable to marginally suitable for the selected upland crops.

Aveyime series are not suitable for irrigated rice production because of its texture which results in moderately rapid to rapid infiltration rates. The soils are however moderately or marginally suitable to selected upland crops which could be produced under sprinkler irrigation.

Doyum series are not suitable for irrigated rice and okro due to the light texture but marginally suitable for the selected upland crops. The limitation to crop production includes texture, low fertility and rapid infiltration.

Agawtaw series are moderately suitable for oko, marginally suitable for irrigated rice production, pepper and tomatoes and marginally to not suitable for maize, cowpea, cotton and sweet potato.

Pejeglo series are deep soils found in patches below *Agawtaw series*. They are marginally suitable for irrigated rice, maize and okro but not suitable for the selected upland crops.

Biological Environment

Vegetation (Flora)

The project area is part of the coastal savannah vegetation zone which is also referred to as the coastal scrub and grass. This zone is characterized by grass interspersed with scrubs and short trees.

The tree species found in project zone include:

Ceiba (kapoka)
Bombax
Antiavis
*Triplochitron scleroxylon (*Wawa*)*
Azadirachta indica (Nim Tree)
Mangefira indica (Mango tree)
Cassia spp. (Acasia)

Shrubs in the project zone include:

Albizia
Milettia
Dicrostachy
Sarcocephalus xanthoxylon

The grass cover includes the following:

Bracharia falcifera
Dactyloctenium
Chloris pilosa
Sedges
Sporobolus pyramidalis
Chamaecrista rotundifolia
Unidentified herbaceous legume
Ximenia Americana
Combretum nigricans
Vertiveria fulvibarbis
Andropogon gayanus
Axonopus compressus

Trees in the project area are the major source of fuel wood (fire wood) for households in the project zone. Charcoal burning is also undertaken on small scale by women in the project zone using the off cuts from these trees.

The trees also support the local building industry. Apart from these, some of the trees and shrubs have medical value. The leaves of *Azadirachta indica* (Nim Tree) are used to cure malaria/fever. Ceiba is used to cure asthma, dysentery and menstrual bleeding among others. The grass cover also support livestock production as the grasses such as Brachiaria falcifera provide excellent grazing grounds for herbivores.

Fauna

The following animal species are found in project area:

Animals in the Wild
Birds: *Bubulcus ibis* (Cattle egret), *Corvus albus* (Hooded Crow), *Neophron monachus* (Hooded Vulture), Milvus milvus (Red Kite) and *M. Migrans* (Black Kite)

Mammals: *Xerus erythropus* (West African Ground Squirrel), *Cricetomys gambianus* (Giant Rat), *Rattus rattus* (House Rat), *Lemniscomys striatus* (Spotted Grass Mouse) and *Heliosciurus gambianus* (Gambian Sun Squirrel), *Thryonomys swinderianus* (Grass cutter)

Reptiles: *Agama agama* (Rainbow Lizard), *Naja nigricolis* (Spitting Cobra), *Dasypeltis fasciatus* (Egg eating Snake), *Bitis arietans* (Puff Adder), *Bufo regularis* (Common Toad). The local fauna tends to be symbiotic in character due to the rural nature of the immediate project environment.

Fish Species

The project area has a number of water bodies. These include lakes, creeks and seasonal streams. A section of the Volta River is also within the project zone. These water bodies have a number of fish varieties (see **Table 7**).

Fishing is one of the economic activities among the inhabitants of communities along the Volta River. The creeks, lakes and creeks also provide avenues fishing and aqua-culture but currently fish landings from these sources are significant due to siltation and invasion by aquatic weeds. Traditional methods of fishing including trapping, the use of cast nets and hook and line are used by the local population to fish.

Table 7: Fish Species in the Water Bodies in the Project Zone

Latin	**English Common Name**	**Ewe Name**	**Ga Adangbe Name**
Auchenoglanis Occidentails	Catfish	Apolo	Kpor
Alestes Baremose	Silversides/Characin	Asentiwoe	Tewoe
Alestes Dentex	Silversides/Characin	Asentikplapa	Tewoe
Alestes Chaperi	Silversides/Characin	Morganutewoe	Tewe Kpiti
Alestes Nurse	Silversides/Characin	Dzaflafa	Dzaplapa
Alestes Brevis	Silversides/Characin	Tewoe/Dzogbla	Tewe Kpiti
Alestes Imberi	Silversides/Characin	Dzogla Dzevui	Tewe Kpiti
Awaous Guineensis	Brown Goby	Kemegbee	Obiritifi
Arius Jigas	Sea Catfish	Korkorte	Korkorte
Atya Gabonensis	River Prawn	Aza	Osa
Bagrus Bayad	Silver Catfish	Avedzeame/Yalefo	Yalefo
Bagrus Docmao	Silver Catfish	Yalefo	Yalefo
Barillus Spp	Barbels/Silver Fish	Torma Sakli	Torma Sakli
Citharinus Citharus	Moon Fish	Vanoe/Vavi	Sleke
Citharinus Latus	Moon Fish	Kebee/Vavi	Sleke
Citharinus Distichodoides	Moon Fish	Vatsui/Vavi	Sleke
Clarias Senegalensis	Catfish/Mudfish	Adewuyie	Donor
Clarias Leaviceps	Catfish/Mudfish	Ndede	Donor
Clarotes Laticeps	Catfish/Mudfish	Kpo	Kportoe
Chrysicthys Nigrodigitatus	Catfish/Mudfish	Blolo	Kportoe
Chrysicthys Walkeri	Catfish	Blolofavimezi	Kportoe
Chrysicthys Furcatus	Catfish	Deblolo	Kportoe
Ctenopoma Kingsleyae	Climbing Perch	Klefoe	Tetepleki

Latin	**English Common Name**	**Ewe Name**	**Ga Adangbe Name**
Cynothrissa Mento	Sardine	Deyi	
Distichodus Engyeephalus	Grass Eater/Perch	Agbasrakorgloe	Agbasra
Distichodus Rostratus	Grass eater/Perch	Konte-gbasra	Agbasra
Utropius Niloticus	Butterfish	Gada Sofla	Tassa
Epiplatys Chaperi	Toothed Carp	Dzorkpletoe/Tagbanae	
Epilatys Secfasciatus	Toothed Carp	Dzorkpletoe/Tagbanae	
Egeria Radiata	Glam/Oyster	Aforni/Aforli	Adordee
Epinephelus	Sea Perch/Grouper	Afiha	Boano
Elops Lacerta	Ten-pounder	Gbavi	Lanmao
Gymnarchus Niloticus	Frankfish	Yor	
Gnathonemus Tamandua	Trunfish	Lelovemasdine	Balekete
Gnathonemus Senegalensis	Trunfish	Atiadra	Balekete
Hydrocyon Lineatus	Tiger fish	Avuwo Kordzeasa	Akao
Hydrocyon Brevis	Tiger fish	Tsinu Vowo	Akao
Hydrocyon Forskali	Tiger fish	Asentiwoe Vuwo	Akao
Hydrocyon Cuvier	Tiger fish	Avuwo	Akao
Hepsetus Odoe	African Pike	Lixe	Akao
Hyperopisus Bebe	-	Liwoe Gokpo	Menyu
Hemichromis Faciatus	Ciclid	Boryi	Loku
Herchromis Bimaculatus	Jewel fish	Adzorvi	Mprabedi
Heterobranchus Logfilis	Catfish	Wonyi	Denor
Heterobranchus Bidorsalis	Catfish	Adewudzea	Denor
Heterotis Niloticus	Catfish	Fa	Denor
Irvinea Voltae	Butter fish	Gada-agborhor	Tassa-Agborhor
Lates Niloticus	Nile Perch	Lesi	Dzo
Labeo Coubie	African Carp	Agbongboyibor	Agbonmo
Labeo Senegalensis	African Carp	Agongboyie	Agbonmo
Labeo Parvus	African Carp	Nylete	Agbonmo
Labeo Bracypoma	African Carp	Adzadasu	Agbonmo
Leptotilapia Irvinei	Ciclid	Dempe	Odeme
Mormyrus Rume	Mormyrids	Liwoe Gordorgor	Menyu
Mormyrus Macropthalmus	Mormyrids	Liwoe Agamata	
Mormyropsdeliciosus	Mormyrids	Noagbe	Nuagbemazu
Mormyrops Oudoti	Mormyrids	Noegbeyibor	Nuagbemazu
Malapterurus Electricus	Electric Catfish	Nii/Dzidzi	Dzidzi
Mugil Faleipinnis	Grey Mullet	Akporloe	Laga
Marcusenius Psittaaus	Mormyrida	Lobokoe	Mumeli
Marcusenius Isidori	Mormyrida	Lobokoe	Mumeli
Megalops Atlanticus	Tarpon	Madzorrfloe	Manyofle

Latin	**English Common Name**	**Ewe Name**	**Ga Adangbe Name**
Mustelus Canis	Smooth Hound	Agbloloe	Lele-akal
Maslacembelus Nigromarginatus	Spiny Eel	Ladi-dekae	Lale-akal
Mannaethiops Unilaeniatus	Carp	Agbongbo-korfua	Denor

Source: Volta Lake Research Project

Livestock Production

The presence of grass and water bodies in the project district supports the production of livestock. In view these, households in the project zone rear livestock such as goats, local poultry and sheep mostly on subsistence basis. Pastoralists also rear cattle and goat on the plains to supply markets in the Accra-Tema metropolis. An estimated 62% of the livestock farmers are males. Most of the livestock farmers are agro-pastoralist. The livestock population in the North Tongu District is presented in **Table 8**.

Table 8: Livestock population in the North Tongu District

Species Type	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average (2000-2008)	% Change- 2000/ 2008
Cattle	33,732	35,422	37,714	40,810	41,165	45,632	45,632	46,205	46,872	41,465	39.0
Sheep	7,124	10,714	9,270	10,624	12,086	9,110	9,110	9065	9,344	9,605	31.2
Goat	8,240	11,234	10,110	12,314	9,701	6,964	1,077	1130	1,107	6,875	-86.6
Guinea fowl	1,200	1,577	1,566	1,770	2,739	3,411	3,411	3,485	3,590	2,528	199.2
Local chicken	27,725	25,410	25,721	26,941	29,680	23,812	23,814	24,716	25,667	25,943	-7.4

Source: MOFA, North Tongu District Directorate, Adidome-August 2009

The livestock population census for the North Tongu District between 2000 and 2008 revealed increases in the number of cattle (39%), sheep (31.2%) and guinea fowl (199.2%) between 2000 and 2008. The number of goats (-86.5%) and local poultry (-7.4%) however declined over the same period.

Livestock statistics from the Livestock Development Project (2008) indicates that the birth and mortality rates of cattle were the least in the district with the highest in both cases recorded for guinea fowl. The growth rate was least for sheep and highest for guinea fowl (see **Table 9**). Major diseases among the livestock are Newcastle disease, foot and mouth disease, worm infestation and diarrhea.

Table 9: Estimated Birth, Mortality and Growth rates for Livestock Species Reared in the North Tongu District in 2008

Species Type	Birth Rate (%)	Mortality Rate (%)	Average growth rate (%)
Cattle	12.7	1.8	7.5
Sheep	22.4	3.7	6.7
Goat	30.6	4.1	12.3
Guinea fowl	63.6	7.6	23.5
Local chickens	52.0	7.0	21.6

Source: Livestock Development Project of the Animal Production Department, Accra

The Aveyime National Cattle Ranch is located within the project zone. The ranch was established in 1973 with 59 cattle. The herd increased to 2,200 in 1990 before declining to the current figure of 316. The decline in the herd is due to inadequate funding. There is a resident veterinary officer at the ranch.

The average holdings for the major livestock per pastoralist are presented in **Table 10** below. Generally holdings are small.

Table 10: Average Herd and flock sizes of livestock in the Project Area

Type of Livestock	Herd/Flock sizes
Cattle	30
Sheep	11
Goat	7
Local Fowl	28
Guinea Fowl	42

Source: Livestock Survey –August 2009

Social Environment

The ethnic groups in the project zone are the Mafis. There are other settler ethnic groups. These include Dangmes, Krobos, Ewes and Akans. STUDI (2009) studied the 5,000ha within the Plains which included profiling eighteen (18) communities in the project zone with a total population of 35,715. The average annual growth rate is 7.3%. Most of settlements in that project zone are rural by population and function. The only exceptions to this general classification are Battor (13,203) and Mepe (8,096) which are urban by population and function. Aveyime (7,258) is urban by population but elements of a rural agrarian economy manifest within the spatial configuration, housing characteristics' and economic life of the town. There are also farmstead within the project catchment area such as Hekpo and Depkoe. **Table 11** presents the current population size and household structure of the communities in the project zone. This based on the exponential growth model which is summarised as:

$P_t = P_o e^{rt}$
Where
P_o = Base Year Population
P_t = Given Year Population
e = 2.718
r = Growth Rate (annual)
t = Time (years)

Table 11: Population of settlements within the 5,000ha studied by STUDI (2009)

Community	1984	2000				2009*				
		Total Population	Total Household Size	Average Household Size	Growth Rate (%)	Total Population	Male	%	Female	%
Aveyime	787	3262	580	5.6	8.8	7258	3509	48.3	3689	50.8
Mangoase	162	318	15	6.5	4.2	465	219	47.2	246	52.8
Manya	266	779	110	7.1	6.7	1426	688	48.3	738	51.7
Kekpoe	207	693	124	5.6	7.6	1367	629	46.0	738	54.0
Battor	1506	6043	979	6.2	8.7	13203	6181	46.8	7022	53.2
Mepe	1813	4724	956	4.9	6.0	8096	3667	45.3	4428	54.7
Dekpoe	65	24	2	6.3	-6.2	14	9	62.5	5	37.5
Lasivenu	46	446	67	6.7	14.2	1601	768	48.0	833	52.0
Hekpo	24	52	10	5.2	4.8	80	34	42.3	46	57.7
Kelekor	31	79	12	6.6	5.8	134	68	50.6	66	49.4
Afalikpo	48	196	45	4.5	8.8	432	174	40.3	258	59.7
Degorme	190	183	44	4.2	-0.2	179	77	43.2	102	56.8
Nuwloe	21	45	8	5.6	4.8	69	31	44.4	38	55.6
Aklamador	100	278	38	7.3	6.4	494	226	45.7	268	54.3
Bla Botikope	97	296	52	5.7	7.0	554	238	42.9	317	57.1
Atitekpo	61	88	14	6.3	2.3	108	52	47.7	57	52.3
Avegonu	13	29	9	3.2	5.0	46	17	37.9	28	62.1
Kumikpo	89	144	28	5	3.0	189	72	38.2	117	61.8

Source: 2000 Population and Hosing Census Report *Projected Populations based on 1984-2000 growth rates and sex structure

The population in the project zone at the end of the thirty year life span is presented in **Table 12** below based on various growth scenarios.

Table 12: Population Projections for the Project Zone (2014-2044)

Years	High Variant	Medium Variant	Low Variant
2014	71,681	50,515	35,599
2024	194,830	106,932	58,689
2034	529,549	226,357	96,757
2044	1,439,313	479,160	159,517

Key

High Variant	Estimated growth rate of 10% over the planned period
Medium Variant	Estimated growth rate 7.5% over the planned period
Low Variant	Estimated growth rate of 5%over the planned period
Staggered Scenario	2.5% point reduction in growth rate from an initial of 10%

Land Uses

Majority of the lands are farm and fallow lands (see **Table 13**). There are vast grasslands in between settlements that support open grazing in the project zones.

Table 13: Land uses within the 5000 ha portion of the Project Area covered by the STUDI study

Land use	Area(ha)
Riverine Areas	883.65
Water bodies (Lakes/Creeks/rivers)	153.2
Cropland	2,692.24
Grassland	1,352.26
Settlements	430.02
Aveyime Rice Project (GIDA)	88.63
Total	5,600.00

There are eighteen (18) settlements within the project zone with an estimated total land area of 430.02 hectares. All the urban settlements are found along the northern boundary of the project. They are beads settlement whose growth towards the north has been constrained by the Volta River.

