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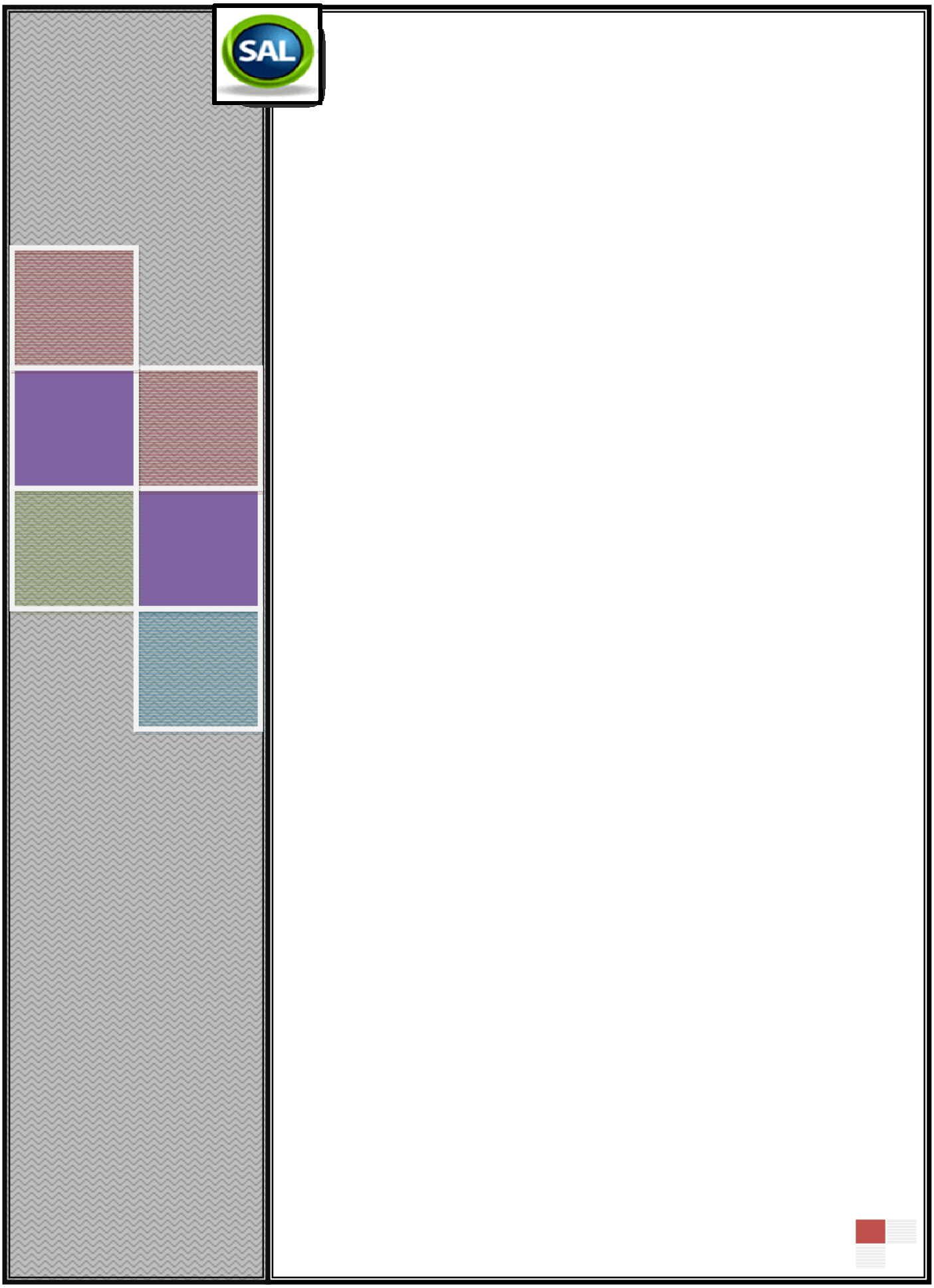

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List of Acronyms

AAGD	Accelerated Agricultural Growth and Development Strategy
CREMAS	Community Resources Management Areas
CWO	Community Wildlife Officer
DA	District Assembly
DAO	District Agricultural Officer
DCE	District Chief Executive
DEMC	District Environmental Management Committee
DPCU	District Planning Coordinating Unit
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EAMP	Environmental and Social Management Framework
FC	Forestry Commission
GDP	Gross Domestic Product
GECCA	Ghana Environmental Conventions Coordinating Authority
GEF	Global Environmental Facilities
GPRS	Ghana Poverty Reduction Strategy
GPRS	Ghana Poverty Reduction Strategy
IDA	International Development Agency
IDA	Irrigation Development Authority
IPM	Integrated Pest Management
LEA	Limited Environment Assessment
LI	Legislative Instrument
M&E	Monitoring and Evaluation
MDA	Ministry Departments and Agency
MEST	Ministry of Environment, Science and Technology
MLNR	Ministry of Lands and Natural Resources
MoFA	Ministry of Food and Agriculture
NGO-	Non-Governmental Organisation
NSBCP	Northern Savanna Biodiversity Conservation Project
NSLMC	National Sustainable Land Management Committee
PAC	Project Advisory Committee
PAS	Protected Area System
PPE	Personal Protection Equipment
RPF	Resettlement Policy Framework
SADA	Savanna Accelerated Development Authority
SEA-	Strategic Environmental Assessment
SOP	Social Opportunities Project
TA	Technical Assistant
TOR	Terms of Reference
TCO	Technical Coordination Office
UER/ UWR	Upper East Region/Upper West Region
WD	Wildlife Division
WRC	Water Resources Commission

Executive summary

The implementation of the Sustainable Land and Water Management (SLWM) Project will present a comprehensive approach to sustainable land and watershed management that combines soft and hard investments at the community level, including maintenance of ecological infrastructure, with planning activities which would eventually integrate these into a much larger program of water and flood management infrastructure across the Northern Savanna eco-agricultural zone. The project will be implemented in the three northern regions (Northern, Upper East and Upper West Regions) of Ghana.

The project aims to support this important initiative to realize the vision of "a diversified and resilient economic zone in the north" with significant regional environmental benefits by; piloting innovative models for grassroots watershed management which combine flood, land & natural resource management, and providing technical tools and capacity for macro-level planning as a basis for eventual scale-up linked to a program of larger-scale flood and water management investments. The project in structured to achieve its objectives within four integral components. They are Capacity building for integral spatial planning; Water and Land Management; Payment for Environmental Services; and Project Management and Monitoring and Evaluation.

The purpose of this EAMP is to provide clear and systematic guidelines to ensure that environmental and social sustainability of the GEF-SLWM funded sub-projects are achieved through application of safeguards measures on environmental and social issues during project implementation.

The EAMP will ensure that both substantive concerns of the World Bank and Ghana's Environmental Polices and Laws are satisfactorily addressed. The objectives of this EAMP are to: establish methodologies for environmental and social impact assessment procedure within the project cycle; assess the potential environmental and social impacts of the proposed project, whether positive or negative, and propose mitigation measures which will effectively address these impacts; inform the stakeholders of the potential impacts of different anticipated activities, and relevant mitigation measures and strategies; identify potential environmental policies, legal and institutional framework pertaining to the project and to highlight Environmental and Social Impact Assessment (ESIA) procedures.

The Project will fall under the purview of the Ministry of Environment, Science & Technology (MEST), under guidance from the National Sustainable Land Management Committee (NSLMC). Implementation will be supported by the Environmental Protection Agency (EPA) of MEST, including the formation of a small Technical Coordination Office (TCO) at the EPA office IN Bolgatanga. At the district level DAs (with consultation and guidance from TCO) will have responsibility for most of the on-the-ground implementation, including community engagement and participatory planning. The Savanna Accelerated Development Authority (SADA) and the Forestry Commission (FC) at the regional level will have responsibility for implementing specific activities.

The physical investment under this project comprises: conservation agriculture, agro forestry, dry season gardening and river bank protection, fire management in agricultural landscape and water holes development.

The potential adverse impacts from these activities, if not correctly designed and implemented, include among others crop pest and disease problems, increased water demand, labour/capital intensive, increased fertiliser usage, introduction of foreign tree species, exclusion of land from other uses, salinity issues, conflict with traditional systems, vegetation removal, sanitation issues, water pollution and human-wildlife conflict. The major mitigation measures applied include education and sensitisation, implementation of pest management plan, monitoring, imposition of by-laws, promote growth of economic trees among others.

The key institutions which will work together to ensure sound management of the environmental aspects of the sub- projects include the Environmental Protection Agency (EPA), the NSLMC, and Forestry Commission. In order to ensure proper implementation of environmental and social screening and mitigation measures, as well as effective community development, the GEF-SLWM project will undertake an intensive programme of environmental training and institutional capacity building spread out over the life cycle of the project.

The target groups for training, sensitization and capacity building at the national, regional, district and community levels include the following: Project coordinators (TCO, SADA, FC), District Coordinating Office staff (including the Planning officers); EPA staff in the three Regional Offices; Regional Coordinating Office staff, District Assemblies and their District Environmental Management Committees (DEMCs), Wildlife Division of the Forestry Commission, Forest Service Division of the Forestry Commission, NGOs and Local Service Providers and Beneficiary Communities, Consultants and Contractors.

The broad areas for capacity building include the following: environmental screening/initial assessment techniques, legislation and procedures; General project planning and management inter-faced with environmental and social assessment and management; Environmental and social assessment; Environmental and social management (including monitoring, environmental audit, etc.); Environmental report preparation and other reporting requirements; Public participation techniques and procedures; and Public awareness creation/educational techniques (on environmental, social and health issues).

This Environmental Analysis and Management Plan (EAMP) report presents definitive, and clear procedures/guidelines for the implementation of the project interventions in consistent with the laws of Ghana and the World Bank Safeguards Policies.

INTRODUCTION

Background

Ghana covers a total area of about 238,537 km^2 including area occupied by water bodies and has equatorial climate. The ecological zones cover the Rain Forest, Semi-Decidous Forest, Sudan Savanna, Guinea Savanna, Coastal Savanna and the Mangrove Forests. The main rivers are Volta, Pra, Offin, Tano, Ankobra, Birim and Todzi. The total amount of water drained by these rivers is 54.4 billion m^3.

Agriculture, Forestry and Wildlife, Savanna, Water Bodies, Wetlands, Mining and Tourism and Built up areas constitute land use in Ghana. 146,810 km ^{2} of the total area of Ghana representing 61.5 percent is used for Agricultural activities. Agriculture is the most important activity in terms of spatial extent employing about 60 percent of the labour force. The sector contributes about 40 percent to the country's GDP. Pressure leading to low agricultural productivity includes rural-urban migration, water storage, prevalence of pests and diseases and poor soils with little nutrients.

Savanna vegetation in many areas of Africa as in Ghana provides valuable environmental services and serves as habitats for biodiversity and protects soil and water resources against degradation. In Ghana the savanna covers about 60% of the land area, supports about 18% of the population and supplies about 70% of Ghana's total annual firewood and charcoal requirement estimated at 16 million m^3. It also provides medicinal plants (the primary source of health care for residents), roofing grasses, fencing poles, bush meat and indigenous farmer crop varieties (cereals, roots/tubers and legumes).

The land degradation and unsustainable land management in the country have been attributed to the direct effects of human activities such as poor farming practices, bush fires, inadequate waste management which have also contributed to environmental issues such as deforestation, overgrazing, soil erosion, destruction of habitats of wildlife, pollution of water bodies among others. Other key issue on natural resource management in Ghana are forest degradation, loss of flora and fauna biodiversity associated with unsustainable harvesting levels in both the high forest (timber extraction) and savanna zones (poles/wood fuel and medicinal plants).

Most biodiversity resources of the Northern savannah zone, which covers more than 60% of the total savannah ecology are threatened by the expansion of agriculture, overgrazing, bushfires and inadequate crop management. This has contributed to degradation of biological diversity as well as the loss of cultural diversity. Similarly, an increasing number of medicinal plant species are threatened.

Preserving the genetic stock and knowledge of their use will require specific interventions to ensure that the wild varieties are not completely lost through inappropriate practices or replaced by introduced varieties. Indigenous crop varieties should be grown alongside introduced varieties.