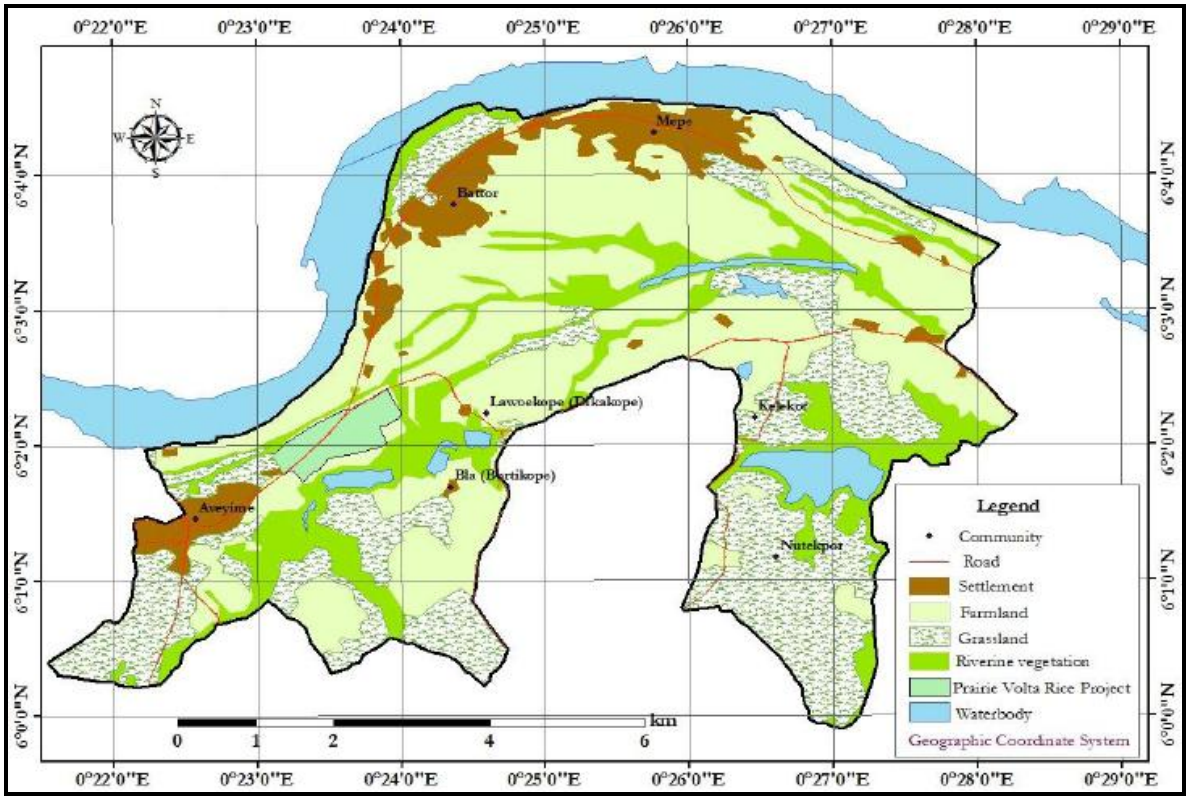

Figure 4: Land uses in the 5000 hectare portion of the Project Area covered by the STUDI Study.

Social Amenities

Education

There are 31 public primary and 17 junior high schools within the catchment area of the proposed project. The enrolment levels are presented in **Table 14** and **Table15** below.

Table 14: Enrolment in Primary Schools in the Project Zone

Circuit	Primary School 2008/2009					Total
	Name of School	Pupil				
		Male	%	Female	%	
Mepe-Dove	Mafi Dove D.A.P	143	54.4	120	45.6	263
	Mafi Dugame Presby Primary	90	46.2	105	53.8	195
	Mafi Atitekpo D.A Primary	111	87.4	106	83.5	127
	Zikponu D.A Primary	52	55.9	41	44.1	93
	Mafi Kpogadzi D.A	72	46.2	84	53.8	156
	Mepe Presby Primary	445	52.7	399	47.3	844
	Mepe R.C Primary A & B	399	53.1	353	46.9	752
	Aklamador DA	130	56.0	102	44.0	232
	Degorme D/A	34	46.6	39	53.4	73

Circuit	Primary School 2008/2009					Total
	Name of School	Pupil				
		Male	%	Female	%	
	Mafi Devime Presby	126	49.8	127	50.2	253
	Mafi-Amidoekor Presby	43	43.0	57	57.0	100
	Mepe Holy Christ Com	173	49.6	176	50.4	349
	Torgbe Aho Memorial	161	56.5	124	43.5	285
	Mafi-Kumikpo D.A Primary	15	50.0	15	50.0	30
	Circuit Total	**1,994**	**53.1**	**1,848**	**49.3**	**3,752**
Aveyime	United D.A/Meth. Primary	135	50.0	135	50.0	270
	Agbetikpo D.A Primary	36	46.2	42	53.8	78
	Aveyime Methodist Primary	132	53.2	116	46.8	248
	Aveyime R.C Primary	150	50.8	145	49.2	295
	Sikor D.A Primary	51	50.5	50	49.5	101
	Dedukope D.A Primary	163	54.5	136	45.5	299
	Manya D.A/Methodist	153	52.8	137	47.2	290
	Battor R.C Primary	294	52.5	266	47.5	560
	Battor D.A Primary	101	54.6	84	45.4	185
	Battor D.A/Methodist Primary	132	43.4	172	56.6	304
	Mafi-Luta D.A Primary	31	60.8	20	39.2	51
	Bla D.A Primary	63	50.0	63	50.0	126
	Three Kings Special	61	62.9	36	37.1	97
	Circuit Total	**1,502**	**51.7**	**1,402**	**48.3**	**2,904**
Grand Total		**3,496**	**52.5**	**3,250**	**48.8**	**6,656**

Source: Ghana Education Service, North Tongu District Directorate, August 2009

Table 15: Enrolment in Junior High Schools in the Project Zone

Circuit	**MEPE DOVE CIRCUIT PUBLIC SCHOOLS (JHS) 2008/2009**										Grand Total
	Name of School	Pupil					Teachers				
		Male	%	Female	%	Total	Trained		Untrained		
							Male	Female	Male	Female	
Mepe Dove	Mafi Dugame DA JHS	24	60.0	16	40.0	**40**	3	-	1	-	**4**
	Mafi Kpogadzi D.A JHS	21	55.3	17	44.7	**38**	2	-	-	-	2
	Mafi Devime Presby	82	61.2	52	38.8	**134**	3	-	1	-	**4**

Circuit	MEPE DOVE CIRCUIT PUBLIC SCHOOLS (JHS) 2008/2009									Grand Total
	Name of School	Pupil					Teachers			
		Male	%	Female	%	Total	Trained		Untrained	
							Male	Female	Male	Female
	Mafi Atitekpo D.A JHS	50	54.9	41	45.1	**91**	2	-	3	-	**5**
	Mepe DA JHS	66	63.5	38	36.5	**104**	2	2		1	5
	Mepe RC JHS A and B	155	59.6	105	40.4	**260**	5	-	1	-	**6**
	Mepe Presby JHS	143	58.6	101	41.4	**244**	6	1	1	-	**8**
	Mafi Dove DA JHS	48	63.2	28	36.8	**76**	3	-		-	3
	Mepe Holy Christ Com	68	56.2	53	43.8	**121**	2	-	4	-	**6**
	Degorme D/A	62	56.9	47	43.1	**109**	1	-	2	-	**3**
	Circuit Total	**719**	**59.1**	**498**	**40.9**	**1,217**	**29**	**3**	**13**	**1**	**46**
Aveyime	Aveyime Methodist Primary	99	54.1	84	45.9	**183**	3	2	1	-	**6**
	Mafi-Dedukope JHS	44	57.9	32	42.1	**76**	3	-	1	-	**4**
	Manya D.A/Methodist	72	54.1	61	45.9	**133**	3	-		-	3
	Battor D.A/Methodist Primary	60	53.1	53	46.9	**113**	3	2	1	1	**7**
	United DA/Methodist	21	50.0	21	50.0	**42**	1	-	2	-	**3**
	Battor R.C JHS	179	58.7	132	43.3	**305**	4	3	1	-	**8**
	Aveyime R.C. JHS	45	51.7	42	48.3	**87**	4	1	1	-	**6**
	Total	**520**	**55.4**	**425**	**45.3**	**939**	21	**8**	**7**	**1**	**37**

Source: Ghana Education Service, North Tongu District Directorate, August 2009

Health

The Catholic Hospital located at Battor is the only health facility in the project zone. This specialised facility serves communities within the project sphere of influence and as well as patients from the Accra-Tema metropolis and other settlements on the Accra Plains. The hospital has four (4) specialist doctors, three (3) medical officers, one (1) house officer, one (1) resident and 37 nurses. The total bed capacity of the hospital is 210 with seven wards namely:

- Male Medical - 20 beds;
- Male Surgical - 29 beds;
- Female Medical - 25 beds;
- Female Surgical - 12 beds;
- Maternity - 22 beds;
- Children's Ward - 80 (including 20cots).

There were 7,058 admissions during the year 2008 as against 6,964 in 2007. Total inpatient days were 45,770 and 51,707 for 2008 and 2007 respectively. The Bed Occupancy rate for 2007 was 63.8% as compared to 74.17% in 2006. The National Health Insurance Scheme is contributing towards the lowering of the inpatient days. Out-patient visits are earlier than before when patients wait till their condition is critical before reporting to the hospital. The hospital provides maternity, radiology (x-ray), pharmaceutics, obstetrics and gynecology, optical/eye and out- patient services. Voluntary Counseling and Testing (VCT) services are also available for People Living with HIV-AIDS (PLWHA).

Water and Sanitation Services

All the communities in the project catchment area have access to pipe borne water through community standpipes provided under the Three District Water Project. The project is being implemented by the Community Water and Sanitation Agency in the North District, South Tongu District and Dangme East.

Standpipes in some of the communities were not in operation (disconnected). Vendors appointed by the community have defaulted in the payment of the water bills. Most of the households in the project catchment area depend on the lakes, creeks and the Volta River for their domestic needs. Some households drink water from these non-pipe sources. Only a few households use water based systems in the communities in the catchment area. In the urban communities there are public KVIPs. User fees are charged for accessing these facilities. In the rural communities the use of pit latrines and open defecation are widely practised. The lack of sanitation facilities and the use of natural water bodies for domestic purposes are linked to the incidence of diarrheal diseases in the project catchment area.

<u>Land Related Issues</u>

The entire project area of 11,000 ha falls under two customary settings. They are; the Osudoku Traditional Area and the North Tongu Traditional Area. Customary land ownership in the form of family lands is the main type of land ownership within the project area. Family lands are vested in the head of the family and is not under government control. They are governed by customary laws prescribed by the local community. Other forms of land ownership within the project area include public land and individual land owners.

The government has acquired three (3) key areas within the project area. They comprise:

- Kpong Irrigation Project (KIP) area;
- Asutuare Irrigation Project area; and
- Aveyime Irrigation Project (AIP).

The 5,000ha under the STUDI (2009) area falls under three (3) traditional areas; Mepe, Battor and Mafi. The total number of Twenty (20) farmlands were identified and demarcated. They are; Nyamidikope, Bla-Botikope, Aveyime cattle ranch, Manya, Battor, Lasivenu-Lawoekope, Dekpoe, Kumikpo, Kelekor, Nutekpor, Kpogadzi, Aflokope/Aklawaya, Dove, Devime and Afalikpo/Aklamador/Atitekpo.

Cadastral survey was carried out to identify the land owners of the area. The Soil survey was done to determine the crop suitability in the Plains. From the cadastral survey, Fifteen (15) individual family lands were identified covering the 5000ha portion of the project area that was covered by the STUDI report.
These are as follows;

- Anyawofoe family farm lands from Aklawaya to Dekpoe
- Kwame Kumah family lands from Aveyime to Bla-Botikope
- Bosomprah family lands at Mepe
- Gevie family lands at Devime
- Akrobor family lands at Dove
- Gasoe family lands at Manya-Battor
- Kwasi Akwetey family land at Manya -Battor
- Atsu /Tse lands at Lowekope
- Mankralo Xevi stool lands at Battor
- Dzagbaku Clan lands at Mepe
- Todiba/Kwadwo Asamani lands at Aveyime
- Atitusi, Dogbadzi, Kuwornu and Gakpo lands at Devime

The Major stakeholders in the project area are Land owners, chiefs, youth, four (4) District Assemblies, smallholder farmers, commercial farmers and other indentified government institutions and NGOs. The Resettlement Policy Framework explains in more detail the land tenure arrangements in the project area and how these will be addressed during project implementation.

4.4 The SADA Regions

The Northern Savanna forms more than half of the total Ghana land surface cover of about 239,000 square km (23.9 million ha). The project area lies between latitudes 8^0 and 11^0 N and longitude 1^0 E and 3^0W. Togo bound it to the east, Burkina Faso to the north, Cote d'lvoire to the west and the high forest ecological zone to the south. The economy of the northern savanna ecological zone is based mainly on agriculture, which is the basis of livelihood for a majority of the population. The small-scale family holding is the basic unit of production. Most of the project area falls within the Guinea Savanna zone, although activities may extend into a small area of Sudan Savanna in the extreme northeast corner of the country.

Climate and Meteorology

The three regions falls within the Guinea savannah climatic zone (also known as the Tropical continental or savannah climatic zones). The climate is influenced by the movement of two air masses; Northeast Trade Winds and the Southwest Monsoons. These air masses converge at the inter-Tropical Boundary (ITB) which, depending on the season determines the rainfall pattern over the district. The Guinea and Sudan Savanna zones are both characterized by a unimodal rainfall regime lasting from April to October, although mean annual rainfall is higher in the Guinea Savanna zone (1000-1200 mm), than in the Sudan Savanna (900-1000 mm) The period between November and March is dry and characterized by the desiccating harmattan winds, rendering the zone prone to bush fires. The mean annual maximum temperature ranges from 33°C to 35°C with a minimum of about 22°C. During the dry season, the harmattan prevails, causing high rate of evapo-transpiration and soil moisture deficiency. Relative humidity is high during the rainy season but falls to about 20 % in the dry season.

Geology and Topography

The Upper East and the Upper West regions are underlain by granitoids of post Birimian age while the Northern region is underlain by sandstones, shales and limestones of the Voltaian system fringed at the west part by the post Birimian granitoids. The granitoids include granitic and gneissic rocks of grey colours and shades of pink. The gneisses are folded and also jointed with the rest of the formation. These rocks tend to be hard and less weathered due to the drier climatic conditions prevailing in the Northern Savanna Zone. They undergo less severe weathering compared to the southern part of Ghana. There are two main physiographic regions recognisable in the zone viz. the Savanna High Plains and the Voltaian Sandstone Basin.

Savanna High Plains

This is a gently rolling plain with average heights between 180 and 300 metres above sealevel. Small rounded hills or inselbergs of Birimian origin can be found occasionally. This zone is found north of the forested dissected intermediate belt.

With the exception of the Mole National Park, part of which is in the Voltaian sandstone basin, the rest of the pilot sites for the project are located within this topographic region. They are: Gbele Resource Reserve, Kenikeni, Nuale, Naaha, Ambalara, Kulpawn Tributaries, Kulpawn Headwaters, Mawbia, Sisili Central, Chiana Hills, Tankwidi West, Tankwidi East, Red Volta and Morago forest reserves.

The soils of these areas include ground-water laterites and savanna ochrosols, which are widely distributed. Less widely distributed are various lithosols and brunosols as well as acid gleisols and some tropical black earth. The soils of the high plains are more fertile compared to those of the Voltaian Basin but erosion is a serious problem.

Voltaian Sandstone Basin

This is an almost flat and extensive plain covering more than 80% of the Northern Region. The bulk of the area falls within heights between 60 and 150 metres above msl. Gentledipping or flat-bedded sandstones, shales and mudstone underlie it, which generally speaking are easily eroded, resulting in almost flat and extensive plain. In this basin soils are relatively poor. Laterite is the most extensively distributed soil, covering 75% of the basin. The upper horizons of the soil become waterlogged during the rainy season but dry up in the dry season. The texture ranges form silty to sandy loam when developed on shales and coarse sand when developed over sandstone. The soils, including the savanna ochrosols (a prominent soil group in the basin) are generally low in organic matter and nutrients and sometimes highly acidic and very susceptible to erosion. The river valleys of the region are generally associated with acid gleisols (Acheampong, 2001).

Soils

The most extensive soil type in the study area is the Groundwater Lateritic Soil which covers approximately 75 percent of the area. The principal characteristic of this soil type is the presence of a well cemented layer of iron stone (iron pan) at a relatively shallow depth below the surface. This layer is largely impervious to infiltrating rainwater resulting in the top soil becoming water logged right up to the surface in the wet season, but dry out completely in the dry season. Soils in the UER and UWR are generally formed by weathering of the bedrock although some drift of soil transported by wind and water is also found. The soils have predominantly light textured surface horizons with heavy textured soils confined to valley bottoms. There are extensive areas of shallow concretionary and rocky soils which have low water holding capacities and limited suitability for agriculture

Surface and Groundwater Hydrology

The Northern Savanna Zone is mainly drained by the White Volta and its tributaries Morago, Red Volta, Atankwindi and Asibelika in the Upper East Region, Kulpawn with its tributary, Sisili in the Upper West Region and the Black Volta, Nasia and Oti in the Northern Region. All the principal tributaries of the Volta are perennial. In the dry season the volume of water in the rivers of the two upper regions reduce considerably, breaking

into pools or drying up at the peak of the dry period. The Volta with its tributaries is an important source of surface water in the Northern Savanna Zone. Ground water is the most important source of potable water in the project area. However, the yields are in general insufficient to meet the needs of large communities or irrigation agriculture. Water supply thus becomes one of the key demands of the project pilot areas. In all the communities visited, water supply was one of the major concerns raised by the people (Acheampong, 2001).