The project location is within the northern savanna region of Ghana, and more specifically within the sub-watersheds of the main tributaries of the White Volta that flow into northern Ghana from Burkhina Faso, and the wildlife corridors within them, particularly the corridor joining Gbele Resource Reserve with Mole National Park, and then linking these with Nazinga Reserve in Burkhina Faso along the Sisilli River.

Due to challenging agricultural and climate conditions, and limited transport access, poverty is concentrated in the north, which holds 53.7% of Ghanaians living in extreme poverty, but only 17.2% of the population overall. Most inhabitants are food crop producers and the small scale family holding is the basic unit of production. Most individuals have user rights to land which is owned by traditional land owners (Tindanas). Livestock are mostly grazed on communal lands without restriction within a community. Cattle ownership is of importance to socio-economic status, and as a result most owners put an emphasis on herd size rather than quality. There is potential for conflict between settled agriculturists and itinerant pastoralists, mostly Fulani coming from outside of Ghana, although some pastoralists are employed by locals to tend their cattle.

Suitable farming land is a major constraint, and increasing population pressure is leading to intensified and unsustainable cropping, as well as other activities such as game hunting and charcoal burning. Intensification without modification of traditional practices is leading to land degradation and soil erosion through depletion of nutrients and loss of vegetation cover (partly due to burning practices). Natural vegetation is also being lost through bushfires, illegal logging and encroachment of forest reserves. Reduced infiltration and siltation of rivers lessen water availability, which in turn increases sensitivity to erosion. All of the north is at high to severe risk of land degradation, and the associated social vulnerability may well be most severe there because: (i) the north is also prone to severe flooding which is not only exacerbated by land degradation, but also reduces the area of reliable agricultural land; (ii) extreme poverty restricts access to alternative livelihoods or more resilient production systems; and (iii) the northern savanna is likely to be one of the region's most impacted by climate change.

The Gbele Resource Reserve provides a fairly good example of unmodified Guinea Savanna habitat, with a large number/variety of woody and other species and a grass layer 3 m tall during the rainy season. The fruits of sheanut and dawadawa trees, many species of grasses, used for thatch, brooms and mats, medicinal plants and other edible plant and fruits are important to local people. Gbele also has a rich bird fauna and a study in 2005 showed that there are about 194 species. The reserve contains a number of large ungulates and primates, but densities are lower than the nearby Mole National Park, and many of the most charismatic species, such as large carnivores, elephant and buffalo are absent or extremely rare. The wildlife corridors and other remaining semi-natural habitat areas have a similar composition, but represent various levels of degradation, particularly from hunting, cutting of trees for wood fuel, grazing and over-burning.

The key natural resources management issues in the northern savanna are loss of vegetative cover and land degradation, resulting mainly from inappropriate farming practices. This is inter-linked with other contributing factors such as:

- poorly developed market system that does not price exploited natural resources at their real economic value thus providing easy and open access to dwindling but cheap natural resources. inefficient public regulating agencies with overlapping responsibilities
- inadequate/negligible involvement of key stakeholders including local communities in natural resource management
- weak institutional capacity in the wildlife sector and little involvement of communities in the management and sustainable use of wildlife resources and
- lack of inter-agency coordination in planning/monitoring of natural resource use, especially at the district and community levels.

The major forms of land degradation include soil erosion, desertification, salinization, acidification and formation. Large tracts of land have been destroyed by water erosion. Environmental impacts of land degradation include reduce crop yield, reduced quantity of vegetable cover and reduced resilience of land to climate variability.

The implementation of the Sustainable Land Management (SLWM) Project will presents a comprehensive approach to sustainable land and watershed management that combines soft and hard investments at the community level, including in maintenance of ecological infrastructure, with planning activities which would eventually integrate these into a much larger program of water and flood management infrastructure across the Northern Savanna eco-agricultural zone.

SLWM is the adaptation of land use systems that through appropriate management practices enables land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of the land resources. The five basic principles of SLWM are; (i) maintaining or enhancing productivity (ii) reducing the level of production risk or creating stability (iii) protecting the potential of natural resources (iv) be economically viable, and (v) be socially acceptable. SLWM therefore, involves the use of renewable land resources for agricultural and other purposes to meet community needs while simultaneously ensuring the long-term productive potential of the resources and the maintenance of their environmental functions. According to the World Bank (2006), SLWM is a knowledge-based procedure that helps integrate land, water, biodiversity, and environmental management including input and output externalities) to meet rising food and fibre demands while sustaining ecosystem services and livelihood.

The Project has triggered a number of World Bank environmental safeguards policies including OP 4.01 on Environmental Assessment. Although potential impacts are expected to be modest, it is classified as a Category B project and requires the preparation of a form of environmental assessment, including measures taken to manage and mitigate potential impacts.

The EAMP will be prepared to meet the requirement for additional documentation and safeguards procedures to cover the remainder of project activities, to be financed from the GEF. The project will be implemented in the three northern regions (Northern, Upper East and Upper West Regions) of Ghana.

Scope of Work

The scope of work is to prepare an EAMP, which represents a plan for mitigating potential impacts of the SLWM activities in the three northern regions of Ghana (Upper West, Upper East and Northern Regions).

The preparation of this EAMP for the sustainable Land Management Project was done following the key activities in the TOR.

Box 1: Key Activities Undertaken

- Reviewed Bank environmental safeguards policies within which the project will be operating, and relevant national policies and regulatory frameworks. Significant changes in regulations/legislative procedures and administrative practices and institutional needs that may be additional demand on implementing agencies were identified
- Reviewed the capacity of existing agencies to carry out environmental safeguards responsibilities under the project, in respect of both existing mandates within the national regulatory framework and any additional requirements resulting from Bank policies.
- Base line description of the environment of the project area (the 3 northern regions), covering aspects relevant to the project, including the biophysical, biodiversity (natural habitats and fauna) and agro-ecological settings have been described.
- Project description focusing on the environmental issues that the project is addressing, interventions, as well as the positive and negative environmental impacts that are likely to result was conducted.
- Provision of a negative list of activities that will not be supported by the project, in order to avoid unnecessary environmental and social impacts.
- Procedure for recognizing and reporting chance find of physical cultural resources during project implementation, to satisfy requirements under the Bank PCR policy was looked into.
- Identified potential environmental issues related to sustainable land management activities under component 3, and the means to avoid and mitigate them via

general aspects of the project design and/or specific safeguards instruments and processes.

- Identified potential environmental issues related to project activities in Gbele Reserve and wildlife corridors under subcomponent 2.2, and the means to avoid and mitigate them via general aspects of the project design and/or specific safeguards instruments and processes

- Designed systems and responsibilities for ensuring that the identified safeguards are followed.
- Assessed what needs and capacities will be required for implementing and monitoring the environmental and social management framework to achieve its intended objectives were identified. Have outlined of a training and capacity building program on environmental and social safeguards requirements for the identified.

Purpose of the EAMP

The EAMP is to enhance positive and sustainable environmental and social outcomes by minimizing or completely avoiding negative environmental impacts and their social consequences. Where avoidance is not possible, the EAMP provides the framework within which to address the issues.

The specific objectives of the EAMP are as follows:

i. To establish procedures and methods for the environmental planning, review, approval and implementation of activities to be financed under the project;
ii. To identify roles and responsibilities including reporting procedures and monitoring and evaluation;
iii. To identify capacity training needs for different stakeholders to ensure better implementation of the provisions in the EAMP and;
iv. To identify funding requirements and resources to ensure effective implementation of the framework.

Description of project Area

The project location is within the northern savanna region of Ghana, and more specifically within the sub-watersheds of the main tributaries of the White Volta that flow into northern Ghana from Burkina Faso, and the wildlife corridors within them, particularly the corridor joining Gbele Resource Reserve with Mole National Park, and then linking these with Nazinga Reserve in Burkina Faso along the Sisilli River. 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'Ivoire 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.

Physical Environment

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).

Soil

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 branches of the Volta flow permanently during the wet periods. In the dryseason 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 km^2. 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

The People

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, 31 persons/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 renovations/rehabilitatioonf residentiala ccommodation. Cattle husbandry plays an importantr ole in the socio-economicli fe of peopleo f 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. Access to these lands is free to all including strangers and the benefit derived carry no reciprocal consideration.

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).

DESCRIPTION OF THE PROPOSED PROJECT

The Project presents a comprehensive approach to sustainable land and watershed management that combines soft and hard investments at the community level, including maintenance of ecological infrastructure, with planning activities which would eventually integrate these into a much larger program of water and flood management infrastructure across the Northern Savanna eco-agricultural zone.

The Project has triggered a number of World Bank environmental safeguards policies including OP 4.01 on Environmental Assessment. Although potential impacts are expected to be modest (indeed the project is specifically aimed at generating environmental benefits), it is classified as a Category B project and requires the preparation of a form of environmental assessment, including measures taken to manage and mitigate potential impacts.

The Environmental Analysis and Management Plan will be prepared to meet the requirement for additional documentation and safeguards procedures to cover the remainder of project activities, to be financed from the GEF. The project will be implemented in the three northern regions (Northern, Upper East and Upper West Regions) of Ghana.

Proposed Project Development Objectives

The Project Development Objective / Global Environment Objective is**:**

To (a) demonstrate improved sustainable land and water management practices aimed at reducing land degradation and enhancing maintenance of biodiversity in selected micro-watersheds, and (b) strengthen spatial planning for identification of linked watershed investments in the Northern Savanna region of Ghana.

Key indicators for PDO / GEO

- Area of land in selected micro-watersheds under new sustainable land and watershed management (SLWM) technologies (ha).
- Management effectiveness according to METT score in Gbele Resource Reserve and Wuru Kayero & Wahabu Wiasi corridor sites (score, disaggregated).
- Pre-feasibility studies conducted for new large-scale multipurpose water storage investments (number).

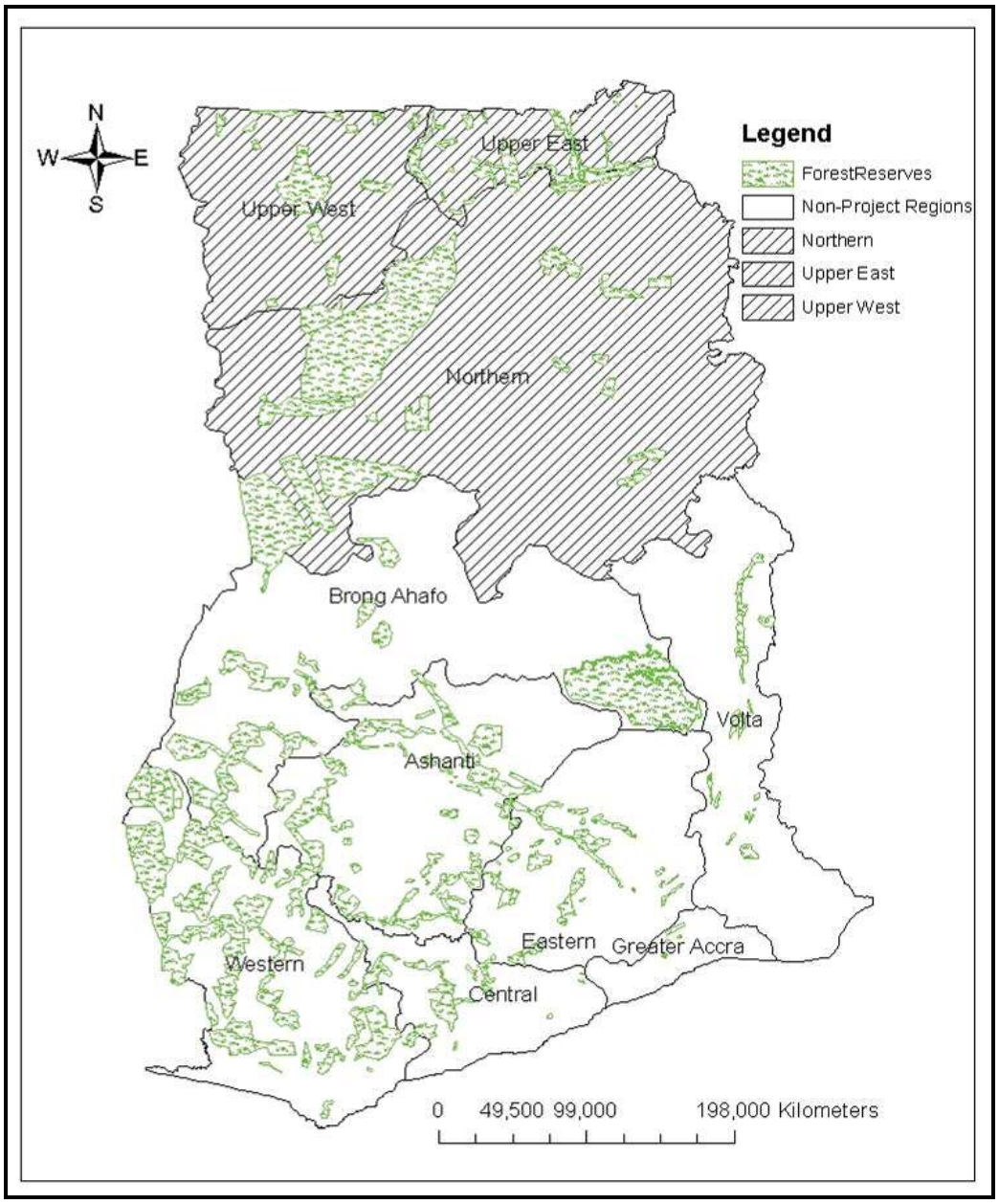

Figure 1: Map of Ghana showing Project Regions and Forest Reserves

Project Description

The Ghana Sustainable Land and Water Management (SLWM) project will be a five-year GEF grant (from both the Land Degradation Focal Area [US$ 7.15 million] and the Biodiversity Focal Area [US$ 1 million]) to the Government of Ghana. The grant will be partially blended with the Social Opportunities Project (SOP), a SIL, and associated with (i) the Natural Resource and Environmental Governance Program (NREG III), a multidonor budget support operation which tackles land degradation policy issues in the environment, forestry and mining sectors, and (ii) the Agriculture budget support operation (AgDPO II) which promotes SLWM policy in agricultural land.

Project Component

The Project has three integrated components:

Component 1: Capacity building for integrated spatial planning ($1.0m from GEF)

This component will provide integrated spatial planning tools to strengthen the capacity of SADA and relevant implementing agencies to guide and undertake decision-making for investment across the northern savanna region. Spatial planning will take into account ecological units such as watershed and is expected to result in the identification of both large-scale water and flood management infrastructure investments, and the community and individually based land and natural resource management programs that should complement them.

Component 2: Water & Land Management ($5.95m from GEF):

This component will fund technical assistance, equipment, incremental operating costs, and direct incentives (a mixture of inputs and direct payments) to support community flood and land management at the micro-watershed level, including both management of agricultural land and ecological infrastructure. It will also be integrated with labor-intensive civil works investments in small-scale flood & water management infrastructure through SOP to provide for a comprehensive approach.

Subcomponent 2.1: Strengthening capacities of districts and rural communities for micro-watershed and land use planning (0.75m)

This subcomponent will (1) strengthen the capacity of district agencies in micro-watershed management techniques, and to conduct a participatory micro-watershed planning exercise; and (2) strengthen the organizational and planning capacity of communities and local government through conducting the participatory exercises.

Subcomponent 2.2: Systems and capacity to promote SLWM. ($1.2m)

This subcomponent will design systems and put in place local extension capacity to promote SLWM technologies on the ground, specifically encouraging experimentation with the design of incentive packages and extension provision systems between districts to allow alternate models to the evaluated:

- *Development of SLWM menu of options, manual & environmental index.* An environmental services index will be devised that allocates to each SLWM technology package a composite score related to the basket of environmental services it provides. The level of support available for each option will be linked to this index under a PES-based framework.

- *Develop district extension approaches and incentive structures for promoting SLWM*. Packages of incentives will be designed for farmers, conditioned on SLWM agreements signed with individual farmers (and in some cases communities) of their own free will. Direct payments to farmers will be included for evaluation as part of the incentive mix, but other forms of support (including training, assistance with inputs and potentially equipment) will also be included.

- *Build capacity of extension services to develop and support SLWM contracts with local farmers*. A SLWM training program and set of training materials for extension service providers will be developed, and a capacity strengthening program will be conducted with extensionists.

Subcomponent 2.3: Implementation of SLWM in micro-watersheds ($3.0m)

This component will finance operational costs of extension service providers and direct incentives (as a mixture of inputs and direct payment incentives) for adoption of SLWM technologies by farmers.

Develop, monitor & verify performance under SLWM contracts. Operational costs will be provided for District staff to establish SLWM contracts with participating farmers, specifying the support to be received in return for implementing the technology. District staff will also monitor contract performance on an annual basis. To address risks of collusion, an independent verification of SLWM contracts will be carried out, on a sample basis, to certify District monitoring.

Support individual SLWM agreements. This will finance support directly to farmers under SLWM contracts, including demonstration and training, input subsidies and direct incentive payments. Support would be conditioned on improvements in environmental services associated with changes in land use, as measured by the environmental index. The contract period and amount of the payments will be related to the economics of specific SLWM technologies.

Linking soft and hard community SLWM investments. The GEF project will not carry out civil works apart from very minor on-farm works (such as bunding and construction of

small rainwater harvesting structures), but will exploit opportunities to complement its soft investments with small-scale watershed infrastructure investments through the IDA Social Opportunities Project.

Subcomponent 2.4: Management of riparian biological corridors ($1m GEF [Biodiversity window])
This subcomponent will support natural habitat and wildlife management activities focused on maintaining and enhancing key habitat values as part of the broader approach to watershed management.

Activity 1: Implementation of Corridor Management Plan in the Western Corridor ($0.6m)

The approaches taken in the corridors and wider watersheds will begin with a community-level planning exercise, with emphasis on building of community institutions for the establishment of Community Resource Management Areas (CREMAs) in the corridors. Direct support will be provided to two sites for:

1. Creation and operationalization of CREMAs
2. Promoting Ecotourism
3. Training of Local Communities
4. Awareness Creation for Wildfire Management

Activity 2: Support to Gbele Resource Reserve Management ($0.4m).

This will implement selected activities within the Tourism and Waterhole development plans that support project objectives, including:

1. Ecological Studies and Monitoring
2. Training and Capacity building in Fire Management
3. Establishing waterholes for wildlife use

Component 3: Project management, monitoring and coordination ($1.2m from GEF [Land Degradation])

This component will support technical assistance, operating costs and where necessary equipment for incremental project management and coordination activities. The component will also finance national monitoring of SLWM policy and implementation, and an evaluation and strategy for PES to support SLWM in northern Ghana.

Implementation Arrangement Principles

Given the uneven status of decentralization, the need for coordination between relevant line agencies and the presence of multiple coordinating bodies whose mandates touch on the areas covered by the project, the implementation arrangements will be more extensive than might be expected for a project of this size. The core focus of the project is to deliver a

model for effective scale up of SLWM technologies in part by overcoming transaction cost barriers. Economy and cost-efficiency must form key principles of the design. The following principles will guide the implementation arrangements:

- Responsibilities of implementing agencies should be in line with existing statutory mandates, and relative strengths in skills and knowledge. Capacity investments should be made on the basis of a clear mandate and commitment for long term action, and managed transfer of implementation responsibilities.

- Logistical costs should be minimized by placing support functions close to the implementers working on the ground.

- Competition between service providers at various levels should be encouraged where it may credibly lead to efficiency gains.

- Synergies should be identified and built with on-going government and donor programs, with flexibility to exploit new opportunities during implementation. The ultimate objective of the project is to influence a much broader program of watershed and flood management investments in the north beyond its own lifespan.

- Community participation and individual choice will be supported. The PES approach is based on exploiting market efficiencies through linking demand with voluntary supply (i.e. self-selection of least-cost providers). Activities on the ground will be predominantly community-driven with involvement of individual farmers via self-selection.

policy, LEGAL and institutional FRAMEWORKS

National Policy Framework

The Poverty Reduction Strategy of Ghana (GPRS I and II)

The GPRS I was a comprehensive framework of policies and development strategies, programs and projects to facilitate macro-economic stability, sustainable growth and poverty reduction (2003-2005). The central goal of GPRS II (2006-2009), which built on GPRS I was to accelerate the growth of the economy to attain a middle-income status. The GPRS II emphasizes the implementation of growth-inducing policies and programs with the potential to support wealth creation and sustainable poverty reduction. The document refers to the need to apply environmental impact assessment and environmental audit to ensure that the growth arising from the GPRS is environmentally sustainable.

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. The policy is conservation sensitive, emphasizing on the placement of shrines, sacred groves and other categories of land (for example the so-called dedicated community forest reserves) with potential for ecosystem maintenance, biodiversity and scenic preservation under protection and leaving management of such lands under the collaborative effort of major stakeholders including the government and the community.
The National Land Policy was prepared in 1999, and the ongoing Land Administration Project seek among other things, to streamline the myriads of laws regulating land

administration and/ or establishing mandates for different land administration agencies in the country.

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. Strategies for ensuring sustainable resource management outlined by the policy include PAS expansion, rehabilitation and development of lands on and outside PAS, protection of endangered plant and animal species, provision of incentives and assistance for conservation, enhancing public and civil society involvement in management through consultative and participatory mechanisms, promoting public awareness and education, and promoting collaborative research and extension. These are in support of the activities identified under the project components.

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.

World Bank Safe guards Policies

The GEF-SLWM project has been categorized as B implying that the expected environmental impacts are largely site-specific, that few if any of the impacts are irreversible, and that mitigation measures can be designed relatively readily. The environmental assessment for a Category B project,

- Examines the project's potential negative and positive environmental impacts,
- Recommends measures to prevent, minimize, mitigate, or compensate for adverse impacts, and
- Recommends measures to improve environmental performance

The Bank's ten safeguard policies are designed to help ensure that programs proposed for financing are environmentally and socially sustainable, and thus improve decision-making. The Bank's Operational Policies (OP) are meant to ensure that operations of the Bank do not lead to adverse impacts or cause any harm. The Safeguard Policies are lumped into

Environment, Rural Development, Social Development and International Law. These operational policies include:

- OP/BP 4.01: Environmental Assessment
- OP/BP 4.04: Natural Habitats
- OP 4.09: Pest Management
- OP/BP 4.12: Involuntary Resettlement
- OD 4.20: Indigenous Peoples
- OPN 11.03: Cultural Property
- OP 4.36: Forests
- OP/BP 4.37: Safety of Dams
- OP/BP 7.50: Projects on international Waters
- OP/BP 7.50: Projects in Disputed Areas
- BP 17.50: Disclosure

The proposed project would trigger five of the policies: environmental assessment, natural habitats, pest management, involuntary resettlement, and forests. A summary of the Bank's environmental and social safeguard policies is provided in **Annex 9.**

OP/BP 4.01: Environmental Assessment

The objective of the OP. 4.01 is to ensure that the projects financed by the Bank are environmentally and socially sustainable, and that the decision making process is improved through an appropriate analysis of the actions including their potential environmental impacts. EA is a flexible procedure, which should vary in breadth, depth, and type of analysis depending on the project. The purpose of EA is to improve decision making and to ensure that the project options under consideration are environmentally sound and sustainable. EAs identify ways of improving projects environmentally, by preventing, minimizing, mitigating, or compensating for adverse impacts.

While most SLWM activities are not expected to generate any significant adverse environmental and social impacts, some activities may result in mainly site-specific and small-scale consequences, if no appropriate mitigation measures are incorporated in sub-project design.

OP 4.12: Involuntary Resettlement

The World Bank's safeguard policy on involuntary resettlement, OP 4.12, (December 2001) is to be complied with where involuntary resettlement, impacts on livelihoods, acquisition of land or restrictions to natural resources, may take place as a result of the project. It includes requirements that:

i. Involuntary resettlement should be avoided where feasible, or minimised, exploring all viable alternative project designs.
ii. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs,

providing sufficient investment resources to enable persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.

iii. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

According to OP 4.12, the resettlement plan should include measures to ensure that the displaced persons are:

i. informed about their options and rights pertaining to resettlement;
ii. consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and
iii. provided prompt and effective compensation at full replacement cost for losses of assets attributed directly to the project.