Biological Environment

Ecology

There are six broad ecological divisions in Ghana that are rich and varied. The project area has savanna ecology, which extends into the neighbouring countries. It is classified into the Guinea savanna and the Sudan savanna ecological zones.

Flora

The Guinea savanna covers more than 90% of the land surface area of the Northern Savanna Zone but not restricted to it. It stretches from the upper regions down south to the forest fringes. The zone includes the grassland of the north and the derived savannaon the fringes of the forests.

The interior savanna contains 1,519 vascular species known to be indigenous or naturalised to the savanna zones of Ghana. Six species including *Ceropergia gemmifera, Commiphora dalzielii, Ptleopsis habeensis* and *Eugenia coronta* are rare in Ghana and internationally. The Guinea Savanna consists generally of fire tolerant, deciduous, broad-leaved trees interspersed in a ground flora of mainly grass, sometimes more than 1.5m high. The more important grasses of grazing value include *Andropogon gayanus* and in densely populated areas, *Diectomis fastigiata, Pennisetum pedicellatum* and *Loudetia togoensis* are common. Other species that occur are *Hetropogon contortus, Schoenfeida gracilis and Aristidaa hordeacea.* The common trees include *Vitellaria paradoxa* (shea), *Parkia biglobosa* (dawadawa), *Piliostigma thonningli, Combretum glutinosum, Anogeissus sp., Detariums p., Afzelia sp., Prosopiss p., Pterocarpuss p., Butyrospermums p., Antiaris sp., Vitex sp., Piliosstigmas p., Lonchocarpuss p.* and *Acacias p.*

The Sudan savanna occurs mainly in the Bawku East, Bawku West and Bolgatanga districts at the extreme northeastern corner of the Northern Savanna Zone. Its total coverage is less than 10% of the zone. The vegetation is made up generally of open savanna with short grass interspersed with relatively short low branching deciduous, broad and thin-leave trees. The common trees include species of *Adansonia, ButyrospermumA, cacia* and *Parkia.* The vegetation in most of the project area is characterised by a mosaic of forest, savanna, marshes and grassland. The ecology is for the most part severely altered. This is a reflection of prolonged unregulated grazing, burning, and intensive cultivation.

There are 72 forest reserves in the northern savanna made up of 23, 33 and 16 in the Northern, Upper East and Upper West in that order. They range in size from 0.4km2 to 1,116 km2. However, many of these areas are under pressure from subsistence farmers, livestock herders and others who engage in illegal activities in the reserves (Acheampong, 2001).

Fauna

Many of the large wildlife species, which are common to tropical Africa, are also found in Ghana. They live mostly in the savanna eco-system and include *Panthera leo* (lions), *Panthera pardus* (leopards), *Loxodonta aficana* (elephants), *Syncerus caffer* (buffalo), *Neotrigus pygmaeus* (royal antelope) and *Colobus* and *Cercopithecus sp* (monkeys), *Hippopotamus amphibius* and *Crocodilus sp.* Snakes include pythons and poisonous ones such as *Naja nelanoleuca* (cobra), *Bitis gabonica* (gaboon viper), Lizards, e.g. *Veranus niloticus,* often of striking colours are common, as are large snails, spiders and scorpions which are found in large numbers. The insect fauna is also very rich. The bird species include Francolinus sp (bush fowl) *Falconidae sp* (falcons, hawks, and eagles) Psittacus *erithacus* (grey parrot), *Neophron sp.* (vultures), *Guttera edouardi* (guinea fowl) and many more. Savanna fauna comprises at least 93 mammal species, about half of which can be considered to be large ones, over 350 bird species, 9 amphibians and 33 reptiles. About 13% of the 860 recorded butterfly species in Ghana are associated with the savanna. The Wildlife Conservation Regulations of 1971, (LI. 685) has schedules which contain lists of wild animals found in Ghana. Fifty-five of these are completely protected (Acheampong, 2001)

Rare or Endangered Species

Populations of many wildlife species found in the savanna have dwindled as a result of human-induced interventions, mainly through over hunting, inappropriate agricultural practices and expansion of agricultural land, road construction and bush burning (Appendix IV). The demand for wild animal meat (popularly called bushmeat in Ghana) is ever increasing, resulting in widespread hunting. As human populations in the northern parts of the country increases, exerting enormous pressure on the finite good "land" and creating land hunger among mostly the rural people, intact savanna woodlands and secondary groves which provide wild animals refuge and source of food become fragmented and unable to hold large populations of animals (Acheampong, 2001).

Wild Animal Migration

Wild animal movement between reserves, groves and sanctuaries in the northern savanna may be limited because these are either fragmented or interspersed with farmlands. Studies have shown that wild animals move from Togo into Ghana and vice versa, using gallery forests along the Red Volta River. It is also on record that wild animals move from the GEF supported Nazinga Game Ranch in Burkina Faso to farms on the Ghana side of the Ghana-Burkina Faso border. Communities outlying protected areas have occasionally had their

farms and property destroyed by wild animals mainly elephants that move outside the reserves, particularly in the dry season, in search for water and food. In 1997 elephants invaded some villages including Widinaba, Zongoiri, Nangodi, Sekoti and Datoko, all at the fringes of the Red Volta Forest Reserve, which is a natural trail for elephants moving from Togo into Ghana. Where villages received no help from the staff of Wildlife Division in driving these animals back into the reserves (or gallery forests) they resorted to killing the rampaging animals (Acheampong, 2001).

Socio-Cultural Environment

According to provisional results on the 2000 Population and Housing Census released by the Ghana Statistical Services Division, the population of the three northern regions (Northern, Upper East and Upper West) stands at 3,346,105. The Northern region carries the highest human population of 1,854,994, followed by the Upper East region with 917,251 and the Upper West region with 573,860 in that order. However, population densities follow the reverse order-104 persons/km^2 for Upper East, 31persons/km^2 for Upper West and 26 persons/km^2 for the northern region. Land hunger is greatest in the Upper East, where soil productivity is lower and climate harsher than in the two other regions. Most areas in the three regions are food deficient, but food security situation is worse in the Upper East region than in the Upper West and Northern regions. The main ethnic groups in the project pilot areas include the Dagbani, Mamprusi and Gonja in the Northern Region, Dagaaba and Sisala in the Upper West Region, Builsa, Kassena, Nankani, Grunnie, Nabdam and Kussasi in the Upper East Region. In all these ethnic patrilineal inheritance is the norm and traditional authority is vested in the chief, who sits on a skin, an acknowledgeds ymbol of identityo f the group and authority (Acheampong, 2001).

On-farm livelihood activities

The majority of people in the three northern regions are traditionally crop and livestock farmers, growing cereals, root and tubers and keeping livestock, mainly goats, cattle and sheep for subsistence and gain. Outside farming season activities include farm produce processing and marketing, livestock grazing and "pastoralling", bush fire prevention and control and rehabilitation of residential accommodation. Cattle husbandry plays an important role in the socio-economic life of people of the three regions. Wealth is mostly invested in cattle. The number of cattle a person owns determines ones wealth. Cattle are used for bride price and on other important social occasions. Most cattle owners, therefore, put greater emphasis on the herd size, rather than the quality of their stock. To them large herds mean security, wealth and prestige in the community. This leads to overstocking in many parts of the northern savanna area. With respect to range tenure, grazing is on communal basis and anyone with animals may graze his/her animals on communal lands in the community where he/she lives. On the contrary, herders from other communities will have to obtain grazing rights from the village chief or head of the land-owning group before putting their animals on communal lands to graze. For inhabitants of a village or community there are no restrictions to the use of the communal grazing lands provided that the user of the land does not change the land use form, for instance, into human habitation.

Traditionally, forage crops are not grown and livestock graze on communal pastures, for which no one has management responsibility. Communal lands are "common good" and are rather taken for granted as limitless gift of nature available to be used. Even in the communities, there is growing concern about the rate of deterioration of pastures, particularly in heavily populated areas (Acheampong, 2001).

Culture and Religion

Each region consists of at least three ethnic groups and spoken languages are varied accordingly. The major ethnic groups are each represented by a paramount chief. The Northern Region has four paramount chiefs who represent four major ethnic groups. Islam is the dominant religion in the Northern Region, whereas Traditional and Christian religions are prominent in the Upper East and Upper West Regions respectively. Aside agriculture, the people engage in the manufacture and sale of traditional artifacts and musical instruments. Blacksmithing and pottery are also common (CEHRT, 2010).

Disaster Risk Exposure

Risk sources range from erratic climatic conditions, limited opportunities for off-farm economic activities, poor planning and implementation of development policies to frequent incidence of bushfires, floods and droughts, which are the bane of the area's underdevelopment. Additionally, persistent inter- and intra-ethnic conflicts result in heavy loss of lives and property, with resources redeployed into conflict resolution (CEHRT, 2010).

Land Tenure

In the Upper West and Upper East regions, ownership of land is vested in the Tindanas (Landowners), while in the Gonja area of the Northern Region the land-owning authority are the "skins" or chiefs. In most parts of the three northern regions undeveloped and unoccupied land may be described as communal lands and subject to common rights. These may be termed as local 'public' lands since they are for the benefit of the whole community. Land that may appear to be unoccupied is in many cases land that is utilized by local communities for a variety of livelihood activities.

The essential principle is that all lands, including wasteland and unoccupied land, are owned by the community or group on a communal basis. The Tindana determines new areas that are to be put under cultivation every farming season. Once a plot is allocated to an individual the person obtains a user's right and continues to till it for any number of years. An individual acquires land user's rights by purchase, gift or through inheritance but he cannot sell it to anyone outside the group. A person who obtains a user right to land cannot be deprived of the land without his/her consent - even by the owner of the allodial title. A person who does not belong to the land owning group can acquire stool or family land only by some form of grant; license or contract irrespective of whatever use it will be

put to (Acheampong, 2001). The Resettlement Policy Framework for the project addresses land tenure issues in more detail.

4.5 Gender and Vulnerable Groups Issues

Role of Women in Ghana's Economy

In Ghana, although women's roles and participation in economic activity have been defined and shaped along biological and cultural lines, women have made significant strides in all aspects of the Ghanaian economy especially in the agricultural and service sectors. Presently, more Ghanaian women are now getting out of their home jobs into paid jobs and are forced to combine their work at home as homemakers and their jobs outside the home. Amu, 2006 has investigated the role of women in the Ghanaian economy especially their participation in economic activities, to identify factors that hinder their development, to shed light on how women affect and are affected by policies, programs and projects that are instituted by the government, domestic and otherwise, how best to take advantage of some of these programs and policies, and how best to minimize their negative impact on women.

Although females make up about 51 percent of the Ghanaian population as at 2000, illiteracy is more prevalent among women than men. The GLSS4 survey for instance found out that twice as many females as males have never been to school. This among other factors implies that in Ghana more males have access to education than women. This situation explains why the concentration of women in skill and knowledge based industries is low, as against the high concentration of women in the informal private sector employment and informal self-employment.

The gender characteristics of the unemployed indicate that the unemployment rate among women is lower than among males. women's participation in the labour force and economic activity and finds that women although they make up almost half of the economically active population are mostly in the lower echelons of economic activity especially the private informal sector where women are predominantly entrepreneurs of small and medium scale businesses. Women are found to be mainly employed in agriculture and allied fields, sales work and to a lesser extent production and transport and professional and technical. These women in recent times have increasingly become the backbone of their families as breadwinners.

Existing programs to enhance women's participation in economic activities have covered financial assistance in the form of micro credit as well as skills training and retraining through workshops, seminars, etc. However due to various operational constraints, financial assistance from micro-financial institutions has been poor and woefully inadequate.

Some general recommendations given include the following:

- Identify diverse types of potential borrowers within the entire population of women in micro-enterprise to ensure that loan outreach extends to a diverse group of potential borrowers, including poor women with little or no education and women in the informal sector.
- Identify the scope of lending opportunities to women by assessing the size and regional distribution of the population of women in micro-enterprise and also identify needs in high-potential sub-sectors and strategize loan outreach by assessing differences in women's businesses between the commercial, services, and production sectors.
- Identify the needs and characteristics of both home-based enterprises and enterprises based outside the home, recognize the development potential of both types of enterprises, and design appropriate lending strategies for each type of enterprise.
- Devise strategies for addressing women's concerns about the high cost of credit, access to collateral and high interest rates, such as by increasing their access to information about credit and lending processes.
- Consider expanding the sectoral scope of the micro-finance programs to incorporate women's agricultural enterprises.
- Supplement lending programs with other forms of business support that are essential for the effective development of women's enterprises as a way of looking beyond credit and rather concentrating on non-financial support needs.

Women in Agriculture

Within the agriculture sector, Amu, 2006 indicates that, given the unique relationship that exist between women and nature, women are predominant in all the sub-sectors namely farming, processing and distribution. As farm owners, farm partners and farm labourers, women are estimated to account for 70% to 80% of food consumed in Ghana. The predominant role of women in agriculture has enabled most women farmers to become increasingly responsible for the educational and other material needs of their wards, especially for female headed households.

On the problems women face in carrying out economic activities, include the following:

- Access to and control over land due to traditional/cultural factors;
- Access to credit due to lack of collateral, inadequate savings needed for equity payment required for loans, cumbersome bureaucratic procedures for accessing formal credit facilities;
- Access to training due to ignorance on the awareness of training programs and low educational qualification;
- Access to hired labour on their farms due to rural-urban migration;
- Access to other inputs: fertilizer, extension services, information, technology, etc;
- Time constraints.

On access to and control of land it appears that most of the problems facing women in this area are associated with customary laws that are discriminatory to women as well as inefficiencies in land administration that tends to impact negatively women and other on

minority groups. Thus the following recommendations have been made which are consistent with suggestions given in the Women's Manifesto for Ghana, 2004 document:

- Customary laws of access to land and inheritance, which are discriminatory and unconstitutional, be reformed. Furthermore, Customary and other tenancies are reformed to ensure that rents are affordable and accessible to both men and women.
- The government should ensure that achieving equity in access to and control of land becomes an integral component of the Land Administration Project (LAP).
- Measures should be put in place to ensure that land registration and titling processes promote joint registration of conjugal family farmlands to enhance women's land tenure security.
- Women's contribution to the development of farms be recognized and compensated at divorce and on death of their spouses.
- The state takes steps, in conjunction with national house of chiefs and traditional councils to address customary laws and practices of access to and control over land that are discriminatory to women.

To address access to labour, technology and extension services the following are recommended:

- Provide women with labour and time saving machinery through the setting up of plant pools within reach such as districts and communities through the collaboration of the Ministries of Agriculture, Trade and Industry, and Women and Children.
- Access to improved variety of seeds and seedlings as well as fertilizers and other chemicals needed to improve agricultural methods, should be enhanced by making them affordable to women farmers.
- Women farmers must be educated on new variety of crops that are being introduced as well as on other new and improved methods of farming through extension services.
- Furthermore, more women extension services workers should be allocated to districts and communities where women farmers predominate as this will enhance their interaction, especially in areas where married women are traditionally barred from being friendly with other men.
- Extension services must also be provided for women in manufacturing and other processing activities in the form of how to maintain standards both locally and internationally which will enhance marketability of the product in and outside Ghana.
- Access to business sensitive information and technology could also be improved by improving rural telephony and Internet services.
- Furthermore women's time constraints need to be taken into consideration when designing programmes for them, be it training or otherwise.

Gender Issues in the Project Area

As part of the STUDI study in 2009, a gender survey was conducted in the Accra Plains project area. The objective of the gender assessment study included:

- Ascertain the social, economic, legal and development constraints faced by women farmers at the project area

- Identify and describe in detail women's' activities on the farm and within the household
- Assess the role and status of women in agriculture particularly, in the acquisition of land, access to credit, fertilisers and extension services
- Examine the social facilities and amenities available and accessible to the women farmers
- Assess the level of illiteracy among women and the rate of school dropouts among girls
- Examine the health challenges facing the women i.e. Family planning, maternal and child mortality and mobility, HIV/ AIDS
- Analyse the effects of the project on women's' activities and social life
- Ascertain the knowledge and involvement of the women in the project
- Create awareness about the project and solicit support from the entire community

A total of 112 questionnaires were administered to groups that were predominantly women (94.6%) and the study concluded that the main problems faced by women in the study area include:

- Access to credit
- Land acquisition
- Unreliable rainfall pattern
- High illiteracy rate among women, and disparity in education between boys and girls
- Reproductive health issues
- Market for produce
- Storage
- Property rights

Main recommendations included the following:

- Women farmers should be fully involved in the planning and implementation of the project
- Chiefs and elders of the community to be sensitised to involve women in decision making
- Various land policies should be gender friendly and accessible
- Special credit scheme with focus on women

Women's Rights to Own and Use Land

Gender challenges may be tackled from traditional point of view. In the Accra Plains, women are involved in farming, harvesting, marketing and all aspect of irrigation farming. They are allowed to own land and usually priority is given to community members including women. Women mostly cultivate rice and vegetables.