If the impacts include physical relocation, the resettlement plan should include measures to ensure that the displaced persons are:

i. Provided assistance (such as moving allowances) during relocation; and
ii. Provided with residential housing, or housing sites, or as required, agricultural sites for which a combination of productive potential, location advantages, and other factors is at least equivalent to the advantages of the old site.

Under the Project, no involuntary land-taking is envisaged, no new reserves are being established, and management activities in CREMAs will be community driven. OP 4.12 has been triggered as a precautionary measure. With the variety of SLWM options that will be available, there are potentials for individual access to resources to be restricted as the result of community-level choices to engage in certain activities under components 2 and 3. In some cases these may include instances where tenant farmers are required to vacate land that communities and tindanas have elected to set aside as a protective riverine buffer, or community woodlots. Individual restrictions to natural resources are also possible through the establishment of CREMA management systems.

OP 4.09: Pest Management

The objective of this policy is to promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides. In Bank-financed agricultural operations pest population are normally controlled through Integrated Pest Management (IPM) approaches such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest. The Bank may finance the purchase of pesticides when their use is justified under an IPM approach.

The following criteria apply to the selection and use of pesticides in Bank-financed projects:

- They must have negligible adverse human health effects.
- They must be shown to be effective against the target species.
- They must have minimal effect on non-target species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them.
- Their use must take into account the need to prevent the development of resistance in pests.

Introduction of improved farming systems could encourage increased use of pesticides as farmers strive to increase agricultural production, even though the Project will not finance these. A simple Pest Management Plan is therefore incorporated into the EAMP to explain how integrated pest management techniques will be included within SLWM technologies that present some risk in this regard.

Natural Habitats (OP 4.04)

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that the overall benefits from the projects substantially outweigh the environmental costs. If the environmental assessment indicates that a project would significantly convert or degrade natural habitats, the project should include mitigation measures to the Bank. Such mitigation measures include, as appropriate, minimizing habitat loss (e.g. strategic habitat retention and post-development restoration) and establishing and maintaining an ecologically similar protected area. The Bank accepts other forms of mitigation measures only when they are technically justified.

The SLWM project will operate in and around natural habitats and in forests. The aim of the Project is to improve community-based natural habitat management, including through fire management, as well as improving the productive quality of agricultural land, which should reduce pressures for unsustainable exploitation.

Forests (OP/BP 4.36)

The management, conservation, and sustainable development of forest ecosystems and their associated resources are essential for lasting poverty reduction and sustainable development, whether located in countries with abundant forests or in those with depleted or naturally limited forest resources. The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests

effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. This policy applies to the projects that have or may have impacts on the health and quality of forests; projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests; and projects that aim to bring about changes in the management, protection, or utilization of natural forests or plantations, whether they are publicly, privately, or communally owned.

Legal and Institutional Framework

The relevant legal and institutional frameworks are subsequently described below:

- The Constitution of the Republic of Ghana, 1992;
- The State Lands Act, 1962;
- The Lands (Statutory Wayleaves) Act, 1963
- Lands Commission (LC) Act 2008, Act 767;
- Water Resources Commission (WRC) Act 1996, Act 522;
- Environmental Protection Agency (EPA) Act 1994, Act 490;
- Environmental Assessment Regulations 1999, LI 1652;
- Environmental Assessment (Amendment) Regulations 2002, LI 1703;
- Forestry Commission Act 1999, Act 571;
- National Fire Service Act, 1997
- Local Government Act 1993, Act 462;

The Constitution of the Republic of Ghana, 1992

The Constitution includes some provisions to protect the right of individuals to private property, and also sets principles under which citizens may be deprived of their property in the public interest (described in Articles 18 and 20). Article 18 provides that

"Every person has the right to own property either alone or in association with others."
In Article 20, the Constitution describes the circumstances under which compulsory acquisition of immovable properties in the public interest can be done:

"No property of any description, or interest in, or right over any property shall be compulsorily taken possession of or acquired by the State unless the following conditions are satisfied:

i. The taking of possession or acquisition is necessary in the interest of defence, public safety, public order, public morality, public health, town and country planning or the development or utilization of property in such a manner as to promote the public benefit; and

ii. The necessity for the acquisition is clearly stated and is such as to provide reasonable justification for causing any hardship that may result to any person who has an interest in or right over the property."

Article 20 of the Constitution provides further conditions under which compulsory acquisition may take place: no property "shall be compulsorily taken possession of or acquired by the State" unless it is, amongst other purposes, "to promote the public benefit (Clause 1).

Clause 2 of Article 20 further provides that:

"Compulsory acquisition of property by the State shall only be made under a law which makes provision for:

i. The prompt payment of fair and adequate compensation; and
ii. A right of access to the High Court by any person who has an interest in or right over the property whether direct or on appeal from any other authority, for the determination of his interest or right and the amount of compensation to which he is entitled."

Clause 3 adds that:

"Where a compulsory acquisition or possession of land effected by the State in accordance with clause (1) of this article involves displacement of any inhabitants, the State shall resettle the displaced inhabitants on suitable alternative land with due regard for their economic well-being and social and cultural values."

The State Lands Act, 1963

The Act 125 vests the authority to acquire land for the public interest in the President of the Republic. It also gives responsibility for registering a claim on the affected person or group of persons, and provides details of the procedure to do this. The State Lands Act, 1962 provides some details to be taken into consideration when calculating compensation such as definitions for (1) cost of disturbance, (2) market value, (3) replacement value, and so on.

The Lands (Statutory Wayleaves) Act, 1963

This Act describes the process involved in occupation of land for the purpose of the construction, installation and maintenance of works of public utility, and for creation of rights of way for such works. The provisions include:

- The owner/ occupier of the land must be formally notified at least a week in advance of the intent to enter, and be given at least 24 hours notice before actual entry;

- Any damage due to entry must be compensated in accord with the procedures established by the Minister unless the land is restored or replaced;
- In the case of highways, no compensation shall be paid, unless the land taken is more than one fifth of the total holdings of an affected person;
- Where a right of way must be established in the public interest, the President may declare the land to be subject to such statutory wayleave;
- On publication of a wayleave instrument specifying the area required, and without further assurance, the land shall be deemed to be subject to wayleave. Compensation is then determined and paid, with the right of appeal to a tribunal established by the President, in parallel with the Lands Act, 1962.

Water Resources Commission (WRC Act 1996, Act 522)

The Act establishes and mandates the WRC as the sole body responsible for the regulation and management of water resources and for the coordination of any policy in relation to them. The WRC does this through the granting of water rights to potential users such as DAs, GWCL, CWSA, Communities and so on. The WRC also grants Drilling License to contractors engaged in borehole drilling activities. The WRC has developed a National Water Policy to give support to the use of environmental assessments to assist in the protection and conservation of water resources and encourages its application to all water usage. The Policy also promotes the rational allocation of water resources through Water Demand Management (WDM), which offers the possibility of improving the efficiency and sustainability of the use of water resources, taking into account economic, social, environmental, regional and national considerations.

Lands Commission Act, 2008 (Act 767)

This act provides for the management of public lands and other lands and for related matters. The Commission manages public lands and any other lands vested in the President by the Constitution or by any other enactment or the lands vested in the Commission. The act advises the Government, local authorities and traditional authorities on the policy framework for the development of particular areas to ensure that the development of individual pieces of land is co-ordinated with the relevant development plan for the area concerned.

The commission formulate and submit to Government recommendations on national policy with respect to land use and capability; advise on, and assist in the execution of, a comprehensive programme for the registration of title to land throughout the Republic in consultation with the Title Registration Advisory Board established under section 10 of the Land Title Registration Act, 1986; The Minister may, with the approval of the President, give general directions in writing to the Commission on matters of policy in respect of the management of public lands. The commission has the following divisions:

- Survey and Mapping
- Land Registration
- Land Valuation
- Public and Vested Lands Management, and
- Any other Division the Commission may determine.

Forestry Commission Act, 1999 (Act 571)

This act provides for the management of the forest and wildlife resources in the country. The Commission is responsible for the regulation of the utilization of forest and wildlife resources, the conservation and management of those resources and the co-ordination of policies related to them. The Commission through its Wildlife Division regulates the utilization of forest and timber resources, manage the nation's forest reserves and protected areas by proper planning for the protection, harvesting and development of forest and wildlife resources in a sustainable manner. Assist the private sector and the other bodies with the implementation of forest and wildlife policies by advising and the provision of technical services with regard to matters of resource protection, management and development and of market intelligence pertaining to the timber and wildlife industries; supporting the development of forest plantations for the restoration of degraded forest reserves, the increased production of industrial timber and the expansion of the country's protected forest cover; the provision of training management and technical skills for related industries.

Environmental Protection Agency Act 1994, (Act 490)

This Act establishes and mandates the EPA to seek and request information on any undertaking that in the opinion of the Agency can have adverse environmental effects and to instruct the proponent to take necessary measures to prevent the adverse impacts. The Environmental Assessment Regulations 1999, LI 1652 list activities for which an environmental assessment is mandatory. The Regulations describe the procedures to be followed to obtain permits for both existing and proposed undertakings through the conduct of environmental impact assessments and preparation of environmental management plans. The Environmental Assessment (Amendment) Regulations 2002, LI 1703 establishes the charges to be taken by the EPA for review and issuance of a Permit.

Local Government Act, 1993 Act 462

This Act establishes and regulates the local government system and gives authority to the RCC and the District Assembly to exercise political and administrative power in the Regions and District, provide guidance, give direction to, and supervise all other administrative authorities in the regions and district respectively. The Assembly is mandated to initiate programmes for the development of basic infrastructure and provide municipal works and services as well as be responsible for the development, improvement and management of human settlements and the environment in the district.

Ghana National Fire Service Act, 1997

This act is to re-establishes the National Fire Service to provide for the management of undesired fires and to make provision for related matters. The objective of the Service is to prevent and manage undesired fire. For the purpose of achieving its objective, the Service shall organise public fire education programmes to create and sustain awareness of the hazards of fire, and heighten the role of the individual in the prevention of fire; provide technical advice for building plans in respect of machinery and structural layouts to facilitate escape from fire, rescue operations and fire management.

The summary of relevant legal and institutional frameworks is provided in Table 1.

Table 1 Summary of legal, regulatory and institutional framework

	Institution	Act of Parliament	Mandate
	Environmental Protection Agency	EPA Act, 1994 Act 490 EAR 1999, LI 1652; EAR (Amendment) 2002, LI 1703	Ensure compliance with laid down environmental procedures in the planning and execution of development projects
	Water Resources Commission	WRC Act, 1996 Act 522 LI 1692; LI 1827	Regulate and manage the use of water resources of Ghana. Give license for drilling and development of groundwater
	Lands Commission	Lands Commission Act, 2008 (Act 767)	Manage public lands and other lands and for related matters
	Forestry Commission	Forestry Commission Act, 1999 (Act 571)	Management of the forest and wildlife resources in the country
	District Assemblies	Local Government Act, 1993 Act 462	Exercise political and administrative authority in the district and responsible for overall development

Project Administrative Framework

Sustainable land and watershed management are cross-sectoral issues that require the expertise and coordination of several line agencies. Under the process of decentralization pursued in Ghana over the past several years, the District Assemblies (DAs) have responsibility for all development activities in their districts, and therefore coordination and implementation at the local level. Each district has an Executive Committee, headed by the District Chief Executive (DCE), with a District Planning Coordination Unit (DPCU) including departments for planning, budgeting, finance and administration. Several MDAs, including MoFA, have de-concentrated staff and functions to the district level, although at the current stage of decentralization, those staff still report to their line ministries. Other MDAs, including MLNR and EPA, have thus far only decentralized to the regional level.

With bearing on land and watershed management issues in the north, three bodies have been formed relatively recently with policy, oversight and/or coordination functions. In chronological order:

- 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) 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.

- The Savannah Accelerated Development Authority (SADA) is being established 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 will be 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 Barong-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.

Project Management & Oversight

Project management will be under the leadership of the Ministry of Environment, Science & Technology (MEST). The National Sustainable Land Management Committee (NSLMC) will act as the Project Steering Committee with responsibility for oversight and guidance, as well as providing technical advice and access to latest international SLWM expertise and experience. MEST will have responsibility for project coordination at the national level. Their responsibilities will include: coordinating, consolidating and reviewing implementation plans, budget & reports; M&E and appraising performance of implementing agencies; and ensuring the timely provision and quality of documentation provided to the Project Steering Committee and World Bank task manager.

To ensure local ownership and appropriate attention to capacity needs, District Project Steering Committees will be established in each District with on-the-ground implementation. District Project Steering Committees will be chaired by the District Chief Executive, with representation from relevant district agencies and the District Assembly, and will approve approaches and plans for implementation of project activities within the District.

Implementation of Component Activities

SADA will carry out activities under Component 1 for macro-level watershed mapping, planning and development of a strategy to link project activities into regional programs. Most of the activities will be carried out by consultants recruited by MEST under terms of reference prepared / cleared and supervised by SADA. Preference will be given to consultant proposals that involve local universities or technical institutes. SADA is also expected to play a coordination & advocacy role, to promote the watershed management approach in district planning, although modalities will depend on the statutory powers and operating procedures under which it will eventually function.

The Environment Protection Agency (EPA) of MEST will be responsible for supporting much of the implementation of activities under Component 2. Under guidance of NSLMC, the EPA will be responsible for the selection of SLWM technologies for inclusion, and convening the expert conference to define the environmental services index. Technical support to most field activities in the three northern Regions will be provided through a Technical Coordination Office (TCO) to be established at the EPA office in Bolgatanga. It will function to support frontline implementation of SLWM-related activities via: coordination of district implementing agencies and staff, particularly dialoguing and providing guidance on the design of SLWM implementation and PES processes within each pilot district; and coordinating and overseeing specialized technical activities for which NGOs or technical institutes will be engaged, including preparation and provision of training programs for pilot districts in participatory micro-watershed planning and extension for implementation of SLWM technologies, monitoring of environmental services and verification of performance under PES contracts.

The TCO will be a small unit, comprised of a consultant technical coordinator, a small number of (likely part-time) seconded staff from a range of MDAs at the regional and district levels, and a modest GIS capacity to manage and present spatial data in support of spatial planning and monitoring activities under components 1, 2 and 3. More complicated GIS tasks involving the capture and generation of data, would be outsourced.

Activities in reserves and Wildlife Corridors will be coordinated and managed from the Forestry Commission Regional Office in Bolgatanga. The office will have responsibility for administrative support and fiduciary management. The office will have responsibility for producing operational plans, budgets and reports, and for conducting routine M&E for subcomponent 2.4. Field implementation will utilize the existing structures of the Forestry Commission of the Ministry of Lands and Natural Resources. This department is entrusted with responsibility for coordinating the implementation of all forest sector projects, including those that are externally-funded.
Through its regional offices in the three northern regions (Upper East, Upper West and the Northern region) the Forestry Commission will be responsible for the planning and implementation of activities in the selected sites in the Western Corridor and for establishment of CREMAs and local monitoring in participation with local communities. More specifically the responsibility for establishing the CREMAs will fall to the Collaborative Resource Management unit within the Wildlife Division. This unit will have

a network of Community Wildlife Officers (CWO) based in the field with locally selected field workers in each community.

The Forestry Commission's Wildlife Division (WD) will also implement activities in the Gbele Resource Reserve in collaboration with the Park Management staff (including the Park Director/Manager, 2 wildlife rangers, an administrative assistant and wildlife guards). Specific government agencies (MEST, FC) and NGOs (SNV, ZoFA, CARE international) will be deployed to provide related and necessary technical assistance and training support.

ASSESSMENT OF INSTITUTIONAL CAPACITY AND project approval NEEDS

Ghana has developed institutional capacity for relevant safeguards policies in various sectoral ministries with the satisfactory implementation of safeguards instruments under previous Bank operations, including related projects such as the Community-Based Rural Development Project and the Northern Savanna Biodiversity Conservation project, implemented through the same front-line agencies as will be involved in this project. Whilst lacking direct experience of implementing World Bank projects, the Ministry of Environment, Science and Technology, through the Environment Protection Agency, oversees national environmental safeguards policies as well as the design of safeguards measures for World Bank projects under other ministries.

Institutional Requirements, Capacity and Needs

Environmental Protection Agency

The EPA is responsible for ensuring compliance with laid down EIA procedures in Ghana in accordance with the EPA Act 1994, Act 490. The EIA is recognized and 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 will clear the safeguards framework, on behalf of the Government of Ghana while all frameworks and action plans will be subject to final clearance from the World Bank. MEST, with support from the EPA, will be responsible for ensuring appropriate inclusion of safeguards procedures in project manuals, reviewing investment plans for compliance and monitoring of safeguards performance overall. With the establishment of the Technical Support Unit, the implementation on the ground would receive support and be strengthened.

The Technical Coordination Office (TCO) will have responsibility for monitoring the safeguards performance of front-line implementing agencies, as well as ensuring that suitable material is incorporated into training programs. Safeguards issues will be specifically addressed in project reporting formats, and on the basis of work plans, the TCO will identify activities and settings where safeguards issues are a particular risk, and focus its monitoring and oversight activities on those. The TCO will also establish and maintain a complaints and response database, based on the complaints resolution system designed under the safeguards documents.

A sample checklist for impact assessment study is provided in **Annex 8**. The EPA is directly responsible for ensuring that the environmental requirements of the project are met.

Water Resources Commission

The functions of the WRC as established under Act 522 among other things are to

- Formulate and enforce policies in water resources conservation, development and management in the country;
- Coordinate the activities of the various agencies (public and private) in the development and conservation of water resources;
- Enforce, in collaboration with relevant agencies, measures to control water pollution;
- Be responsible for appraising water resources development project proposals, both public and private, before implementation.

Forestry Commission

The law establishing the Commission empowers the Commission to assist the private sector and other bodies with the implementation of forest and wildlife policies by advising and the provision of technical services with regard to matters of resource protection, management and development.

Two main divisions of the Forestry Commission will be actively involved in the project and these include:

- Forest Services Division; and
- Wild life Division.

The Forestry Commission offices implementing activities on the ground will be responsible for implementation of safeguards measures reflected in the safeguards documents and various sections of the PIM.

The Forestry Commission will also play a key role with regard to permitting or giving approval of activities to be undertaken in a forest/wild life reserve. The Forestry Commission is fully represented in all the three project regions. Activities in reserves and Wildlife Corridors will be coordinated and managed from the Forestry Commission Regional Office in Bolgatanga.

Ghana National Fire Service

The Ghana National Fire Service will provide for the management of undesired fires and to make provision for related matters. For the purpose of achieving the objectives of the SLWM project, the Service will organise public fire education programmes to create and sustain awareness of the hazards of fire, and heighten the role of the individual especially the CWOs in the prevention of fire; provide technical advice on rescue operations and fire management and help equip CWOs in fire management facilities.

District Assemblies

The DAs are responsible for the overall development of the district and its functions include: to prepare and submit development plans and budgets to superior institutions for approval and implementation.

DAs (with consultation and guidance from TCO) will have responsibility for most of the on-the-ground implementation, including community engagement, participatory planning, establishing appropriate incentive mixes for community-selected SLWM technology options, establishing contracts with individual farmers, provision of extension services for agricultural SLWM investments and routine field monitoring. They will also see to the implementation of safeguards measures reflected in the safeguards documents.

With regard to environmental management at the district level, the District Environmental Management Committees (DEMC) has been set up by law (Act 462) to among other things:

- promote and provide guidelines for the establishment of community level environmental committees to put into effect the environmental programmes of the Assembly in the community;
- Plan and recommend to the DA, strategies and activities for the improvement and protection of the environment with emphasis on fragile and sensitive areas, river courses etc.

The mandate and activities of the DEMC therefore complement the intended environmental actions under the SLWM Project. It is expected that the DAs will effectively use the DEMC as much as possible, to contribute to the project, especially since the EPA structures are not adequate at the district level.

DAs will also be represented on the CREMA management team and participate in planning of activities particularly negotiation and agreements of CREMA boundaries. They will also be responsible for legalizing the CREMA constitution within the district and in respect of the Local Government Act (Act 462) by the passing of a district by-law.

Community structures

Through the participatory micro-watershed mapping and planning process, village communities (and where several villages are involved, Unit Committees) will play a key role in identifying community infrastructure investments, prioritizing SLWM interventions, and establishing the incentive frameworks for adoption of SLWM technologies by individual farmers. Community consultation protocols will ensure representation of potentially vulnerable and under-represented groups. In addition, Water User Committees may be established or strengthened if necessary for management of community infrastructure investments.

Capacity building requirements

The capacity building requirements will mostly be in the form of a training workshop and on the job training. A training workshop on the EAMP should be organized for the following stakeholders:

- TCO, DAO and DEMC of DA;
- Community Wildlife Officers
- Water User Committee
- Unit Committee
- Beneficiary community; and
- Project consultants and contractors.

The capacity of project staff at the EPA will be enhanced to provide guidance, and ensure adequate overall environmental supervision of the sub-projects.

Awareness creation

All stakeholders will need some orientation if they are to appreciate conditions which trigger environmental action. It is proposed that environmental management issues are included:

- In all monthly project site meetings; and
- in discussions at all Project review/ evaluation workshops to further sensitise stakeholders.

The discussions will assist to assess environmental progress especially with regard to the effectiveness of implementation of mitigation measures.

There is also the need to promote knowledge on environmental issues at the district and community levels. This approach through the TAs is expected to assist community members to identify their existing beliefs and practices, provide them with information and assist them to analyse the environmental consequences of installing new water points and sanitation facilities.

potential eNVIRONMENTAL AND SOCIAL impacts and mitigation measures

Although 5 safeguards policies have been triggered, negative social and environmental impacts of activities are expected to be minor. In general, impacts should be positive as the overall aim is to improve land, water and natural habitat management through technologies which also benefit participating communities and individuals. In order to be included in the menu of options for application during the project, an SLWM technology will first need to judged to have a clear (and potentially quantifiable) environmental benefit, which will be denoted by its score on an environmental services index, as determined by an expert panel.

All potential adverse impacts are considered for mitigation. Specific measures have been suggested in this section when practicable. Project monitoring will include measures to address both the implementation of mitigation activities and their effectiveness.

Positive Environmental and Social Impacts

The project aims to work with communities to apply soil conservation and mixed cropping techniques, and to improve the management of natural habitats and natural resources. These activities are expected to have the following environmental benefits:

- Enhancement of terrestrial biodiversity through improved protection of both wildlife and habitats, more complex agro-ecologies, and improved connectivity between protected areas.
- Reduced run-off, soil erosion and risk of desertification.
- Improved regulation of hydrological flows and reduced sedimentation of watercourses.
- Reduced requirements for agricultural chemicals due to better management of natural soil fertility and promotion of IPM techniques.
- Protection of aquatic biodiversity by maintaining dry season flows and reducing sedimentation in water courses.
- Increased carbon sequestration from restoration of natural habitats, and higher soil organic content and above ground biomass in agricultural systems.

These, and the implementation approach pursued by the project will produce substantial local social benefits, including:

- Soil fertility improvement and greater agricultural productivity, with lower dependence on chemical inputs, resulting in greater returns to participating farmers once SLWM technologies have been established.
- Improved long-term maintenance of irrigation scheme and/or regulation of stream flow will help maintain or even increase the length of the growing season.

- Diversified livelihoods from wider opportunities in agro-forestry and natural resource based activities, potentially including eco-tourism.
- Greater availability of natural resources such as wood, wildlife and medicinal plants.
- Increased climate resilience of livelihood systems through (i) improved soil moisture retention and water availability, (ii) livelihood diversification, and (iii) availability of natural resources as insurance against agricultural impacts.
- Reduction in risk of major bush fires that endanger property or life.
- Community empowerment and organisational capacity building, including greater voice in District-level decision-making through participatory planning, and active promotion of participation of women and appreciation of their critical roles in both agricultural production and natural resource management.

Potential Negative Impacts and their Mitigation

As SLWM technologies are being introduced for their environmental benefits, negative impacts should not arise, but inadvertent impacts are possible if inappropriate technologies are selected or activities are poorly designed. SLWM technologies may include minor earthworks, such as bunding or contouring, and more rarely rehabilitation or construction of water harvesting structures up to dugouts[1], but as these will be on existing agricultural land, the potential for adverse environmental impacts is negligible. Prevention of negative impacts will therefore be largely a matter of ensuring appropriate considerations are included into the design of the menu of options, rather than specific mitigation activities at the time of implementation. Benefits and general environmental and social issues associated with SLWM technologies are summarised in table 2, and project mitigation measures to prevent inadvertent impacts are identified in table 3.