In many parts of the SADA Regions, women do not have the right to own land. However, they do have a long established right to borrow land from their husbands or male partners skin to cultivate a crop of their own. If a woman is unable to obtain land from these men, she will negotiate the loan of land from another compound (Abaka-Yankson, 2009). With the introduction of the Water Users Association, women are increasingly getting involved in dry season irrigation farming which to a large extent represents a change in cultural

behavior towards women. In Bongo Central for instance, women participation in dry season irrigation increased by 64% in four years (Abaka-Yankson, 2009).

Other vulnerable groups in the project area include: Children, Orphans, Elderly, Widows, Female Heads of Households, Migrant/Settler farmers, and Nomadic cattle herders.

Concerns about Participation of Women and other vulnerable groups in the Project

Issues of concern arising from public consultation include:

- The need for the project to streamline processes for land acquisition by women;
- Women involvement in the Market -Value –Chain;
- Involvement of women in decision making;
- Youth involvement and their roles;
- Knowledge and understanding of the out growers scheme;
- Extension services available to women or just men;
- Women understanding and knowledge of the project;
- Negative impacts of the projects on women, youth and children;
- In case of disaster, floods or drought which group will be mostly affected;
- Possible barriers preventing women from accessing aspects of the project;
- Verification that the project will not make women worse off;
- Project support to improve project objectives to the beneficiaries;
- Will the project affect their current food security?
- There is the need to educate the women on the usage of chemicals since some of them are illiterates.

5.0 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND SIGNIFICANCE

5.1 Methodology for Impact Identification

The potential environmental and social impacts likely to arise as a result of the GCAP were identified by matching the project components with the surrounding environmental and socio-cultural resources. This section presents both the likely positive and negative impacts that can arise from the project. Information regarding the social, cultural, natural and coastal resources, etc, was sourced from related literature, visits to the project site and consultation with relevant stakeholders.

Stakeholders were identified using a stakeholder identification matrix and were involved in the identification of the potential impacts of the GCAP. The key stakeholders include:

- Ministry of Food and agriculture
- Lands Commission;
- Environmental Protection Agency (EPA);
- Affected District Assemblies;
- Ministry of Health (MoH);
- Project catchment communities;
- Ministry of Food and Agriculture (MoFA);
- Forestry Commission/Wildlife Division (WD);
- Ministry of Environment, Science and Technology (MEST); and
- NGOs and CBOs.

5.1 GCAP and Associated Activities

The potential interactions between various project activities and environmental and social receptors are identified for analysis. At the project phase, these will be evaluated against site-specific conditions using information gathered from existing baseline conditions and site observations. The interactions/project phase activities will be 'screened out' if the potential for impact does not exist or is negligible.

The potential GCAP facilities and associated activities are summarized in the table below. The activities are later assessed for their potential impact on the physical and social environment.

Table 16: Project associated activities

Potential GCAP Areas	Associated Projects and Activities
Irrigation facilities	Construction of dams Diversion of rivers Water abstraction Construction of irrigation canals

Potential GCAP Areas	Associated Projects and Activities
	Development of Plantations (agricultural fields) Construction of access roads Provision of power supply
Post harvest infrastructure	Construction of storage facilities
Agro processing	Installation of machinery Waste treatment and disposal

5.2 Project activities and potential environmental and social impacts

The project is associated with many positive impacts which will include:

- Soil Conservation
- Flood Control
- Water Resources Conservation
- Improved soil conservation
- Improvement of previously water-logged areas
- Increased farm incomes from crop output
- Food Security
- Poverty Alleviation
- Raise Rural Income
- Improved nutrition
- Employment creation for community members
- Empowerment of farmers

Improved Regional Economy

Constructional Phase

It is expected that the project will accelerate the pace of regional development. This will occur in both the construction and operational phase of the project. During construction, work on the project will provide market for local goods and service including food and housing. Local businesses will take advantage of the situation to increase the supply of basic goods and services to meet the increase in demand.

The trend is expected to continue in the operational phase of the project. Over 2,000 farmers will be working on the plains and SADA regions after the completion of the project. There will be other people engaged in ancillary services in areas such as transport. The influx of migrants into the regions to farm and provide other ancillary services to support the irrigation scheme will expand markets for local goods and services. New business opportunities will also be created for the local people. The expansion of business activities in the districts will enhance the revenue base of the Assemblies through increase receipts from local taxes (tolls) and ground rent. In the long term the project will contribute to the poverty reduction and wealth creation efforts of the beneficiary districts.

Improved National Economy

Operational Phase

The intended project will reduce food dependent inflation and food imports. The food basket accounts for 50% of the consumer price index while food imports accounts for about 5% of Gross Domestic Product. The project will increase the output of rice, maize, vegetables and livestock in Ghana. For example, after fourth years in operation the project is expected to produce over 2,000 metric tonnes of rice as well as vegetables and livestock. The direct impact of the project impact will be a reduction in rice and other food imports. The increase in food production will positively impact on food prices all things being equal. Inflation attributable to the escalating food prices will be controlled. The project will support government efforts to achieve single digit inflation.

Improved Food Security Profile

Operational Phase

Ghana is generally described as food secure. This notwithstanding, pockets of food insecurity occur across regions, among social groups and in between seasons. It is estimated that the incidence of food insecurity in Ghana is between 5-9% (FAO, 2008). The incidence of food insecurity has been exacerbated by escalating food prices globally since 2007. The inability of local farmers producing under unstable weather conditions to meet domestic demand at all times is major contributory factor to seasonal for food shortages experienced across the country. The project proposal to make water available for farming all year round through irrigation is expected to improve productivity and output of farmers by removing the constraints associated with rain fed agriculture. With improved productivity and output unit production costs will reduce leading to a reduction in food prices all things being equal. As prices of food fall it will have a positive impact on affordability. The incidence mal nutrition in Ghana will be reduced. The increase in food stocks will also enhance the country's emergencies preparedness. In sum, the proposed project will support government efforts to improved food security and emergency preparedness of the nation.

The project will add to the food stocks in the country and contribute to government initiatives aimed at achieving the Millennium Development Goal One. That is reducing the incidence of hunger by 50% by 2015. In view of this the project impact is significant. It is long term and regional because the agriculture products will be distributed across the country.

Improved Land and Environmental Management

Operational Phase

Land use and land management reforms proposed under the project are expected to ensure sustainable use of land resources. This will encourage investment into farming practices that

support land conservation in the long term. In addition, the introduction of scientific methods of farming through sustained extension services will ensure the intensive use of land. The effect of these reforms will be minimal land erosion, improved fertility and ultimately higher yields and productivity. The expected output per hectare of the selected crops will compare favourably with achievable yields. This makes the project impact significant localised and long term.

Employment Opportunities and Improved Income Profiles

Constructional Phase

During the construction phase, people will be employed directly as labourers, drivers, engineers etc. Women from the local communities will sell food and provide other services for the work force at various sites.

Operational Phase

Over 2000 farmers of various categories will be working on the irrigated fields when the project is fully operational. Again, the post construction phase will see a rapid influx of migrants into the project area. As in the case of most infrastructure projects in Ghana, women and men engaged in trading activities in the communities within the project zone will experience increase in their daily sales. The existing low levels of income will improve during the operational phase of the project. More importantly, the opportunity to farm three or four times a year using scientific methods of farming and animal husbandry will improve agricultural output and productivity. The marketing and processing models proposed as part of the project activities will reduce marketing bottlenecks. The effect of these interventions is an improved income profile of beneficiary farmers.

5.3 Determination of environmental and social significance of impacts

The actual impact significance rating depends on a lot of factors, including:

- the magnitude of the impact;
- the sensitivity and value of the resource or receptor affected;
- compliance with relevant laws, regulations and standards;
- views and concerns of stakeholders;
- overall worker/public comfort; and
- likelihood of occurrence.

5.3.1 Categories of impact significance

A 'negligible or nil impact' or an impact of negligible significance is where a resource or receptor will not be affected in any way by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background levels. A 'minor impact' or an impact of minor significance is one where an effect will be experienced,

but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value. In such instances, standard construction/ operational practices can address such impacts. A 'moderate impact' or an impact of moderate significance is where an effect will be within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit. In such cases, standard construction practices can take care of these impacts but mitigation measures may also be required. A 'major impact' or an impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. In such cases, alternatives are required to address such impacts otherwise mitigation measures should be adopted with strict monitoring protocols.

The above classification used in the tables is largely subjective, and may be overruled by new site specific issues or information and detailed project activities not captured in this framework.

Some of the major potential environmental issues/impacts arising from project activities at the construction, operation and decommissioning stages are listed in the table below.

Table 17: Some project activities and associated potential adverse environmental and social impact issues

No	Projects and Associated Activities	Potential Major Environmental and Social Impact Issues	Environmental Significance
1.	Dams	Water pollution Soil erosion Flooding Alteration of hydrological regime Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Land take Spread of disease Altered downstream water uses Micro climate changes Dam failure	Moderate Moderate Major Major Major Major Major Major Major Major Moderate Moderate
2	Diversion of rivers	Water pollution Flooding Alteration of hydrological regime Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Land take	Moderate Moderate Major Major Major Moderate Moderate
3	Irrigation canals	Water pollution Flooding Alteration of hydrological regime Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Water related diseases Land take	Moderate Moderate Moderate Moderate Moderate Moderate Major Moderate
4	Access roads	Dust and noise pollution Water pollution Solid waste disposal Waste oil/ fuel disposal Public health and safety Traffic congestion and delays Land take	Major Moderate Moderate Moderate Major Minor Minor
5	Power supply	Land take Resettlement related issues Air quality deterioration Noise/ vibration Public safety Fire management	Minor Minor Minor Moderate Minor Moderate
6	Plantation development (agricultural fields)	Water pollution Soil erosion Flooding Alteration of hydrological regime	Major Major Moderate Moderate

No	Projects and Associated Activities	Potential Major Environmental and Social Impact Issues	Environmental Significance
		Destruction of flora and fauna habitat Changes in biodiversity Resettlement related issues Soil and land degradation Agro chemical usage Pest management Groundwater pollution Micro climate changes Salinization Fire management (bush fire)	Major Major Major Major Major Major Moderate Moderate Major Major
7	Agro processing facilities	Land clearing- vegetation loss Air quality deterioration Noise Water pollution Changes in aquatic life and habitat Occupational safety Public safety Solid waste disposal	Moderate Minor Moderate Major Major Major Moderate Major
Social Impacts			
8	General	Livelihood loss Community disruption Cultural heritage site Increase in women work burden Loss of land for women Loss of land for land-poor Loss of access to non-cash or food crops- medicinal plots Exclusion of community voice in transactions between investors and traditional authorities	Major Moderate Moderate Moderate Moderate Major Moderate Major

6.0 MITIGATION GUIDELINES

The mitigation measures are applied to impacts of environmental and social significance.

6.1 Applicable WB Safeguard policies

Based on the discussions in the previous section, the safeguard policies triggered by projects include the following:

Table 18: WB Safeguard Policies Triggered

Policy	Requirements
OP 4.01 - Environmental Assessment	select appropriate instrument to assess, minimise and
OP 4.09- Pest Management	Support integrated approaches to pest management. Identify pesticides that may be financed under the project and develop appropriate pest management plan to address risks
OP 4.11- Physical cultural resources	Investigate and inventory cultural resources potentially affected. Include mitigation measures when there are adverse impacts on physical cultural resources
OP 4.12- Involuntary Resettlement	Assist displaced persons in their effort to improve or at least restore their standards of living. Avoid resettlement where feasible or minimise. Displaced persons should share in project profits
OP 4.37- Safety of dams	For large dams, technical review and periodic safety inspections by independent dam safety professionals
OP 4.36 Forests	Send letters to game and Wild life division of the Forestry Commission with map of the project area seeking clarification
OP 4.04 Natural Habitats	Send letters to game and Wild life division of the Forestry Commission with map of the project area seeking clarification on whether the area does not fall within a protected area or does not contain species which are endangered
OP/BP 7.50 – Projects on International Waterways	Ascertain whether riparian agreements are in place, and send a Riparian Notification Letter to ensure that riparian states are informed of and do not object to project interventions.

The World Bank distinguishes between small and large dams for application of its Policy on Safety of Dams, OP 4.37, paragraph 3.

a. Small dams are normally less than 15 meters in height. This category includes, for example, farm ponds, local silt retention dams, and low embankment tanks.
b. Large dams are 15 meters or more in height. Dams that are between 10 and 15 meters in height are treated as large dams if they present special design complexities-for example, an unusually large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials. Dams under 10 meters in height are treated as large dams if they are expected to become large dams during the operation of the facility.

6.2 Mitigation considerations and options

All moderate and major adverse impacts are considered for mitigation. Specific measures have been suggested in this regard where practicable. With regard to negligible and minor impacts where the project activity is not expected to cause any significant impact in such cases, best practice measures and mitigation have also been recommended where appropriate to improve the environmental and social performance of the Project.

The mitigation options considered include project modification, provision of alternatives, project timing, pollution control, compensations and relocation assistance. In cases where the effectiveness of the mitigation is uncertain, monitoring programmes are introduced.

6.3 Recommended mitigation measures

The mitigation measures or guidelines have been designed in order to avoid, minimize and reduce negative environmental and social impacts. The project will conform with the Bank's Environmental, Health and Safety Guidelines. The mitigation measures are presented in the following tables in a descriptive format.

Table 19: Mitigating Potential Environmental and Social Impacts /Concerns

Impact issues	Description of mitigation measures
Physical Environment	
Waste disposal	Solid non toxic waste • Adequate waste reception facilities should be provided at project sites/camp sites • Final disposal should be at dump sites approved by the local District Assembly Waste oil /fuel ▪ Spent or waste oil from vehicles and equipment should be collected and temporarily stored in drums or containers at site ▪ Waste oil should be disposed of by oil marketing companies or agents approved or recognized and have the capacity to undertake oil disposal
Air pollution	• The Projects should require that construction contractors operate only well maintained engines, vehicles, trucks and equipment. A routine maintenance program for all equipment, vehicles, trucks and power generating engines should be in place. If sites are located nearby schools/health clinic, thus include minimization of noise generating activities during day-time hours • The project should ensure the use of good quality fuel and lubricants only • If dust generation at the project/construction site becomes a problem, limited wetting of sites and or unloading and reloading points should be done to reduce dust raising • Construction traffic speed control measures should be enforced on unpaved roads (speed limits through communities should be ≤50km/hr on unpaved or untarred roads and near or at project site should be ≤30 km/hr). • Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.
Noise and vibration	• The Projects should require contractors to use equipment and vehicles that are in good working order, well maintained, and that have some noise suppression equipment (e.g. mufflers, noise baffles) intact and in working order. This will be achieved by making it a component of contractual agreements with the construction contractors. • Contractors will be required to implement best driving practices when approaching and leaving the site (speed limit of ≤30 km/hr) to minimize noise generation created through activities such as unnecessary acceleration and breaking squeal. • Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.