Activities in Gbele Resource Reserve will include the construction of spillway dykes to improve dry season water availability for wildlife, and longer term tourism potential, modelled on those already in place in Nazinga Wildlife Reserve in Burkhina Faso. These will be modest structures, or less than 2m in height at maximum (often less), and constructed with maximal use of labor-intensive methods and local materials. They will hold water longer into the dry season, whilst in the wet season having little effect on flow patterns, and allowing free passage of fish and also providing river crossing points to improve wet season patrolling access for Park Rangers. Nevertheless, simple environmental impact mitigation measures will be required for their construction. Impacts and measures are reviewed in table 4, and additional details on the design of the dykes are provided in **Annex 10**.

[1] Dugouts are excavations dug into ephemeral stream bed and drainage lines to retain water longer into the dry season. Maximum capacity of dugouts directly supported under the SLWM project will be 250m^3.

Table 2 Environmental and social benefits and issues of SLWM activities

Activity	Social and environmental benefits	Social and environmental issues
1. Conservation agriculture	• Ensure optimal and stable crop yields • Reduced commercial inputs • Increased profit, in some cases from the beginning, in all cases after a few years • Food security • Continuous use of same piece of land • Improved soil chemical and physical properties • Carbon sequestration • Reduced erosion • Reduction of shifting cultivation and reduced land degradation • Improved water use efficiency • Reduction in poverty • Reduction in hunger threats	• Crop pest and disease problems can increase due to the residues left in the field. • Social and cultural attachment to bush burning as a means of land preparation • Requires higher management skills and may be labor intensive at the start • Only attractive where land (rather than labor) is limiting • Improved agricultural systems could increase water demand • Productive agricultural systems could encourage increased use of fertilizers or pesticides • New farming practices could encourage conversion of natural or semi-natural habitats. • Loss of agricultural land for dugouts.
Agro forestry	• Readily available tree products- poles, firewood, fruits & fodder • Multiple out puts–tree products, crops and animals • Dry season fodder, especially for goats & sheep • Food & nutritional security • Productive use of land taken up by earth structures • Increased off season income • Low labor after establishment, some tree species coppice • Reduced pressure on natural vegetation for wood products and fodder • Link erosion control practices with production • Provide biodiversity corridors on farms • Improved micro-climate in farms • Recovery of native vegetation & species • Create favourable sites/micro-climate for on-farm biodiversity	• Water and nutrient competition between trees & crops leading to reduced crop yields • Land tenure issues may affect tree planting-limited adoption • Compete for irrigation water during dry season especially in early years • May interfere with mechanized farming e.g. ridging • Cultural taboos and customs on planting of certain trees • Exclusion of land from other uses e.g. Grazing creating conflicts • Use of certain tree species can lead to decrease in soil fertility' nutrients, water, etc. • Use of mono tree species create more vulnerable conditions for disease, insects, fire, etc; • Introduction of foreign tree species may potentially disrupt eco-balance • Increase in population at forested areas put more pressure on the natural resource and may have unintended adverse socio-economic results • People's livelihoods that are dependent on forestry/forest resources may worsen (e.g. Hunters) • Possible fire outbreaks due to cigarette smoking, nefarious activities of locals enhanced by the presence of fuel woods in the reserves
Dry season gardening and protection of river banks	• Productive use of seasonally flooded land • Benefit from periodic nutrient replenishments–by flooding • Food & nutritional security • Increased income during off season (7 months dry season)	• Potential occurrence of salinity • Potential conflicts between up-stream and downstream water users • May result in pollution of rivers due to increased use of agro-chemicals (misuse) • Highly labour and capital intensive (fencing,

	• Improved water quality • Create incentive for river bank (buffer zone) protection • Permanent vegetation cover along rivers for carbon sequestration • Reduced erosion and reduced sediment loads in rivers • Regulated river flow • Reduction in seasonal migration of youth from up north to down south to undertake farming during long dry seasons up north • Reduction in flooding potential	irrigation, guarding, etc) • Social exclusion for farmers without land along rivers • Communities may become unwilling to protect river banks due to land shortage • Possible fire outbreaks due to cigarette smoking, etc
Fire management in agricultural landscapes	• Increased availability of native species • Reduced losses associated with bush fires • Protection of sacred grooves • Increased growing of annual crops, e.g. cassava) • Recovery of native vegetation & animal species in landscapes • Reduction in wind erosion • Reduction in soil erosion at the start of rains • Increased carbon sequestration in farms and pastures • Reduced negative cultural practices associated with bush burning	• Herders & hunters may favour annual burns (conflicts) • Traditional believes regarding bush fires • Suppression may be expensive or dangerous – limited ability to suppress fires. • Effectiveness of early burning not well demonstrated • Difficulty in establishing by-laws & enforcing them • Challenges in setting up appropriate incentives for fire management • Reduced authority of traditional institutions (chiefs) • overly rigorous fire suppression could alter natural fire-adapted ecologies

Table 3 Mitigation measures for key potential environmental safeguards issues of SLWM technologies

Potential environmental impact	Avoidance / mitigation measure
Introduction of harmful species	• All species to be included in the menu of SLWM technologies will be screened (based on behaviour in the northern savanna and similar environments) to ensure that they are not invasive, highly water demanding, likely to negatively impact other crops grown nearby, or requirement high application of fertilizer or pesticides. • Mixed farming systems will be encouraged, as opposed to extensive mono-cropping, to reduce pest and market vulnerability.
Increased use of agricultural chemicals	• Species dependent on high pesticide or fertilizer use will not be introduced. • The project will not finance pesticides except in the very limited circumstances laid out in Annex 1, and may only finance herbicides and fertilizers for limited and targeted application as part of integrated pest or nutrient management approaches. • Integrated pest and nutrient management approaches will be included within SLWM technology packages and capacity building programs as appropriate. • See for Annex 1 for more detail.
Increased demand for irrigation	• The project will not finance large-scale or diesel pump irrigation. It may finance small-scale pipe or treadle pump irrigation. • The project may finance improvement of existing irrigation schemes or those being introduced by other projects, e.g. through application of more efficient technologies such as drip or pot irrigation, or through capacity building of water user groups for better management and maintenance of irrigation systems, and resolution of water use

	disputes.
Habitat conversion	• Agricultural SLWM technologies will only be supported on existing farmlands. • The project will not finance conversion of natural habitats to cropland or plantation, nor directly finance large-scale irrigation. • The project will finance improved natural habitat management in CREMAs and through improved fire management.
Overly rigorous fire suppression	• The project will support improved fire management through controlled early burning, rather than outright fire suppression. • Village fire volunteers may receive training and basic equipment, but will not be encouraged to directly tackle large and dangerous fires.
Harvesting of wild species	• CREMA plans will be discussed and developed on the basis of enhancing wildlife and natural resource stocks. • Increased extractive use of natural resources will only be supported where populations are sufficiently robust, and subject to community monitoring systems.
On-farm earthworks	• Only as part of SLWM subprojects selected by land owners & users (i.e. no land acquisition – see RPF for more details). • Only within existing fields, or in near-field sites involving habitats that are degraded and/or common within the agricultural landscape. • Water-harvesting structures (e.g. dugouts) may be constructed along ephemeral streams or eroded drainage lines, but not within well-vegetated, perennial watercourses. • Local-labor-intensive construction techniques only; no work camps will be established. • If any heavy equipment is required, it must be used with appropriate PPE and under qualified supervision. • Earthworks must be conducted during the dry season. • For excavations (i.e. of dugouts), (i) spoil should be used for bunding if possible, or otherwise left in low mounds (<1m height) at least 10m from water courses, and (ii) top soil must be piled separately and used to cover spoil. • Chance finds of artefacts suspected to have cultural or historical value will result in: (i) immediate cessation or work and notification of a project officer; (ii) inspection by TCO to determine if genuine a genuine chance PCR find is likely involved, and if so (iii) notification of Ministry of Chieftaincy & Culture to determine appropriate steps before work may continue.

Table 4 Potential impacts and mitigation for spillway dyke creation

Activity	Potential Impact/ Issue	Potential significance	Required mitigation
	Construction Stage		
Access	• Damage to natural habitats from new access routes	Med	• Labor-intensive construction methods will minimize need for heavy equipment. Contractors must stick to routes agreed in advance with park management, making use of existing access, and avoiding rare or especially sensitive habitats. Construction during dry season, when soils are hard and vehicles can pass with little damage to savanna vegetation.
	• Use of new access routes for poaching	Lo – poachers do not require access suitable for 4-wheel vehicles	• Regular patrolling presence whilst access is open.
Work camps	• Vegetation clearance	Lo	• Camp sites to be agreed with park management, avoiding rare or especially sensitive habitats. No cutting of trees of burning allowed (other than controlled burning by park management).
	• Sanitary waste from work camps	Lo	• Camp size restricted to max 30. Black and brown water, and food waste must be disposed of in pits at least 50m from water course.
	• Solid waste	Lo	• Solid waste should be removed where feasible. Inert waste (e.g. concrete) may be buried to at least 50cm depth.
	• Hazardous waste	Lo	• No regular vehicle maintenance within reserve. If emergency maintenance is required, sheeting must be used to catch oil and then removed. All other hazardous waste (e.g. batteries, chemicals) must be removed.
	• Poaching & harvesting by workers	Med	• No hunting or harvesting activity or equipment allowed. Workers must be supervised. Rangers will inspect camps and surrounding areas, and check food supply for workers.
	• Disturbance to wildlife	Lo – limited period of activity at any one site	• Construction or camps not allowed at locations / times critical for wildlife use. Use of heavy equipment minimized. Use of loud entertainment equipment not permitted.
	• Fire risk	Med	• Awareness for workers. Campfires and cigarette disposal only allowed in pre-determined locations. If high risk of fire in work or camp area, controlled early burn may be carried out by park management ahead of time.
	• Safety	Lo – little heavy machinery to be used	• Heavy machinery only to be used by experienced operators with appropriate PPE, and under supervision if in presence of other workers. Basic first-aid kit and at least 1 person trained in use at each camp.
	• Health risks	Lo- small groups of locals in dry season	• Sanitation awareness for workers. Bed nets available.
Construction work	• Sedimentation of water courses	Lo	• Work to be carried out during dry season in low or no flow setting. If there is significant flow during in-stream works, silt screens will be placed

	• Downstream scouring • Destruction of river bed habitat • Inundation of riparian habitat • Disturbance of wildlife • Aesthetics • Chance PCR finds	Lo Med Lo – max height of dykes <2m Lo – limited period of activity at any one site Med Lo	downstream. • Dykes will generally be constructed in areas with hard substrate. If there is a risk of scouring of the river bed at the end of the spillway, suitable protection (e.g. rip-rap) will be included in the design. • Dykes will not be sited within or close to known spawning grounds or other rare or potentially valuable sections of stream bed. • Sites will be selected where area of inundation is mostly within stream channel, and does not include rare or potentially sensitive riparian habitats. • Construction or camps not allowed at locations / times critical for wildlife use. Use of heavy equipment minimized. • Natural materials will be used on exterior of dykes, with concrete cores largely hidden. • Chance finds of artefacts suspected to have cultural or historical value will result in: (i) immediate cessation or work and notification of a project officer; (ii) inspection by TCO to determine if genuine a genuine chance PCR find is likely involved, and if so (iii) notification of Ministry of Chieftaincy & Culture to determine appropriate steps before work may continue.
Sourcing borrow	• Destruction of habitats	Med	• Borrow pit sites must be agreed with park management, and will be located outside of the reserve wherever feasible. Top soil must be stored and replaced. No pits may be sited on river banks.
Operation and Maintenance Stage			
Human-wildlife conflict	• Use by livestock increases competition with wildlife • Hunters attracted to water points	Med Hi	• Dyke sites will not be located close to existing grazing lands, and will be subject to regular patrolling to ensure park regulations are respected. • Regulated fishing may be allowed at some sites but not hunting, ban will be enforced by regular patrolling presence.

Negative list of activities which cannot be supported by the project

The project is based on a flexible design in which new SLWM technologies or conservation activities. To avoid any inadvertent environmental impacts from unforeseen activities, either in the course of promoting SLWM technologies on agricultural land or improving management of natural habitats, the project will not finance any on-the-ground activities that do not have a demonstrable environmental benefit, including:

- Conversion of natural habitat to agricultural land.
- Purchase of pesticides (except for very limited circumstances laid out in Annex 1).
- Large-scale or diesel pump irrigation.
- Introduction of any species known or suspected of being detrimental to local biodiversity or hydrological balance.
- Firearms, chainsaws, or hunting equipment.
- Large-scale civil works (but may fund investments complementary to community infrastructure constructed under the SOP project, and subject to its safeguards procedures).
- Any other civil works, other than those (i) required for improved conservation area management as part of a balanced protected area or CREMA management plan, or (ii) required for on farm SLWM technologies, including ridging, bunding, etc, small-scale piped irrigation development (but not new irrigation channels), and small water-harvesting structures, up to dugouts of maxmimum capacity 250m^3 (but not dams).

In addition, any project activity that may arise during the course of implementation and which is not adequately addressed in the scope of the table above will be assessed for safeguards impacts in accordance with the general screening tools in annexes 3-8, and subject to approval by the EPA (and notification of the World Bank).

ENVIRONMENTAL Management plan and monitoring component

The Environmental Management Plan presented under this section considers institutional arrangements required to implement the environmental actions, including capacity building and monitoring activities. The cost of the mitigation measures will be largely folded into regular project implementation costs, with the exception of the contractors' obligations for construction of spillway dykes, which will be incorporated into the contractors' costs under the contract.

Screening, clearance and monitoring responsibilities

As the issues are neither expansive nor complicated, processes for screening and addressing environmental safeguards issues will be incorporated into the general design and implementation of project activities. EPA will have responsibility for reviewing safeguards compliance of implementing agencies on the ground in line with its national mandate.

- ***SLWM technologies***. Screening of SLWM technologies for safeguards issues and consistency with the mitigation measures laid out in table 3 will be conducted in line the final selection for the menu of SLWM options and the development of the environmental index under the auspices of the EPA. This process will include expert evaluation of the environmental benefits of each SLWM technology option, which will ensure that undue environmental impacts are not included. The full description of the technologies, including any mitigation measures will be included in the manual & training materials developed for the project. In the event of contractors being engaged for on-farm earthworks, standard requirements consistent with table 3 will be included in contracts. If the impacts of a certain SLWM option are likely to depend on local circumstances, then there may also be a need for a simple screening instrument to be used during participatory planning or at the stage of developing the SLWM contracts. If so, these would be designed by the EPA and incorporated into the manual and training materials. District staff and any contractors involved in on-the-ground implementation will be responsible for ensuring SLWM technologies are implemented in accordance with project guidelines. This will be verified through spot checks by the TCO (including regional EPA staff) and by the process for independent verification of SLWM contracts. Regular progress reports compiled by the TCO must state occurrence of any environmental or social safeguards issues.

- ***CREMA & Gbele Reserve activity plans***. MEST will request EPA to review these plans for consistency with the EAMP before giving approval for implementation by the Forestry Commission. Regular progress reports compiled by the FC must state occurrence of any environmental or social safeguards issues.

- ***Spillway dyke construction***. Mitigation measures required of dyke construction contractors (as laid out in table 4) must be included in contractors' contracts. Gbele Reserve staff will conduct frequent visits to the construction areas to ensure compliance with Reserve Regulations, and in addition, Forestry Commission staff working on the project will conduct at least two visits to each construction site, once during construction, and once at the cessation of works. As part of these visits, they will monitor compliance with the safeguards measures of the contract according to a simple checklist instrument. Final payment of contract fees will not be released until the contractor has met safeguards obligations, and refusal to do so may result in withholding of a part of the fee. Construction contract templates and monitoring instruments will be reviewed by EPA before the first contract is signed.

- Any new project activities that might have unforeseen safeguards impacts would be subject to identification by the TCO (including regional EPA staff). The TCO would be responsible for the initial safeguards screening (using the tools in annexes 3-8), and would pass the results to the EPA in Accra for review and clearance. Activity plans collated by the TCO and passed to MEST in Accra must state whether any activities are included that require additional safeguards measures.

All these arrangements will be subject to regular supervision and post review as requested by the World Bank.

Environment Training and Sensitization

In order to ensure proper implementation of the EAMP, the project will undertake environmental training and sensitization at the national, regional and community levels for those involved in the implementation, and over the life cycle of the project.

For each group, training will be provided to them to different level of expertise in different areas, and would include:

- In-depth training to a level that allows trainees to go on to train others, including technical procedures where relevant;
- Regular training to allow project participants to carry out clearly defined duties; and
- Sensitization or awareness-raising in which the participants are familiarized with the significance or relevance of the issues, to the extent that they can identify potential or emergent problems and request further assistance as necessary.

The objective of the training/capacity building efforts under GEF-SLWM Project will be to:

- Support communities and the DAs to mainstream environmental and social issues in project activities.

- Ensure that District staff have the capacity to supervise and assist communities in the implementation of activites;
- Strengthen the capacity of local NGOs and other service providers to provide technical support to communities in environmental and social aspects of activities as necessary; and
- Ensure project staff in the TCO and FC have the capacity to supervise and monitor activities at the ground-level in relation to safeguards requirements.

Capacity Building

Project institutions need to understand the purpose of the EAMP, their expected roles and the extent to which the EAMP will facilitate the respective statutory functions. This will engender the required collaboration for the EAMP implementation.

To make these institutions effective and efficient in implementing, coordinating, supervising and monitoring programs and projects in sustainable land management, proper institutional arrangements will have to be established. The target groups for training, sensitization and capacity building at the national, regional, district and community levels should include the following:

- Project coordinators (MEST,SADA, NLSC, PAC)
- District Assemblies and their District Environmental Management Committees (DEMCs);
- District Coordinating Office staff (including the Planning officers);
- Relevant Decentralized Departments of the Das (particularly agricultural extension staff);
- EPA staff in the three Regional Offices;
- Wildlife and Forest Services Division staff involved in the project;
- Involved NGOs and Local Service Providers;
- Beneficiary Communities (esp. CWMAs and CREMAs); and
- Consultants and Contractors.

The broad areas for capacity building include the following:

- General project planning and management inter-faced with environmental and social assessment and management;
- Inclusion of environmental mitigation measures & penalties in small works contracts and contractor supervision;
- Environmental screening and monitoring; and
- Public participation techniques and procedures.

Institutional Capacity Strengthening Programme

The table below describes the capacity strengthening programme for the implementation of the EAMP.

Table 5 Institutional Capacity Strengthening Programme and Proposed Budget for EAMP Implementation

Description	Application	Target Audience	Duration (Days)	Estimate Budget (GH ¢)
General environmental training seminar that will Ghana & World Bank policy frameworks and responsibilities, nature and consequences of environmental issues relevant to project, EAMP, and environmental and social screening tools.	Personnel require knowledge of WB and national environmental policies, as well as specific issues and responsibilities related to the project.	EPA, TCO & FC staff working on project	2	40,000.00
Environmental issues related to land management, PES approaches and rationale, inadvertent impacts that could arise from poorly designed SLWM techniques, specific project responsibilities for overseeing application of SLWM technologies, and identifying and reporting potential problems/	Extension service providers are able to ensure that SLWM technologies are applied correctly and identify potential environmental issues.	DAs, District staff and other extension service providers.	7	N/A – included within general training on supporting implementation of SLWM technologies
Potential impacts of small works in sensitive natural habitats (especially protected areas), contractual tools for environmental mitigation, specific mitigation measures & supervision responsibilities with respect to construction of spillway dykes.	Formation of appropriate contracts, sensitization and appropriate selection of contractors, and supervision of dyke construction.	TCO & FC (including Wildlife & Forest Services Divisions) staff working on project.	2	30,000.00
Benefits of SLWM, natural resource management and biodiversity conservation. Principles and rationale of PES. Potential environmental issues and warning signs relevant to the project.	Understanding and support for project activities.	Participating communities	3	N/A – included within participatory planning exercises

The total incremental cost of the institutional strengthening and capacity building for the implementation of the EAMP is estimated at a lump sum of GH ¢ 70,000.00. These estimates include local travel expenses.

Monitoring Indicators

Environmental and social monitoring during implementation is done in order to measure the success of the mitigation measures. Monitoring is a key component of the EAMP during project implementation. It is essential that the basis for the choices and decisions made in the activity design and other environmental and social safeguard measures implemented are verified. Monitoring will verify the effectiveness of impact management, including the extent to which mitigation measures are successfully implemented.

Monitoring of the general project and the specific sub-project activities will help to:

- Improve environmental and social management practices; and
- Provide the opportunity to report the results on safeguards, impacts and mitigation measures implementation.

Table 6 below describes the activities and monitoring responsibilities

Table 6 Monitoring Responsibilities

Activity	EAMP-related monitoring	Responsibility (instruments)
SLWM technologies	• Implementation of SLWM options according to specification • No conversion of natural habitat • Agricultural chemical use and pests • Water balance	• District extensionists (SLWM contracts & checklists in manuals); independent verification mechanism • District extensionists (recording of SLWM contract plots); MEST (analysis of remote sensing imagery) • District extensionists (annual participant survey) • District extensionists (annual participant survey & field observations at select locations)
Harvesting of wild species	• No extractive use of highly threatened species • Robust stock of exploited species	• Wildlife Division staff (spot checks) • CREMA committee members (simple community indicators or stock or availability)
Spillway dyke construction	• Reserve regulations respected • Contractors obligations met (in line with table 4)	• GRR staff (additional patrols in construction areas) • FC project staff (checklists)
Screening of new activities	• Potential impacts from SLWM plans flagged. • Potential impacts from CREMA plans flagged.	• TCO (annual plans & screening tools) • FC staff (CREMA management plans & screening tools)

CONSULTATION

The public and private sector consultative workshop with stakeholders took place on the 4th of May, 2010 while the community consultative workshop took place on the 5th of May, 2010. Both consultative workshops were held in Bolgatanga in the Upper East Region of Ghana, and the reports have been appended as **Annex 2.**

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ANNEXES

ANNEX 1 PEST MANAGEMENT PLAN

PEST MANAGEMENT PLAN (PMP)

Introduction

The Pest Management Plan (PMP) has been prepared as an integral part of the EAMP with reference to the World Bank safeguard policy on Pest Management (OP 4.09). Use of pesticides is not heavy in the project area, and in general the project will not support or finance pesticide use. Nevertheless, it is possible that the project activities could lead to increased and new agricultural activities which in turn could bring about an increase in the use of pesticides. The improper application of these pesticides can be harmful to both the environment and public health. This Plan has also been prepared to ensure that the project does not increase the environmental impacts of pesticide use, and where possible decreases them, in line with its environmental objectives.

The objective of the World Bank safeguard policy on Pest Management (OP 4.09) is to promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides and ensure that health and environmental hazards associated with pesticides are minimized. Pest populations are to be controlled through Integrated Pest Management (IPM) approaches such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest.

Objective

The plan extends the coverage in section 6 of increased pesticide use as a potential side effect of introduction of improved SLWM technologies. It provides project stakeholders with clearer guidelines on the project approach to managing the use of pesticides.

The specific objectives of the PMP are to:

- Ensure appropriate pest management techniques into SLWM technologies supported under the project.
- Monitor pesticide use and pest issues amongst participating farmers.
- Provide for implementation of a robust IPM action plan in the event that serious pest management issues are encountered, and/or the introduction of SLWM technologies is seen to lead to a significant increase in the application of pesticides.

Rationale

The Pest Management Plan (PMP) addresses the GEF-SLWM project concerns about pests. It stresses the need to monitor and mitigate negative environmental and social impacts of the project and promote ecosystem management. Some hazards associated with the use of pesticides on human health, environment and crops are described in the table below which further emphasizes the need for an integrated approach to the management of pests.