Impact issues	Description of mitigation measures
Impacts on Landscape and Visual Receptors	• Project sites should be boarded off from public view during construction • Good house-keeping at construction sites should be ensured
Impact on traffic and Public safety	• Only road worthy vehicles and trucks should be used to avoid frequent breakdowns on the roads • Only experienced drivers should be employed
Water use	• Obtain water abstraction permit from the WRC
Water pollution	• No garbage/refuse, oily wastes, fuels/waste oils should be discharged into drains or onto site grounds • Fuel storage tanks/sites should be properly secured to contain any spillage • Maintenance and cleaning of vehicles, trucks and equipment should take place offsite especially where project sites are close to water bodies. • Toilet facilities should be provided for construction workers to avoid indiscriminate defecation in nearby bush or local water bodies
Soil and Land degradation	• Minimize land clearing areas as much as possible to avoid unnecessary exposure of bare ground to the elements of the weather • Revegetate cleared areas as early as possible • As much as possible, avoid construction work in the rainy season
Impact on fauna and habitat	▪ Avoid unnecessary exposure and access to sensitive fauna habitat areas ▪ For identified or suspected sensitive habitats (swamps/ wetlands), regular inspection or monitoring should be carried out in the area prior to start and during work. ▪ If sensitive habitats are encountered, Project activities should cease and the Project should consult Wildlife Division to determine the appropriate course of action. ▪ If the project site is discovered as a sensitive habitat area, the Project should engage the Wildlife Division to develop a suitable plan.
Impacts on water bodies/ Fauna habitat	• The Projects should require that contractors implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and cleanup of accidental spills into the aquatic environment. • During pre-installation and installation of project facilities, spotting of sensitive aquatic life should form part of the project activities. Should these species be observed in the vicinity of the work area, the project should execute

Impact issues	Description of mitigation measures
	measures to avoid destruction or disturbance. • Project staff must report sightings of any injured or dead aquatic life (fishes) immediately, regardless of whether the injury or death is caused by a Project activity. The report should include the date and location of the animal/strike, and the species identification or a description of the animal. The report should be made to the EPA or Wildlife Division. • The Project workforce and local communities should be educated to ensure that the importance of environmental protection and nature conservation are effectively communicated and that wider appreciation of environmental issues and construction best practice are fostered.
Impact on inland water quality	• All Projects should implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and cleanup of accidental spills into the inland water/marine environment. • Marine vessels will be required to adhere to International Maritime Organization (IMO) regulations on bilge and ballast water discharge. • Areas close to water environment that are disturbed during construction activities (such as trench digging) should be rehabilitated as soon as possible after the pipes/cables have been installed. • All rehabilitated areas should be surveyed on weekly basis for the first month after rehabilitation, and a monthly basis for the subsequent five months, to monitor levels of erosion in the vicinity of the development. If observations indicate that significant erosion and sediment transport is taking place (i.e. that rehabilitation has been unsuccessful) additional mitigation should be employed to reduce erosion.
Decommissioning of projects	• Social and Environmental Contract Clauses should be added in bidding documents such as the imperative and conditional agreement to clean up land before handing it over to either the Government/Local community.
Social Environment	
Involuntary displacement	***SADA Regions*** Possible cases of involuntary resettlement are expected during construction of warehouses and farmlands. ***Accra Plains Regions*** The project in the Accra Plains will involve the need to move people or displace their rights to use land as a result of the construction of irrigation canals and farmlands.
Local economy,	• If a site is acquired, all persons living off the site should be provided with livelihood assistance based on their

Impact issues	Description of mitigation measures
Employment and loss of livelihood	current income levels or the project should assist such persons obtain new jobs immediately without any loss of income. It should be done in accordance with the Resettlement Policy Framework (RPF). • Contractors should use local labour inclusive of women and vulnerable groups as much as possible and where available. As much as possible, all unskilled labour should be contracted or obtained from the local community. ***SADA Regions and Accra Plains Regions*** Land will be cleared during the land preparation stage when the project is fully operational. It is estimated that pastoralists likely to lose grazing grounds for their livestock. Also, iinclude participatory decision making regarding finding alternative land for pastoralists to use (in the case of customary land) ***Accra Plains Regions*** Animal husbandry is one of main source of local economy. Irrigation canals likely to block cattle grazing, if cattle crossing point is not provided.
Deprivation of use of land	Due process should be followed to establish the true owner of or rights holder over any land, be it family or stool land. Once established, the project should acquire the site by paying appropriate compensation. Recognition of customary land ownership structure that would require putting in measures (participation of community in consultation, dissemination of payment information) to ensure that compensation and lease payments are utilized by communities. The land compensation should be in accordance with the resettlement policy framework (RPF).
Loss of structures/ properties	For a project site to be used, irrespective of the land compensation, appropriate compensation should be paid to the owner for any structures/ properties which are permanent structures at the site. Depreciation should not be factored during valuation of these properties. The compensation process should satisfy the RPF developed for the project. Appropriate compensation should be paid for any damaged or destroyed propriety that belongs to affected persons. No depreciation during valuation of these properties.
Impacts on recreation and public areas	Appropriate notices and warning signs will be erected around working areas and public areas to warn prospective trespassers of any danger or risk
Impacts on Human	• Trucks carrying construction materials such as sand, quarry dust, laterite etc will have the buckets covered with

Impact issues	Description of mitigation measures
Health/ Safety and sanitation	tarpaulin or appropriate polythene material from or to project site • Only road worthy vehicles/trucks should be used • Only experienced drivers/operators should be employed • Except for areas secured by fencing, all active construction areas will be marked with high-visibility tape to reduce the risk accidents involving pedestrians and vehicles. • All open trenches and excavated areas will be backfilled as soon as possible after construction has been completed. Access to open trenches and excavated areas will be secured to prevent pedestrians or vehicles from falling in. • Adequate sanitary facilities will be available for workers and open range defecation will not be countenanced. • Construction workers will be provided with and educated to wear suitable Personal Protective Equipment (PPE) including hard hats, overalls, high-visibility vests, safety boots, earplugs, gloves etc. • Construction workers should be ?
Impacts on cultural heritage/archaeological interest /existing ecologically sensitive areas	• The pre-construction surveys should identify cultural heritage resources and existing ecologically sensitive areas that the project should avoid and by-pass these resources. • The Project should implement a "chance find" procedure and reporting system to be used by contractors in the event that a cultural heritage feature or ecologically sensitive item/issue is encountered.
Impacts on Human Health and Public Safety	• The Project will require all contractors to implement an Environmental, Health and Safety (EHS) plan which will outline procedures for avoiding health and safety incidents and for emergency medical treatment. This will be achieved by making it a component of contractual agreement. • Contractors will be required to wear suitable Personal Protective Equipment (PPE) including hard hats, high-visibility vests, safety boots and gloves and life vests as appropriate in accordance with the EHS plan. • All construction and other workers will be sufficiently trained in the safe methods pertaining to their area of work to avoid injuries.
Marginalisation of women	• Special credit schemes with focus on women • Provide women with labour and time saving machinery through the setting up of plant pools within reach such as districts and communities through the collaboration of the Ministries of Agriculture, Trade and Industry, and

Impact issues	Description of mitigation measures
	Women and Children. • Access to improved variety of seeds and seedlings as well as fertilizers and other chemicals needed to improve agricultural methods, should be enhanced by making them affordable to women farmers. • Women farmers must be educated on new variety of crops that are being introduced as well as on other new and improved methods of farming through extension services. • More women extension services workers should be allocated to districts and communities where women farmers predominate as this will enhance their interaction, especially in areas where married women are traditionally barred from being friendly with other men. • Women's time constraints need to be taken into consideration when designing programmes for them, be it training or otherwise. • More women participation in consultations and separate women-only meetings to be established. Women-suitable timing for consultations so that attendance does not clash with other priorities. •
Community disruption	• Schedule regular meetings with the community • Continuous engagement of communities using Participatory Rural Appraisal (PRA) methods • Implement grievance redress mechanisms
Cultural heritage site	• Inventorising of cultural heritage sites • discuss and agree with community to relocate if necessary
Increase in women work burden	• Education programmes on time management should be instituted • Adequate compensation for work done by women
Loss of land for women	• Implement RPF/RAP
Loss of land for land-poor	• Implement RPF/RAP
Loss of access to non-cash or food crops- i.e. medicinal plots	• Implement RPF/RAP
Exclusion of community voice in	• Schedule regular meetings with the community • Continuous engagement of communities using Participatory Rural Appraisal (PRA) methods

Impact issues	Description of mitigation measures
transactions between investors and traditional authorities	• Implement grievance redress mechanisms

7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

Environmental and social planning, implementation and management are undertaken by MOFA for its development projects to cover environmental and social assessment (ESA) and the pre-project/project planning processes. Key stages of the ESA include proposal screening, ESIA and mitigation measures, while the pre-project/planning process involves project concept, identification, design and appraisal. The ESA process links up with the pre-project/planning process signifying the importance of the two processes (i.e. EA and feasibility) to influence one another in the development of the GCAP. In the context of the ESMF, environmental and social planning identifies and assesses the potential concerns and implications that may arise with the implementation of the GCAP, in order to influence the design and other engineering feasibility options and decisions, for informed and sustainable project development. The successful implementation of the ESMF depends on the commitment of MOFA and related institutions, the capacity within the institutions and the appropriate and functional institutional arrangements among others.

The MOFA, Lands Commission, and EPA as well as MEST were identified as directly associated with the preparation, review and the implementation of the ESMF. The Ministry of Food and Agriculture (MoFA), Wildlife Division (WD), Lands Commission (LC) and the project communities were involved for their inputs regarding the appropriate environmental, social and health safeguards to be observed when the sub-projects are being implemented. The contractor(s) to be employed to undertake construction works will also have a role to play in the implementation of the sub-projects. This section addresses the following key areas of the ESMF implementation:

- Roles of Key Stakeholders in the ESMF implementation;
- Capacity building;
- Environmental and social monitoring and reporting; and
- ESMF implementation budget.

Thus the ESMF implementation provides guidance on procedures to be followed and standards to be met in implementing the GCAP which should be in agreement with national and World Bank safeguard provisions. Roles and responsibilities are clearly defined as well as monitoring protocols to be followed to ensure that the required provisions are adhered to. Finally, budgetary estimates are provided to support the implementation of the environmental and social management plan.

7.1 The Environmental and Social Screening Process

A screening process, selection and evaluation of GCAP projects are required to manage environmental and social aspects of these activities. The extent of environmental assessment that might be required prior to the commencement of the projects will depend on the outcome of the screening process (see checklist in **Annex 4**). MoFA will use this checklist to screen all potential projects and report accordingly as part of the usual project formulation (feasibility phase) exercise.

The purpose of the screening process is to determine whether projects are likely to have potential negative environmental and social impacts; to determine appropriate mitigation measures for activities with adverse impacts; to incorporate mitigation measures into the project design; to review and approve projects proposals and to monitor environmental parameters during implementation. The extent of environmental and social work that might be required for the projects prior to implementation will depend on the outcome of the screening process. This process should include screening for possible resettlement impacts.

7.2 ESIA Procedure to be followed for GCAP Projects

The World Bank safeguard policy OP4.01 provides guidance on the environmental assessment procedures for WB funded projects. The Ghana EIA procedures (EPA, 1995) have also established an acceptable process to screen and evaluate all developments, undertakings, projects and programmes which have the potential to give rise to significant environmental impacts. The two processes are largely similar and the Ghanaian procedures are therefore given in the following sections and will mostly be statutorily followed by all projects under the GCAP to obtain environmental permits for GCAP projects.

A GCAP project will only commence when an environmental permit has been procured from the EPA. The Agency has provided the list of projects for which ESIA is mandatory. These have been given in the **Annex** and are consistent with the World Bank categorization of projects.

The following steps will be followed by MoFA, the implementing agency to ensure environmental and social compliance of the GCAP project.

Step 1: Environmental Registration of the GCAP project

MoFA will appoint an Environmental Officer to provide safeguards supervision over all GCAP associated projects. The appointed/ designated Environmental Officer will be directly responsible for the registration of a GCAP project with the EPA as required by law. The Environmental Assessment Registration Forms are available at all EPA offices to register every project/ development that may have an impact on the environment.

A sample copy of the EA1 Form is provided in the Annex and the mitigation measures suggested in this ESMF as well as the checklist used in the screening exercise should assist to complete this Form. For projects for which EIA are mandatory, the Environmental Officer should register with Form EA1 otherwise Form EA2 should be used. This is a requirement under the Environmental Assessment Regulations LI 1652 (1999).

Step 2: Screening

This activity in accordance with the EAR 1999 LI1652 is the responsibility of the EPA. The Agency, within 25 days of receiving the Registration Form take a decision by placing the project at the appropriate level of environmental assessment. The results will be communicated to the implementing agency with reasons, which could be any of the following:

- Objection to the project
- No objection to the project (equivalent to World Bank Category C Project)
- Preliminary Environmental Assessment (PEA) will be required (equivalent to World Bank Category B2 Project)
- Environmental and Social Impact Assessment (ESIA) required (equivalent to World Bank Category B1 or A Project).

For projects receiving the 'no objection' from the EPA (WB Category C project) and therefore have only minor environmental and social risks, the implementing agency may move to implementation in accordance with pre-approved standards or codes of practices or they pre-approved guidelines for environmental and social management.

Step 3: Conduct environmental and social assessment studies

For the PPP projects for which the decision is the conduct of a PEA (equivalent WB category B2 project) or and ESIA (WB Category B1 and A Projects), stand alone reports will be prepared.

The Environmental Officer will prepare the Terms of Reference for the ESIA, and follow procurement rules for the recruitment of consultants for the ESIA. The ToR may be prepared using issues identified during the screening exercise and also the registration of the project with the EPA. Also, the impact mitigation measures provided in this ESMF may provide some basis for the design of the ToR. To facilitate the formulation of the ToR, a template has been prepared and provided in the **Annex** of this report.

The ESIA will identify and evaluate potential environmental impacts for the proposed activities, evaluate alternatives, and design mitigation measures. It will also analyze any cumulative impacts, where applicable. The preparation of the ESIA will be done in consultation with stakeholders, including people who may be affected. Public consultations are critical in preparing a proposal for the activities of the projects likely to have impacts on the environment and population. The public consultations should identify key issues and

determine how the concerns of all parties will be addressed in the ESIA. When an ESIA is necessary, the administrative process enacted by the EPA will be followed and executed.

Procedures for projects requiring an ESIA

First stage: Preparation of Terms of Reference

The results of identification, and extent of the ESIA (scoping), the terms of reference will be prepared by the Environmental Officer.

Second stage: Selection of consultant

Third stage: Preparation of the ESIA with public consultation

The report will follow the following format:

- Description of the study area
- Description of the subproject
- Discussion and evaluation of alternatives
- Environment description
- Legal and regulatory
- Identifying potential impacts of proposed sub-projects, including cumulative impacts
- Process of public consultations
- Development of mitigation measures and a monitoring plan, including estimates of costs and responsibility for implementation of surveillance and monitoring

Step 4: Review and approval of the ESIA for the sub-project; Publication / Dissemination of ESIA

The Environmental Officer will submit the draft ESIA to EPA. The report will be reviewed by a cross-sectoral National Environmental and Social Impact Assessment Technical Review Committee (ESIA/TRC) which is expected to:

- Assist the Agency in screening/reviewing all Environmental Assessment Applications and Reports (Environmental Impact Statements, Annual Environmental Reports, Environmental Management Plans and other related reports)
- Make recommendations to the Executive Director of the EPA for final decision-making
- Provide technical advice on conduct of assessments and related studies on undertakings and the reports submitted on them;
- Make recommendations on the adequacy of the assessment and any observed gap;
- Advice on the seriousness of such gaps and the risks or otherwise to decisions required to be made recommend whether the undertakings as proposed must be accepted and under what conditions, or not to be accepted and the reasons, as well provide guidance on how any outstanding issue/areas may be satisfactorily addressed.

Copies of the ESIA will be placed at vantage points including the EPA Library, relevant District Assembly, EPA Regional Offices and MoFA head office and regional offices. EPA serves a 21-day public notice in the national and local newspapers about the ESIA publication and its availability for public comments.

Step 5: Public Hearing and Environmental Permitting Decision (EPD)

Regulation 17 of the LI 1652 specifies three conditions that must trigger the holding of a public hearing on a project by the Agency. These are:

- Where notice issued under regulation 16 results in great public reaction to the commencement of the proposed undertaking;
- Where the undertaking will involve the dislocation, relocation or resettlement of communities; and
- Where the Agency considers that the undertaking could have extensive and far-reaching effects on the environment.

Where a public hearing is held, the processing of an application may extend beyond the prescribed timelines required for EPA's actions and decision-making.

Environmental Permitting Decision (EPD)

Where the draft ESIA is found acceptable, MoFA will be notified to finalise the reports and submit eight hard copies and an electronic copy. Following submission to EPA, the implementing agency shall be issued an Environmental Permit within 15 working days and issue gazette notices.

Where the undertaking is approved, MoFA shall pay processing and permitting fees prior to collection of the permit. The fees are determined based on the Environmental Assessment Fees Regulations, 2002, LI 1703.

Responsibilities for the Implementation of the Screening Process

The ESMF will be implemented by MoFA that would establish a team of Environmental and Social Officers who will collaborate with the EPA and the World Bank safeguards team to ensure effective execution. **Table 20** provides a summary of the stages and institutional responsibilities for the screening, preparation, assessment, approval and implementation of the GCAP project activities.

Table 20: Summary of the Social and Environmental Screening Process and Responsibilities

No.	Stage	Institutional responsibility	Implementation responsibility

No.	Stage	Institutional responsibility	Implementation responsibility
1.	Screening of Environmental and Social Infrastructure micro Project to assist in project formulation using checklist	MoFA	Social and Environmental Officers
	Statutory Environmental Registration of PPP project	MoFA	Social and Environmental Officers
2.	Determination of appropriate environmental and social assessment level/ category	EPA/ MoFA	Social and Environmental Officers
2.1	Selection validation	World Bank	Social and Environmental Officers
3.	Implementation of environmental and social assessment	MoFA	Social and Environmental Officers
3.1	If ESIA is necessary		
3.1a	Preparation of terms of reference	MoFA	Social and Environmental Officer
3.1b	Selection of Consultant	MoFA/ Procurement Office	Social and Environmental Officer/ Procurement Officer/ Safeguards sspecialist
3.1c	Realization of the EIA, Public Consultation and participation. Integration of environmental and social management plan issues in the tendering and project implementation,	MoFA/ Procurement Office/ Consultancy firm/ Contractor	Social and Environmental Officers/ Procurement Officer
4	Review and Approval	EPA/ World Bank	-
4.1	ESIA Approval (B1)	EPA/ World Bank	-
4.2	Approval simple measures (B2&c)	MoFA	Social and Environmental Officer/ Project manager
5.	Participatory Public Consultation and disclosure	MoFA/EPA/ World Bank	EO/Contractor/Consultant
6.	Surveillance and participatory monitoring	Implementing agency/EPA/ World Bank/ MoFEP	Social and Environmental Officers/ WB Safeguards specialists
7	Development of participatory monitoring indicators	MoFA	Environmental Officer /Safeguards Consultant

Other relevant World Bank provisions

The national provisions for the management of resettlement related issues are not as fully developed and therefore do not comply fully the World Bank safeguard policy requirements. Thus, it is expected that the WB OP 4.12 will be mostly applied under the PPP Programme and a separate document to guide the process, i.e. a Resettlement Policy Framework (RPF) document will be prepared as a standalone report to support the social management and acceptability of the projects.

The World Bank OPs 4.04 and 4.36 have been triggered in this project. While the project is not expected to affect natural habitats, ESIAs prepared during implementation will address any impacts to natural habitats. The project will avoid adverse impacts on natural habitats and, where necessary, appropriate plans will be prepared and/or offsets established to mitigate any impacts. Similarly, for forests, the project may involve some forestation activities. Management plans will be prepared as and when necessary.

The World Bank OP 4.09 has also been triggered and a Pest Management Plan (PMP) will also be available to guide the project as a standalone.

The project also triggers OP4.11 as such there is chance find procedures as its implementation is as below.

Chance Find Procedures Cultural Resources

Should the project encounter a cultural, historic or archaeological property or cultural resources in the form of historic and archaeological relics or if any cultural resources are found, the following principles and procedures will be followed:

- Execution of work will stop as soon as these are found to be cultural sites.
- Cultural resources uncovered during the project construction works will be handed over to the National Museums and Monuments Board for preservation or preservation of the site.
- Salvage excavation and relocation of artifacts or ruins from a cultural site will be undertaken.
- Collaboration between MOFA and the Museums and Monuments Board in determining and avoiding damage to cultural sites and resources.
- Marking and fencing important cultural sites during the construction period.

To be added as clause in contract for the contractor:
Protection of archaeological and historical sites

a) Upon discovery of ancient heritage, relics or anything that might be or is believed to be of archaeological or historical importance during the execution of works, immediately suspend activity and report such findings to the Site Engineer so that the National Museums and Monuments Board may be expeditiously contacted for fulfillment of the measures aimed at protecting such historical or archaeological resources.
b) The contractors shall take the necessary measures to prevent any person or equipment that may damage the article or things and shall provide barricades, fences, and signals and, if necessary, protect against atmospheric agents, as directed by the engineer, also guard service may be required by the engineer.
c) The supervising engineer shall take the following measures:
    - Notify the National Museums and Monuments Board.
    - Request that a representative make a site inspection.
    - Cessation of work in the vicinity of the find until the visit of the representative. The decision by the National Museums and Monuments Board on possible salvage or excavation shall be undertaken within 48 – 72 hours of notification.

The project also triggers OP 4.37.

The Volta River Authority (VRA) the operator of the dam has carried out a dam safety assessment in 2011 which the MOFA is relying upon. However the OP 4.37 recommends, that VRA should continuously carry out the dam safety assessment since the Kpong dam influences the performance of GCAP project. Thus the dam safety assessment should be carried out by dam experts and necessary additional dam safety measures be implemented.

The project also triggers OP 7.50; Policy on **Projects on International Waterways.** This is being handled by MOFA by writing/notifying the riparian states of the project.
The project also triggers Policy on Forestry and Natural habitats: Should there seems to be impact on forestry and/or critical habitats MOFA will write to Game and Wildlife Division of the Foresty Commission with a map of the project to ascertain that the area in question is not a protected area or an area of Global Significant Biodiversity Area

Technical Specifications and Standards

7.2.1 Technical specifications

MoFA with technical support from its department and agencies, will be responsible for the development and presentation of clear guidelines for the design and provision of technical specifications and standards to assist the private sector to plan for projects. These will ensure the streamlining of approaches and activities for sound implementation of projects. These will include adequate reference to sector norms and prescribed national codes of practice. The private sector will be well aware of applicable technical provisions and fit their projects into these accordingly.

7.2.2 Environmental standards

The EPA is responsible for setting environmental standards and has in place both general and sector specific guideline values. These standards and in some cases guidelines are required for the management of pollutant emissions. In situations where standards which therefore have legal backing are available then these must be followed. Otherwise, national guidelines or the World Bank guidelines could be used. In most cases, these are practically similar.

7.3 Environmental and Social Monitoring and Reporting

Monitoring is a key component of the ESMF during project implementation. Monitoring should be undertaken at the GCAP sub-projects implementation phase to verify the effectiveness of impact management, including the extent to which mitigation measures are successfully implemented. Monitoring should involve three areas namely:

- Compliance monitoring;
- Impact monitoring; and
- Cumulative impact monitoring.

The aim of monitoring would be to:

- Improve environmental and social management practices;
- Check the efficiency and quality of the EA processes;
- Establish the scientific reliability and credibility of the EA for the project; and
- Provide the opportunity to report the results on safeguards and impacts and proposed mitigation measures implementation.

7.3.1 Compliance Monitoring

This is to verify that the required mitigation measures, which are the environmental and social commitments agreed on by the MOFA and EPA (main environmental regulator) are implemented. Compliance monitoring would include inspections during construction of the project's components such as the various parts of the plant and pipelines as well as the right of way to verify the extent to which conditions based on which licenses are issued are adhered to. The operational/ decommissioning phase of the sub-projects of the GCAP will also be monitored. Compliance monitoring will be done by the EPA .

7.3.2 Impacts Monitoring

Monitoring of sub-projects impacts mitigation measures should be the duty of the Environment Department (which is yet to be created) of the MOFA. The Environmental and Social (E&S) safeguards given to the contractor in the contract specifications (in the Annex) should be monitored to ensure that works are proceeding in accordance with the laid down mitigation measures. The MOFA should ensure that the contractor submits report on work progress and any challenges in observing the E&S safeguards. The monitoring results should form a major part of the reports to be submitted to the EPA, MoE and MOFA

7.3.3 Cumulative Impacts Monitoring

The impacts of the GCAP on the environmental and social resources within the Project's area of influence should be monitored with consideration to other developments which might be established. There should be collaboration between MOFA and other proponents to compare E&S safeguards guiding the individual projects implementation to ensure comprehensive management of cumulative impacts.

Table 21: Project monitoring indicators and responsibilities

Impact issue	Proposed Action/ Measures	Implementation tool/ criteria	Monitoring/ indicators	Verification	Project stage	Responsibility
Solid waste disposal	-Provide adequate waste reception facilities at construction/work camp sites -Dispose of waste at District Assembly approved waste dump sites	-EHSP/Waste Management Plan/Construction site management plan	Number of site waste bins Final disposal records	Weekly checks by project engineers	Construction Operation	Contractors Project engineers
Waste oil/fuel disposal	Provide drums or containers for temporarily storage of spent or waste oil from vehicles and equipment Dispose of waste oil through recognized oil marketing company or approved agent	EHSP/Spill prevention and control plan	Waste oil drums or containers on site Waste oil collection and disposal records	Monthly checks by project engineers	Construction Operation	Contractors Project engineers
Air/noise pollution	-Purchase sound equipment/ machinery for project -Operate well maintained engines, vehicles, trucks and equipment. -Use good quality fuel and lubricants -Suppress dust generation at project sites -Reduce traffic speed on unpaved roads through communities and at project sites -Switch off engines of vehicles/trucks and earth-moving equipment when not in use.	-Part of contract agreement with contractor -A routine maintenance program or plan for equipment/ machinery -Purchase fuel at recognized fuel/ filling stations Speed limits on unpaved roads through communities should be ≤50km/hr and near or at project site should be ≤30 km/hr	-Maintenance plan implementation -Grievances recorded	-Independent checks by project engineers Maintenance records verified by project engineers -Self check by contractor	Construction	Contractors / Project engineers
Impacts on Landscape and Visual Receptors	Project sites should be boarded off from public view and ensure good house-keeping at construction sites	Construction site management plan	Implementation of Plan	-Self check by contractor	Construction	Contractors / Project engineers

Impact issue	Proposed Action/ Measures	Implementation tool/ criteria	Monitoring/ indicators	Verification	Project stage	Responsibility
Impact on traffic	-Use only road worthy vehicles and trucks -Use experienced drivers	Purchase sound vehicles and trucks /machinery for project Driver qualification	-Traffic incidence records -Grievances recorded	Project engineers to verify Self check by contractor	Construction	Contractors / Project engineers
Water pollution	-No garbage/refuse, oily wastes, fuels/waste oils should be discharged into drains or water bodies -Fuel storage tanks/sites should be properly secured -Maintenance and cleaning of vehicles, trucks and equipment should take place offsite. -Provide toilet facilities for construction workers	EHSP/ waste management plan Spill prevention and control plan/EHSP Construction site management plan EHSP	-Visibility of oil on water bodies -On site erosion features Proposed actions implemented	-Daily self checks by contractors -Periodic reports on performance by contractor to project engineers -Spot checks/audits by project engineers	Construction Operation	Contractors / Project engineers Investor Project engineers
Impact on fauna and habitat	-avoid unnecessary exposure or access to sensitive habitat. -Regular inspection or monitoring should be carried out in sensitive areas eg swamps/ wetlands the area prior to start of work.	If a sensitive habitat is discovered in the work area or vicinity, Project activities should cease. The contractor should notify project engineers who will consult Wildlife Division to determine the appropriate course of action.	Presence of sensitive habitat at project area/beach	-Regular self checks by contractor -	Construction	Contractors / Project engineers/Wildlife Division/ EPA
Impacts on inland water bodies and Fauna/ habitat	-Ensure proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials. -Regular monitoring of suspected or known sensitive areas should form part of the project activities. -Project activities should avoid disturbance of habitat or	-Hazardous material management plan/ oil spill prevention and control plan -Regular fauna observation report -Awareness raising for contractor personnel	Implementation tools Water accidents/incidents recorded	-Daily self-checks by contractor -Periodic reports on performance by contractor to client -Spot checks and audit by project engineers -Grievances recorded	Pre-construction, construction and maintenance	Contractors / Project engineers

Impact issue	Proposed Action/ Measures	Implementation tool/ criteria	Monitoring/ indicators	Verification	Project stage	Responsibility
	sensitive areas in working area. -Project must report sightings of any injured or dead aquatic life (fishes).					
Impact on inland water bodies/ marine water quality /coastal processes	-Ensure proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials. -Marine vessels to adhere to IMO regulations on bilge and ballast water discharge/waste oil disposal. -Areas close to water bodies that are disturbed during construction activities should be rehabilitated as soon as possible.	-Hazardous material management plan/ oil spill prevention and control plan -Wastewater management plan/waste oil disposal plan Erosion control and restoration plan	Occurrence of coastal/ beach erosion in the project area Visibility of oil contaminant on water bodies	-Daily self-checks by contractor -Periodic reports on performance by contractor to client -Spot checks and audits by project engineers -Periodic review of grievances recorded -Rehabilitated areas to be observed on regular basis.	Pre-construction, construction and maintenance	Contractors / Project engineers

Social Impact Assessment

Type of impact	Description of mitigation measures	Implementation tool/ criteria	Monitoring indicator	Verification	Project stage	Responsibility
Physical displacement of PAP	For acquired sites, the affected persons to be given relocation assistance (cash or kind) For acquired sites, to relocate communities and properties	RPF Resettlement Plan (RAP or ARP)	PAPs removed and absent from site	Records to confirm PAPs received or provided with relocation assistance Resettlement plan implemented	Pre-construction	Project engineers
Employment and loss of livelihood	PAPs provided with livelihood assistance or assisted to get new jobs immediately without any	RPF	Caretaker complaints	PAPs employed elsewhere or evidence of	Pre-construction	Project engineers

Type of impact	Description of mitigation measures	Implementation tool/ criteria	Monitoring indicator	Verification	Project stage	Responsibility
	loss of income. <u>General</u> Use local labour as much as possible and where readily available.	Contractor labour policy	Complaints from local communities	livelihood assistance given Project engineers to verify quota to locals prior to recruitment of construction workers	Construction	Contractors / Project engineers
Deprivation of use of land	Compensation or replacement land	RPF/ Resettlement Action Plan	Resettlement Action Plan implementation	Evidence of acceptable compensation paid Resettlement plan implemented	Pre-construction	GIDA/ Project engineers
Loss of structures/ properties	Compensation for loss of permanent structures and assist to relocate other properties.	RPF/ Resettlement Plan	RPF implementation Resettlement Action Plan implementation	Evidence of acceptable compensation paid Evidence of Resettlement Action plan implemented	Pre-construction	GIDA/ Project engineers
Impacts on recreation and public areas	Place notices and warning signs at working areas	EHSP	Grievance records	Warning signs/ notices in place	Construction	Contractors / Project engineers
Impacts on Human Health/ Safety and sanitation	-Cover buckets of trucks carrying construction materials such as sand, quarry dust, etc -Use road worthy vehicles/trucks and experienced drivers/operators -Active construction areas to be marked with high-visibility tape -Backfill and or secure open trenches and excavated areas.	EHSP Vehicle maintenance programme/plan in place Construction site management plan	-Health and safety incident register -Grievance records	Health and safety plan under implementation -Daily self checks and verification by contractor -Spot checks by project engineers -Periodic reports by contractor to	Construction	Contractors

Type of impact	Description of mitigation measures	Implementation tool/ criteria	Monitoring indicator	Verification	Project stage	Responsibility
	-Provide adequate sanitary facilities -Provide PPEs for construction workers. -Educate construction workers on site rules/regulation and hygiene and disease (HIV) prevention.	EHSP EHSP EHSP		project engineers		
Impacts on cultural heritage/ archaeological interest /existing marine infrastructure and services	-Identify cultural heritage resources and existing ecologically sensitive areas.	Pre-construction surveys / Chance finds procedure	Cultural/ archaeological resources/ existing infrastructure encounter incidence register	-Chance finds procedure under implementation -Daily self checks and verification by contractor Periodic reports by contractor to project engineers	Pre-construction and construction and repairs/ recovery	Contractors
Impacts on Human Health and Safety	-Use suitable Personal Protective Equipment (PPE). -Train all construction workers in safe methods of working.	EHSP	-Health and safety incident register -Grievance records	-EHSP under implementation Spot checks and observations by project engineers -Periodic reports on performance by contractor to project engineers	Pre-construction and construction, and repairs/ recovery	Contractors
Marginalisation of women	-Special credit schemes with focus on women -Provide women with labour and time saving machinery through the setting up of plant pools within reach such as districts and communities -More women extension	ESMF	-no of women benefitting from credit facility -no of women extension workers -no of women attending training	-periodic survey and assessment reports	Operation	MoFA, GIDA

Type of impact	Description of mitigation measures	Implementation tool/ criteria	Monitoring indicator	Verification	Project stage	Responsibility
	services workers should be allocated -Women's time constraints need to be taken into consideration when designing programmes for them, be it training or otherwise.					

8.0 INSTITUTIONAL CAPACITY FOR ESMF IMPLEMENTATION

8.1 Institutional roles and responsibility in the ESMF Implementation

The ESMF provides the environmental and social safeguards for the GCAP and its successful implementation, will depend largely on the key stakeholder institutions. This will ensure that the sub-projects are undertaken with due regard for the integrity of the resources to be affected by the project development activities. The roles of the major stakeholders are identified in an institutional role identification matrix in which the various components of the GCAP were matched with the institutions which have jurisdiction in the areas of licensing, permitting, assessment, monitoring, etc. The main institutions to implement the program and projects and to ensure sound management of the environmental and social aspects include:

- MoFA
- GIDA
- Government Regulatory Agencies
- Private sector

Ministry of Food and Agriculture (MoFA)

The Ministry of Food and Agriculture (MoFA) has established a unit with focus on environmental issues. This Land and Water Management Unit collaborates strongly with the EPA to mainstream environment into policy decisions. MoFA is the government ministry spearheading the GCAP effort and therefore plays a coordinating role among all the main stakeholders to ensure project success. The environmental and social management capacity at the regional offices is however limited and this will need to be enhanced and utilized for the environmental success of the project.

Ghana Irrigation Development Authority (GIDA)

Additionally, sector agencies like GIDA have their environmental outfits. Again, this is not adequately equipped and will require some support to be capable of playing a full role in the environmental management of the GCAP.

Environmental Protection Agency (EPA)

The EPA is responsible for ensuring compliance with laid down ESIA procedures in Ghana in accordance with the EPA Act 1994 (Act 490) and its amendment, and the Agency is expected to give environmental approval for Projects. The ESIA is being applied in Ghana to development projects as well as other undertakings as an environmental permitting pre-requisite and a major environmental management tool. The EPA is represented in all the ten (10) regions of the country and will support the project by exercising its permitting and monitoring powers. Though the Agency's technical capacity may be adequate there are issues with regard to logistics especially transport which therefore limits its monitoring and enforcement functions.

Project Screening, ESMF Review and Environmental Authorisation/ License
This document provides the framework for an environmentally sustainable development and implementation of the GCAP. Following formal submission of this ESMF, the EPA would undertake a review of the document and confirm that the ESMF document is adequate for project approval vis-à-vis national ESIA provisions.

Water Resources Commission (WRC)
The WRC is responsible for granting licenses for any water use activity and the procedures as laid down in the WRC Act 1998 (Act 526) will be followed. All project activities requiring such license will receive assistance from the WRC and the Commission will therefore provide adequate guidance to ensure that the proper procedures are used.

Lands Commission
The Land Valuation Board (LVB) is the statutory body ensuring that land required for projects are properly acquired and also transparent procedures are followed and fair and adequate compensation is paid. Though private firms may be invited to participate in the process, in case of disputes, the LVB would assist to ensure prompt settlement.

8.2 Capacity Building Requirements

Competence of government i.e., the ability of active government parties to carry out their respective design, planning, approval, permitting, monitoring and implementation roles will, to a large extent, determine the success and sustainability or otherwise of the GCAP.

The objectives and provisions of this ESMF therefore cannot be achieved in the absence of relevant competencies on environmental and social management within MoFA and GIDA and other stakeholders. The following sections provide recommendations on capacity building to support the program's environmental and social management objectives.

Identification of Capacity Building Needs
The first step in pursuing capacity building will be to identify the capacity building needs of the various stakeholders. Capacity building should be viewed as more than training. It is human resource development and includes the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively. It also involves organizational development, the elaboration of relevant management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community).

The capacity building requirements will mostly be in the form of training workshops and seminars. A training workshop on the ESMF/RPF and the World Bank safeguard policies of OP 4.12 and OP 4.01 would be organized for MoFA and GIDA (head office and regional

offices) as well as the Private sector (Project consultants/contractors). The following additional training topics are proposed:

- Environmental and social Screening Checklist
- Completion of EA Registration Forms
- Preparation of Terms of Reference for ESIA
- Environmental and Social Clauses in Contractors' contract and bidding documents.

The Social and Environmental officers would have sufficient knowledge and understanding of the implementation of the World Bank policies of OP 4.12, OP 4.01 and OP 4.09 and participate in the training of regional officers.

8.3 Budgetary provisions

The awareness creation, capacity improvement and training workshops will be organised for selected officers involved in the implementation of GCAP project, mainly:

- MoFA head office and regional officers, and
- GIDA head office and regional officers

The relevant regions will comprise: Greater Accra, Volta, Northern, Upper West, Upper East and Brong Ahafo Regions.

The total cost is estimated at US$259,000 as explained in the **Table 22** below:

Table 22: Estimated budget to implement ESMF

	Activity	Description	Unit cost, US$	No	Total Cost, US$
1.	Awareness creation and Capacity building for MoFA, project staff	Training workshop on ESMF implementation and ESIA procedures	9,000	1	9,000
		Study tours (local) for selected social and environmental champions participating in GCAP drawn from EPA, MoFA, MMDAs	LS	-	10,000
2.	Capacity building/ improvement for Regional Directors (both MoFA and GiDA)	Training workshops for regional directors on ESIA procedures	10,000	Biannual	20,000
3.	Capacity building for Extension officers/ MMDAs	Regional training workshops on ESIA procedures	5,000	10	50,000
4.	Awareness creation	Investors, consultants,	10,000	2	20,000

	and information dissemination workshops	general public on social and environmental issues relating to GCAP			
6.	Monitoring and evaluation	Hiring of consultants and preparation of reports	LS		150,000
					259,000

9.0 PUBLIC CONSULTATIONS AND PARTICIPATION AND INFORMATION DISCLOSURE

9.1 Stakeholder consultations and Participation

The ESMF preparation included extensive stakeholder and participation consultations. Key project stakeholders were identified for consultations and these included Government Ministries, State Agencies/ Organizations'/ and Departments, Project offices, Non-governmental organization and local communities, both the affected and host communities, including women, the poor and most vulnerable groups.

Meetings were held with key officials and opinion leaders to gauge level of awareness and involvement with the project, concerns of project implementation, and to obtain relevant documents or baseline information. The consultations and participation also served to gather information on the mandates and permitting requirements to inform the development of the Program.

The list of stakeholders contacted and issues discussed are presented in the Stakeholder Meetings and Public Consultation and Participation report.

9.2 ESMF Disclosure

The World Bank policies require that environmental reports for projects are made available to project affected groups, local NGOs, and the public at large. Public disclosure of ESIA documents or environmental reports is also a requirement of the Ghana ESIA procedures. However, there is no limitation as to the extent and scope of disclosure. MoFA in collaboration with the line agencies and EPA will make available copies of the ESMF in selected public places as required by law for information and comments. Public notice in the media should be served for that purpose.

The notification should be done through a newspaper or radio announcement or both. The notification should provide:

- a brief description of the Project;
- a list of venues where the ESMF report is on display and available for viewing;
- duration of the display period; and
- contact information for comments.

The EPA will assist to select display venues upon consultation with MoFA. These would be project sites specific and very much informative to beneficiaries.

10.0 GRIEVANCE REDRESS MECHANISM

Grievance mechanisms provide a formal avenue for affected groups or stakeholders to engage with the project implementers or owners on issues of concern or unaddressed impacts. Grievances are any complaints or suggestions about the way a project is being implemented. They may take the form of specific complaints for damages/injury, concerns about routine project activities, or perceived incidents or impacts. Identifying and responding to grievances supports the development of positive relationships between projects and affected groups/communities, and other stakeholders.

The World Bank/IFC standards outline requirements for grievance mechanisms for some projects. Grievance mechanisms should receive and facilitate resolution of the affected institutional or communities' concerns and grievances. The World Bank/IFC states the concerns should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities, at no cost and without retribution. Mechanisms should be appropriate to the scale of impacts and risks presented by a project.

Grievances can be an indication of growing stakeholder concerns (real and perceived) and can escalate if not identified and resolved. The management of grievances is therefore a vital component of stakeholder management and an important aspect of risk management for a project.

Projects may have a range of potential adverse impacts to people and the environment in general, identifying grievances and ensuring timely resolution is therefore very necessary. As such the ESMF has developed a grievance management process to serve as a guide during project implementation. This Grievance Redress Mechanism (GRM) builds pretty much on the one provided in the Resettlement Policy Framework (RPF) where much more details could be found.

The grievance management guide to be followed by MoFA is provided in **Table 23.**

Table 23: Grievance Redress Mechanism

Step	Process	Description	Time frame	Other information
1	Identification of grievance	Face to face; phone; letter, e-mail; recorded during public/community interaction; others	1 Day	Email address; hotline number
2	Grievance assessed and logged	Significance assessed and grievance recorded or logged (i.e. in a log book)	4-7 Days	Significance criteria Level 1 –one off event; Level 2 – complaint is widespread or repeated; Level 3- any complaint (one off or repeated) that indicates breach of law or policy or this ESMF/RPF provisions
3	Grievance is acknowledged	Acknowledgement of grievance through appropriate medium	7-14 Days	
4	Development of response	-Grievance assigned to appropriate party for resolution -Response development with input from management/ relevant stakeholders	4-7 Days 10-14 Days	
5	Response signed off	Redress action approved at appropriate levels	4-7 Days	MoFA should sign off
6	Implementation and communication of response	Redress action implemented and update of progress on resolution communicated to complainant	10-14 Days	
7	Complaints Response	Redress action recorded in grievance log book Confirm with complainant that grievance can be closed or determine what follow up is necessary	4-7 Days	
8	Close grievance	Record final sign off of grievance If grievance cannot be closed, return to step 2 or refer to sector minister or recommend third-party arbitration or resort to court of law	4-7 Days	Chief Director, MoFA

11.0 REFERENCES AND BIBLIOGRAPHY

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ANNEXES

List of Annexes

ANNEX 1A

UNDERTAKINGS REQUIRING REGISTRATION and ENVIRONMENTAL PERMIT (EPA LI 1652 (1999))

SECTOR	Sub sector	Description
AGRICULTURE	Community Pastures	Involving the clearing of land greater than 40 ha Involving the clearing of land located in an environmentally sensitive area
	Fruit and other vegetable farms	Management areas: Involving the clearing of land greater than 40 ha Involving the clearing of land located in an environmentally sensitive area
FISHING AND TRAPPING	Fishing	a. fish or shell fish farming in salt water, brackish water or fresh water, where the proposal includes the construction of shore-based facilities other than wharves; b. permanent traps or weir fisheries, salt water.
	Services incidental to fishing	Fish or shellfish breeding and propagating services, or fish or shellfish hatchery services, where the proposal includes the construction of shore based facilities other than wharves.
LOGGING AND FORESTRY	Logging	Management of forested land for the primary purpose of harvesting timber in a contract area.
	Forestry services	a. application of pesticides; b. introduction of exotic species of animals, plants or microbial agents.
MINING	Metal mines Non metal mines	-
CRUDE OIL AND NATURAL GAS	Crude oil or petroleum production facilities Natural gas production facilities	
QUARRIES AND SAND PITS	Stone quarries	Where the total area is greater than 10ha, OR Where any portion is to be located within an environmentally portioned area
	Sand and gravel pit	a. where the total area is greater than 10 hectares, or b. where any portion is to be located within an environmentally sensitive area.
FOOD	Meat and poultry products	a. abattoirs; b. meat, fat or oil processing facilities c. poultry processing facilities.
	Fish products	-
	Flours, prepared cereal foods and feeds	-

SECTOR	Sub sector	Description
	Feed mills	
BEVERAGES	Distillery products Brewery products Wines	-
RUBBER PRODUCTS	a. tyres and tubes; b. rubber hoses and beltings; c. other rubber products	-
PLASTIC PRODUCTS	a. tyres and tubes; b. rubber hoses and beltings; c. other rubber products	-
LEATHER AND ALLIED PRODUCTS	Man made fibres and filament yarns Spun yarns and woven cloths Broad knitted fabrics	-
TEXTILE PRODUCTS	Natural fibres processing and felt products Carpets, mats and rugs Canvas and related products Other textile products	-
WOOD	Sawmill, planning mill and shingle mill products industries Veneers and plywoods Other wood products Wood preservation facilities which use hazardous chemicals or similar chemical processes Particle board or wafer board production	-
PAPER AND ALLIED PRODUCTS	Pulp and paper Asphalt roofing Other converted paper products	-
PRIMARY METALS		-
FABRICATED METAL PRODUCTS		-
TRANSPORTATION EQUIPMENT		-
REFINED PETROLEUM PRODUCTS	Agricultural chemicals Plastics and synthetic resins Paints and varnishes Soaps and cleaning compounds	-

SECTOR	Sub sector	Description
	Other chemical products	
OTHER MANUFACTURING	Scientific and professional equipment	Photographic films and plates manufacturing Floor tiles, linoleum and coated fabrics manufacturing Other manufacturing products
CONSTRUCTION	Industrial construction (other than buildings)	a)Construction of pipelines for the transmission of oil, natural gas and other related products from the source to the point of distribution, where: Any portion of the pipeline is to be located at a distance greater than 500m from an existing right of way; or Any portion of the pipeline is to be located in an environmentally sensitive area b)diesel electric power generating plants having capacity greater than 1 megawatt a gas turbine electric power generating plants having capacity greater than 1 megawatt c)nuclear electric power generating plants
HIGHWAYS AND HEAVY CONSTRUCTION	Roads	-
	Waterworks and sewage system	Construction of trunk pipelines for transmission of water from the source to the point of distribution Construction of trunk sewer pipelines Construction of trunk sewer pipeline outfalls
	Hydroelectric power plants and related structures	Construction of dams and associated reservoirs Inter or intra basin water transfers Construction of hydroelectric power developments
UTILITIES		Establishment of waste disposal sites Establishment of facilities for the collection or disposal of hazardous waste materials
WHOLESALE TRADE	Petroleum products	Wholesale establishment of petroleum products storage facilities
	Waste materials, wholesale	Establishment of facilities for the purpose of assembling, breaking up, sorting or wholesale trading of scrap, junk or waste material of any type
SERVICES	Economic services administration	Resource conservation and management programmes involving introduction of exotic species of animals or plants for any purpose; Resource conservation and management programmes involving introduction of native species of animals or plants into areas where those species do not occur at the time of the proposed introduction Designation of land for cottage development

SECTOR	Sub sector	Description
		or other recreational development
ACCOMMODATION SERVICES	Establishment of recreation and vacation camps	-
AMUSEMENT AND RECREATIONAL SERVICES	Commercial spectator sport	Establishment of horse racetrack operations Establishment of racetrack operations for motorized vehicle sports and recreation clubs and services Establishment of facilities, including trails Establishment of outdoor firearm ranges Establishment of marina operations Establishment of facilities, including trails for mortised recreational vehicles Other amusement and recreational services

ANNEX 1B:

UNDERTAKINGS FOR WHICH ESIA IS MANDATORY

SECTOR	SUBSECTOR	DESCRIPTION
AGRICULTURE	-	Land development for agricultural purposes not less than 40 ha Agricultural programmes necessitating the resettlement of 20 families or more
AIRPORT	-	Construction of all airport or airstrips as well as the enlargement of existing airports or airstrips
DRAINAGE AND IRRIGATION	-	Construction of dams and man- made lakes; Drainage of wetlands; Irrigation schemes
LAND RECLAMATION	-	Coastal land reclamation Dredging of bars, estuaries
FISHERIES	-	Construction of fishing harbours Harbor expansion Land based aquaculture undertaking
FORESTRY	-	Conversion of hill forest land to other use Logging or conversion of forest land to other land use within the catchment area of reservoirs used for water supply , irrigation or hydropower generation or in areas adjacent to forest, wildlife reserves Conversion of wetlands for industrial, housing or agricultural use
HOUSING	-	Human settlement development undertaking Housing development
INDUSTRY	Chemical	Production capacity of each product or combined products is greater than 100 tonnes/ day
	Petrochemical	All sizes or raw material requirements of 100 tonnes/ day or greater
	Non- ferrous smelting	Aluminum- all sizes Copper- all sizes Others- producing 50 tonnes/ day and above product
	Non- metallic Cement lime	10 tonnes/ day and above burnt lime rotary kiln or 50 tonnes/ day and above vertical kiln
	Iron and steel Shipyards Pulp and paper	
INFRASTRUCTURE	-	Construction of hospitals Industrial estate development Construction of roads and highways Construction of new townships Construction of railways
PORT	-	Construction of ports Port expansion involving an increase of 25% or

SECTOR	SUBSECTOR	DESCRIPTION
		more in handling capacity per annum
MINING	-	Mining and processing of minerals in areas where the mining lease covers a total area in excess of 10ha
	Quarries	Proposed quarrying of aggregate, limestone, silica, quartzite, sandstone, marble and decorative building stone within 3km radius of any existing village, residential, commercial or industrial areas, or any area earmarked for residential, commercial or industrial development
	Sand dredging	
PETROLEUM	Oil and gas fields development Construction of off- shore and on- shore pipelines Construction of oil and gas separation, processing, handling and storage facilities Construction of oil refineries	Construction of product depot for the storage of petrol, gas, diesel which are located within 3km of any commercial, industrial or residential areas.
POWER GENERATION AND TRANSMISSION	-	Construction of steam generated power stations; Dams and hydroelectric power schemes; Construction of combined cycle facilities in national parks Construction of nuclear fueled power stations Erection of power transmission lines
RESORT AND RECREATIONAL DEVELOPMENT	-	Construction of coastal resort facilities of hotels with more than 40 rooms Hilltop resort or hotel development Development of tourist or recreational facilities in national parks Development of tourist or recreational facilities on island waters
WASTE TREATMENT AND DISPOSAL	Toxic and hazardous waste	Construction of incineration plant Construction of recovery plan (off site) Construction of wastewater treatment plant (off site) Construction of secure land fill facility Construction of storage facility (off iste)
	Municipal solid waste	Construction of incineration plant Construction of composting plant Construction of recovery recycling plant Construction of municipal solid waste landfill facility Construction of waste depots
	Municipal sewage	Construction of wastewater treatment plant Construction of marine outfall Night soil treatment
WATER SUPPLY	-	Construction of dams impounding reservoirs

SECTOR	SUBSECTOR	DESCRIPTION
		Groundwater development for industrial, agricultural or urban supplies
ENVIRONMENTAL CONSERVATION AND MANAGEMENT	Activity to remove 'designated' status from an area designated for wildlife conservation and management	Activities relating to: Wildlife conservation and management Forest conservation and management Watershed conservation and management Commercial exploitation of flora and fauna

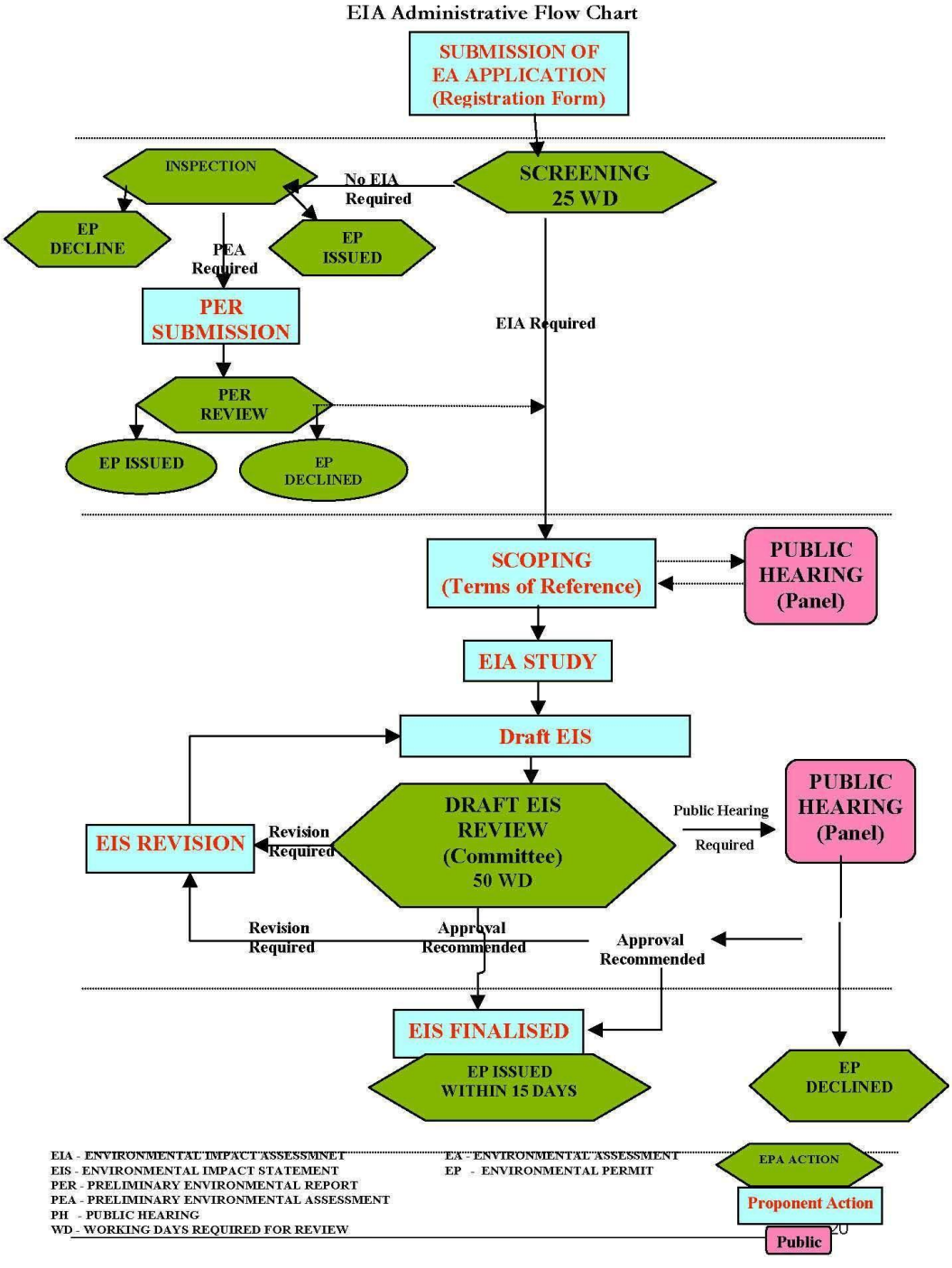
ANNEX 2:

ENVIRONMENTALLY & SOCIALLY SENSITIVE AREAS

ENVIRONMENTAL & SOCIAL ASSESSMENT REGULATIONS, 1999 SCHEDULE 5 (Regulation 30 (2))

1. All areas declared by law as national parks, watershed reserves, wildlife reserves and sanctuaries including sacred groves.
2. Areas with potential tourist value.
3. Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna).
4. Areas of unique historic, archaeological or scientific interests.
5. Areas which are traditionally occupied by cultural communities.
6. Areas prone to natural disasters (geological hazards, floods, rainstorms, earthquakes, landslides, volcanic activity etc.)
7. Areas prone to bushfires.
8. Hilly areas with critical slopes.
9. Areas classified as prime agricultural lands.
10. Recharge areas of aquifers.
11. Water bodies characterized by one or any combination of the following conditions
a. water tapped for domestic purposes;
b. water within the controlled and/or protected areas; c. water which support wildlife and fishery activities.
12. Mangrove area characterised by one or any combination of the following conditions
a. areas with primary pristine and dense growth;
b. areas adjoining mouth of major river system;
c. areas near or adjacent to traditional fishing grounds;
d. areas which act as natural buffers against shore erosion, strong winds or storm floods.

ANNEX 3: ADMINISTRATIVE FLOWCHART FOR GHANA ESIA PROCEDURES



ANNEX 4:

Criteria for Environmental and Social Screening of Projects to be used by MoFA

No	Impact area	Impact issue	Impact description	Yes	No	Don't Know
1.	Natural/ Physical resources	Protected areas and wildlife	Will vehicular traffic and noise scare away wildlife			
		Protected areas and wildlife	Will access road pass through protected areas			
		Flora and fauna loss	Will vegetation clearance lead to loss of exceptional flora/ fauna			
		Surface water and aquatic flora and fauna loss	Will access road and land preparation affect surface water and aquatic flora and fauna			
		Groundwater vulnerability to pollution	Is the local water table high			
		Environmental media vulnerability to human activities	Are there human activities already impacting on environmental media (air, land, water, noise)			
		Increased erosion risks	Do you have drains in the project area			
		Surface water quality	Is there a local stream in your community (less than 15 min walk)			
			Does it flow throughout the year			
		Surface water and groundwater pollution	Do you have public sanitary facilities for migrant workers			
		Disposal of waste oil	Is there a local fuel filling station			
		Solid waste disposal	Do you have properly designated sites for waste disposal			
2.	Social and cultural conditions	Health and well- being	Is there any HIV- AIDS education groups in the project area			
		Gender & Vulnerale Groups	Are there any women groups in the project area			
			Is there a woman leader in any group			
		Work for local people	Are there local people available to provide unskilled labour			
		Community Consultation & participation	Has there been any community projects previously			
		Access of poor to community assets eg.	Will all sections of the project communities be able to access land			

		farming opportunities	Will the project enhance access of poor people to farming opportunities			

ANNEX 5: EPA Registration Form, EA1

ENVIRONMENTAL PROTECTION AGENCY, GHANA

ENVIRONMENTAL ASSESSMENT REGISTRATION FORM

(To be completed in Duplicate)

FEE: ⊄50,000

Serial No.

FORM EA1

PROPONENT:

Address for correspondence:

Contact person: Position:

Phone No.: Fax No.:

Email:

ASSESSMENT NO:		**FILE NO:**	

Environmental Protection Agency
P.O. Box M 326
Accra, Ghana

Tel: 664697/8, 664223, 662465
Fax: 662690
Email: support@epagghana.org
Web-site: www.epa.gov.gh

*This form shall be submitted to the relevant EPA Regional Office. It is important that you read carefully the guide for completing the form before starting.

1. PROPOSED UNDERTAKEN/DEVELOPMENT

Title of proposal (General Classification of undertaking)

Description of Proposal (nature of undertaking, unit processes [flow diagram], raw materials, list of chemicals (source, types and quantities), storage facilities, wastes/ by-products (solid, liquid and gaseous)

Scope of Proposal (size of labour force, equipment and machinery, installed/production capacity, product type, area covered by facility/proposal, market)

2. PROPOSED SITE

Location (attach a site plan/map)

Plot/House No. Street/Area Name

Town District/Region

Major Landmarks (if any)

Current zoning

Distance to nearest residential and/or other facilities

Adjacent land uses (existing & proposed)

Site description (immediate activities should be described)

3. INFRASTRUCTURE AND UTILITIES

Structures (buildings and other facilities proposed or existing on site)

Access to water (source, quantity)

Access to power (type, source & quantity)

Drainage provision in the project area

Nearness to water body

Access to project site:

Other major utilities proposed or existing on site(e.g. sewerage, etc)

4. ENVIRONMENTAL IMPACTS

Potential environmental effects of proposed undertaking (Both constructional and operational phases)

5. OTHER ENVIRONMENTAL ISSUES

Potential significant risks and hazards associated with the proposal (including occupational health and safety). State briefly relevant environmental studies already done and attach copies as appropriate.

6. CONSULTATIONS

Views of immediate adjourning neighbours and relevant stakeholders (provide evidence of consultation)

7. MANAGEMENT OF IMPACTS AND ENVIRONMENTAL ENHANCEMENT MEASURES

ATTACHMENTS

Tick appropriate boxes below indicating that the following required documents have been attached:

- ☐ Authentic site plan (signed by a licensed surveyor and certified by Survey Dept.)
- ☐ Block plan of the site
- ☐ Photographs of the site
- ☐ Fire report from the Ghana National Fire Service
- ☐ Zoning letter from Town & Country Planning Department

DECLARATION:

I, ……..…, hereby declare that the information provided on this form is true to the best of my knowledge and shall provide any additional information that shall come to my notice in the course of processing this application. I also declare that information provided is true.

Signature _____ Date _____

* Use additional sheets where spaces provided in 3, 4 and 5 are inadequate.

Annex 7: General Environmental & Social Management Conditions for Construction Contracts

General

1. In addition to these general conditions, the Contractor shall comply with any specific Environmental Management Plan (EMP) or Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an EMP. and prepare his work strategy and plan to fully take into account relevant provisions of that EMP. If the Contractor fails to implement the approved EMP after written instruction by the Supervising Engineer (SE) to fulfil his obligation within the requested tune, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor
2. Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an EMP. In general these measures shall include but not be limited to.
   a) Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, vibration equipment, temporary access roads, etc.to ensure safety, health and the protection of workers and communities living within the vicinity dust producing activities.
   b) Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e g. excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.
   c) Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and or re-established where they are disrupted due to works being carried out.
   d) Prevent oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated to the best way to avoid creating possible breeding grounds for mosquitoes.
   e) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore /rehabilitate all sites to acceptable standards.
   f) Upon discovery of ancient heritage, relics or anything that might or believed to be of archaeological or historical importance during the execution of works, immediately report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfilment of the measures aimed at protecting such historical or archaeological resources.
   g) Discourage construction workers from engaging in the exploitation of natural resources such as hunting; fishing, and collection of forest products **or** *any* other activity that might have a negative impact on the social and economic welfare of the local communities
   h) Implement soil erosion control measures in order to avoid surface run off and prevents siltation, etc.
   i) Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camp**.**
   j) Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long distance transportation.
   k) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents,
3. The Contractor shall indicate the period within which he/ she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.
4. The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan/ strategy to ensure effective feedback of monitoring information to project management so

that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.

5 Besides the regular inspection of the sites by the SE for adherence to the contract conditions and specifications, the Owner may appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State environmental authorities may carry out similar inspection duties. In all cases, as directed by the SE. the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.

Worksite/Campsite Waste Management

6 All vessels (drums, containers, bags, etc.) containing oil/ fuel/ construction materials and other hazardous chemicals shall be bunded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed off at designated disposal sites in line with applicable government waste management regulations.

7 All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.

8 Used Oil from maintenance shall be collected and disposed-off appropriately at designated sites or be re-used or sold for re-use locally.

9. Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.

10. Construction waste shall not be left in stockpiles along the load, but removed and reused or disposed of on a daily basis.

11. If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE. of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and planted with species, indigenous to the locality.

Material Excavation and Deposit

12. The Contractor shall obtain appropriate license/ permits from relevant authorities to operate quarries or borrow areas.

13. The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional laud

14. New extraction sites:

a) Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.

b) shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels where they are located near water sources, borrow pits and perimeter drains stall surround quarry sites.

c) shall ret be located In archaeological areas, Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.

d) shall not be located in forest reserves, However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.

e) shall be easily rehabilitated, Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height; are preferred.

f) shall have clearly demarcated and marked boundaries to minimize vegetation clearing.

15. Vegetation clearing shall be restricted to the area required for safe operation of construction work.

Vegetation clearing shall not be done more than two months in advance of operations.

16. Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits from workings.
17. The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable EMP, in areas approved by local authorities and or the SE
18. Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE and appropriate local and/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.

Rehabilitation and soil Erosion Prevention

19, To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
20, Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
21, 21. Topsoil shall not be stored us large heaps. Low mounds of no more than 1 to 2m high are recommended.
22, Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.
23, Locate stockpiles where they will not be disturbed by future construction activities.
24, To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.
25, Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
26, Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
27, Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term laud use. and allow natural regeneration of vegetation.
28, Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.
29, Minimize erosion by wind and water both during and after the process of reinstatement.
30, Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.
31, Re-vegetate with plant species that will control erosion, provide vegetative diversity and. Through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

Water Resources Management

32, The Contractor shall at all costs avoid conflicting with water demands of local communities.
33, Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.
34, Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.
35, Temporary damming of streams and rivers shall be done in such a way to avoid disrupting water supplies to communities downstream and maintains the ecological balance of the river system.
36, No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.
37, Wash water from washing out of equipment shall not be discharged into water courses or road drains.
38, Site spoils and temporary stockpiles shall be located away from the drainage system, and surface runoff shall be directed away from stockpiles to prevent erosion.

Traffic Management

39, Location of access roads/ detours shall be done in consultation with the local community especially

in important or sensitive environments. Access roads shall not traverse wetland areas.
40, Upon the completion of civil works, all access roads shall be ripped and rehabilitated.
41, Access roads shall be sprinkled with water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.

Blasting
42, Blasting activities shall not take place less than 2km from settlement areas, cultural sites, or wetlands without the permission of the SE.
43, Blasting activities shall be done during working hours, and local communities shall be consulted on the proposed blasting times
44, Noise levels reaching the communities from blasting activities shall not exceed 90 decibels.

Disposal o1 Unusable Elements
45 Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.
46. As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the SE and the local authorities concerned.
47 AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.
48. Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.
Hearth and Safety
49. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign Workers and local residents shall be sensitized on health risks particularly of AIDS.
50. Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
51. Construction vehicles shall not exceed maximum speed limit of 40km per hour.

Repair of Private Property
52. Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.
53 In cases where compensation for inconveniences, damage of assets etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

Contractor's Health, safety and Environment Management Plan (HSE-MP)
54 Within 6 weeks of signing the contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an EMP for the works The Contractor's EHS-MP will serve two
- For the Contractor, for internal purposes, to ensure that all measures are in place for adequate HSE management, and as an operational manual for his staff.
- For the client support where necessary by a SE, to ensure that the contractor is fully prepared for the adequate management of the HSE aspects of lie project, and as, a basis for monitoring of the contractor's HSE performance.

55 The contractor's EHS-MP shall provide at least:
- a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an EMP;

- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts,
- a description of all planned monitoring activities (e g. sediment discharges from borrow areas) and the reporting thereof; and
- the internal organisational management and reporting mechanisms put in place for such.

56 The Contractor's EHS-MP will be reviewed and approved by the Client before start of the works. This, review should demonstrate if the Contractor's EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

HSE Reporting

57 The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any and his own EHS-MP. An example format for a Contractor HSE report is given below. It is expected that the Contractor's reports will include information on:

- HSE management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to HSE aspects {incidents, including delays, cost consequences etc. as a result thereof),
- Lack of compliance with contract requirements on the part of the Contractor.
- Changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects; and
- Observations, concerns raised and/or decisions taken with regard to HSE management during site meetings

58. It is advisable that reporting of significant HSE incidents be done "as soon as practicable". Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keeps his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports Example formats for an incident notification and detailed report are given below. Details of HSE performance will be reported to the Client through the SE's reports to the Client.

Training of Contractor's Personnel

59. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project EMP, and his own EHS-MP and .are able to fulfil their expected roles and functions. Specific training should be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP. General topics should be:

- HSE in general (working procedures),
- emergency procedures, and
- social and cultural aspects (awareness raising on social issues)

Cost of Compliance

60. It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item "Compliance with Environmental Management Conditions" in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable HSE impact.

Example Format HSE Report

Contract:
Period of reporting:
HSE management actions/measures:

Summarize HSE management actions/measures taken during period of reporting, including planning and management activities (e.g. risk and impact assessments), HSE training, specific design and work measures taken, etc.

HSE incidents:
Report on any problems encountered in relation to HSE aspects, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.
HSE compliance:
Report on compliance with Contract HSE conditions, including any cases of non-compliance.

Changes:
Report on any changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects.
Concerns and observations:
Report on any observations, concerns raised and/or decisions taken with regard to HSE management during site meetings and visits
Signature (Name, Title Date):
Contractor Representative
Example Format: HSE incident Notification
Provide within 24 hrs to the Supervising Engineer
Originators Reference No:
Date of incident: **Time:**
Location of incident:
Name of Person(s) involved:
Employing Company. Type of incident:
Description of Incident:
Where, when, what, how, who, operation in progress at the time (only factual)
Immediate Action:
Immediate remedial action and actions taken to prevent reoccurrence or escalation
Signature (Name, Title, Date):
Contractor Representative