Table 1: Pesticide problems relating to health, environment and crops

Hazards to health	Hazards to Environment	Hazards to crops

Acute poisoning: 3 million poisonings including 20,000 unintentional deaths occur annually (WHO). Symptoms of acute poisoning include severe headaches, nausea, depression vomiting, diarrhoea, eye irritation, severe fatigue and skin rashes. Chronic ill-health problems can affect women and men, girls and boys exposed to pesticides, whether because of their occupation or because they live near areas of use. Such problems can include neurological disorders, cancers, infertility and birth defects and other reproductive disorders.	Contamination of drinking water and ground water. Water contamination kills fish. Soil contamination. Wildlife and domestic animals can be killed by spray drift or drinking contaminated water. Exposure may also cause infertility and behavioural disruption. Persistence in the environment and accumulation in the food chain leads to diverse environmental impacts. Loss of biodiversity in natural and agricultural environments	Pesticide resistance: 520 species of insects and mites, 150 plant diseases; and 113 weeds are resistant to pesticides (FAO). Resistance can create treadmill syndrome, as farmers use increasing inputs to little effect, while elimination of beneficial insects Causes secondary pest outbreaks. High cost of pesticides can lead to falling incomes for farmers: Newer products are often safer, but are more expensive. Farming communities lose knowledge of good horticultural practices and become dependent on expensive external inputs.

General approach

As pesticide use in the project area amongst small-scale farmers is light, this is not expected to be a major focus of project activity. However, the design and environmental impact screening of SLWM options for inclusion in the project will ensure that:

- Use of pesticides is not promoted or funded under the SLWM options selected, with the exception of the case that live mulching techniques are included that require the application of herbicide. In such an event, only the use of glyphosate will be supported, and on the basis of safe minimal effective application.
- If other SLWM options are included which are considered in the safeguard and expert review processes to be likely to increase the need or demand for pesticides, appropriate IPM techniques will be incorporated into the SLWM option to mitigate that demand.

Pesticide use and pest issues amongst project participants will by surveyed annually by extensionists in the course of the annual review of contract performance. If this monitoring indicates that unanticipated significant pesticide use or serious pest issues are associated with introduced SLWM technologies, then a more robust intervention to promote IPM techniques will be undertaken, as described in the sections below. This contingency plan would not just involve participants in SLWM contracts, but would be open to all members of project communities.

CONTINGENCY ACTION PLAN FOR ROBUST IPM APPROACH

The rationale behind the Plan is illustrated in the matrix below which confirms the results expected from the development and implementation of the Pest Management Plan.

Table 2: Planning matrix

Narrative summary	Expected results	Performance indicators	Assumptions/risks

Goal: Empower crop and livestock farmers to contribute significantly to household and national economies through environmentally friendly pest management practices.	• *Food security enhanced, environmental quality improved, crop and livestock productivity and farmers' income increased*	• *Evidence of improvements in food availability, level of poverty, and environmental protection in Northern Savanna Region*	• Government policies continue to support food security programme
Purpose 1. To prevent losses caused by pests in order to increase profitability of agriculture. 2. In the longer term, strengthen national and local capacity to reduce environmental and health risks associated with pest management practices.	**Medium-term results/outcomes** • *Farmers in Northern Savanna Region prioritize their pest problems and identify IPM opportunities to mitigate negative environmental and social impacts associated with pesticides.* • *Farmers in Northern Savanna Region adopt ecologically sound options to reduce crop and livestock losses with minimal personal and environmental health risks.* • *GEF/SLWM decision makers provided with clearer guidelines enabling then to promote IPM approaches and options in agriculture* • *Collaborate linkages established to develop a national IPM policy to promote compliance with international conventions and guidelines on pesticide use*	• *Availability of sufficient food.* • *Perception of state agencies regarding the value of IPM in agriculture.* • *Level of compliance with World Bank etc.* • *Level of chemical control practices* • *Types and level of use of alternatives to synthetic pesticides*	

Table 3: Component activities and expected results

Actions	Expected results	Milestones	Performance indicators	Assumptions/risks
1. Record stakeholders' views on crop and livestock pests. 2. Conduct field diagnosis to specify pests that undermine agriculture. 3. Identify farmers' coping mechanisms and researcher recommended IPM options against the pests. 4. Develop and explain historical profile of pesticide use and other pest control practices. 5. Specify partnership opportunities at local, national and international levels to assist in the implementation of the PMP	**Result 1:** Members of FCAs and other relevant stakeholder groups develop common understanding of key pest problems and agree on corrective action.	• Pest problems diagnosed and related IPM opportunities identified • Potential constraints farmers may face in the use of the technologies specified • Pest lists including quarantine pests and alien invasive species developed. • Potential for improving existing pest control practices assessed • Pest monitoring schemes for early warning on alien invasive species and migratory pests are organized and functional • Action plan for location-specific IPM activities developed	• Type and nature of participatory methods for problem analysis • Inventory of alien invasive species and quarantine pests • Types and availability of natural enemies for use in biological control of named pest. • Types and availability of microbial pesticides and botanical pesticides to replace chemical pesticides • Type and number of crop rotation schemes to reduce build up of named pest species • Type of composting and mulching as alternatives to mineral fertilizers • List of principal actors and of partners	Social, economic and political situation remain stable

Table 3 (contd.): Component activities and expected results of the PMP

Action	Expected results	Milestones	Performance indicators	Assumptions/risks
1. Develop participatory learning modules (PLM) in line with farmers identified training needs 2. Conduct short to medium term training of farmer support groups on skills relevant to the PLMs 3. Organize international study visits on specialized IPM skills of relevance to the PLMs 4. Intensify training of men and women farmers in IPM knowledge and skills. 5. Promote farmer-led extension to increase secondary adoption of proven IPM options 6. Strengthen researcher-farmer-extension linkages through participatory research on issues emerging from farmer training 7. Develop/disseminate IPM decision-support information resources for field agents, farmers, policy makers, and the general public	**Result 2**: Human resource capacity for IPM delivery and implementation developed.	• *PLM for crop/livestock and pest management practices developed and adapted to suit local needs* • *training of trainers courses for extension agents completed* • *Farmers accurately relate pests to respective damage symptoms; recognize natural enemies/biological control agents against the pests; test a range of IPM options and select "best-bet" options to implement and adopt.* • *At least 30% of trained farmers undertake participatory extension; and at least 50% farmers adopt new IPM options in targeted crop or livestock* • *At least 70% of information materials developed is disseminated and used by extension agents and farmers.* • *Significant reduction in pest damage by at least 30% of baseline data in target crop/livestock*	• Type and number of PLMs developed • Type of IPM skills covered in study visits by agric staff • Number of farmers' learning groups implemented • Gender and number of extension agents and of farmers trained. • Gender and number of trained farmers engaged in participatory extension • Extent to which new knowledge/skills are used by extension agents & farmers to promote adoption of IPM options • Number & type of IPM information materials developed/disseminated • Number and type of new IPM options introduced and adopted. • Gender and number of farmers adopting IPM technologies. • Area of crops under IPM • *Incremental benefits due to pest control* • *Type and number of user-friendly taxonomic keys for pest and natural enemy recognition by farmers*	Farmers adopt and apply new improved technologies. users and their service providers comply with international conventions guiding pesticide use and MRLs in trade Critical mass of staff trained remain within the Northern Savanna communities

Table 3 (contd.): Component activities and expected results of the PMP

Action	Expected results	Milestones	Performance indicators	Assumptions/risks
1. Test and promote botanical alternatives to synthetic pesticides. 2. Test and romote microbial alternatives to synthetic pesticides 3. Develop/update a national IPM policy including legislation to govern the manufacture, importation, distribution and use of pesticides 4. Establish a national IPM advisory and oversight committee to guide national and local compliance with World Bank safeguard Policies, OP 4.09 and BP 4.01 and other international conventions concerning pesticide use 5. Sensitize the population on IPM issues and activities through formal and informal educational channels and public awareness campaigns	**Result 3**: Harmful pesticide regimes replaced by environmentally friendly alternatives	• Local commercial enterprises initiated and/or strengthened to produce and/or market botanical pesticides • At least one botanical pesticide widely used in place of chemical pesticides • At least one microbial pesticide registered and widely used in place of chemical pesticides • Surveillance systems to protect Northern Savanna agriculture from banned/harmful pesticide regimes is fully operational • Existing pesticide regulations are fully enforced • A multi-stakeholder National IPM advisory and oversight committee established to guide compliance with international conventions and guidelines on pesticide use, and promote the IPM development • Radio and other public campaigns on impact of pesticides in agriculture, environment and health conducted through radio and TV spots, mass field days, rural market days, information workshops, and focus groups discussions	• Level of reduction in chemical pesticide use; type and number of pesticides replaced by botanical or microbial pesticides • Number of commercial enterprises engaged in the production of botanical pesticides; and quality of the products • Volume of sale of microbial and botanical pesticides • Level of compliance with World Bank safeguard policies by Northern Savanna farmers and pesticide dealers/service providers • Effectiveness of the IPM advisory and oversight committee • Number of pest surveillance groups and pesticide law enforcement mechanisms • Effectiveness of public awareness of campaign	Government and development partners remain committed to international conventions and guidelines on safe pesticide use Critical mass of staff trained remain within Savanna zone.

IMPLEMENTATION OF CONTINGENCY PLAN

Implementation Strategies

GEF-SLWM will use the following specific strategies to achieve an effective pest management process.

Education and awareness creation
The GEF-SLWM Project will create awareness among workers and farmers of the importance of pest management.

Availability of Information: The GEF-SLWM Project will ensure that all farmers practicing Sustainable Land Management Technologies have access to information regarding declared pest plants.

Education and Training: The project coordinators and implementers will incorporate pest management awareness into environmental training programs.

Pests Inventory
The project will identify the types, abundance and location of pest plants and animals by conducting surveys. So that regular pest surveys will be carried out and the data collected will be managed in a standardized way so that trends can be determined.

Communication
The GEF-SLWM Project coordinators and implementers will communicate the content of the Pest Management Plan and include follow up activities through interactions with:

Local Government: The PMP implementers will establish on-going communication with Local Government pest management representatives.

Other Interested Parties: The project will inform such groups or individuals of its pest management policies, practices and achievements as required.

Planning
The PMP implementers will coordinate the pest management process with all relevant landholders, and all activities that may have an impact on pest management will be identified and included in the pest management planning process. Contacts will be established with significant neighboring land managers and consult with them when appropriate and co-ordinate management activities with the other nominated government agencies when appropriate.

Prevention of new Pest Infestations
The PMP will endeavor to treat and manage new pest infestations as soon as they are identified.

Early Detection and Eradication: A process for the reporting and identification of unusual plants and animals will be established. Pest surveys will be conducted on a regular basis to detect new

infestations and a rapid response process for the management of new infestations will be established.

Prevention of Spread: The PMP will establish protocols for appropriately managing risks of all human assisted transport of declared pests.

Management of established Pests
The PMP will ensure that established pest infestations are effectively managed. Priorities for pest management will be regularly reviewed. These will include the reduction of Class 3 pests (environmental weeds) where appropriate. The impact on non-target species, particularly those of environmental significance, will be minimized.

Monitoring and Evaluation
There will be regular monitoring and evaluation of control programs to determine the level of progress being made in controlling the spread of declared plants and the reduction of infested areas.

Reporting
Annual report on the progress of pest management on the farming sites will be prepared. The reports will indicate the pests treated, location of pests, level of success of treatment and the amount and type of herbicide used.

Capacity building issues

The success of IPM depends largely on developing and sustaining institutional and human capacity to facilitate informed decision making by farmers, and empowering farmers to integrate scientific and traditional knowledge to solve location-specific problems, and respond to market opportunities. Poor communication between farmers, extension agents and researchers has often led to poorly-targeted research or to poor adoption of promising options generated by research. The full benefits of investments in agricultural research thereby remain untapped under these circumstances.

Farmer participatory research (FPR) and participatory learning (PL) approaches in capacity building efforts help to bridge this gap and make research results more understandable and useful by farmers. This is particularly the case in knowledge intensive disciplines such as IPM.

Farmers will have the capacity to accurately identify and diagnose pests and pest problems, understand trophic relationships that underpin biological control opportunities, and use such knowledge to guide pesticide and other kinds of interventions. Through the participatory approaches GEF-SLWM will build local capacity to ensure rapid spread and adoption of ecologically sound and environmentally friendly management practices in Northern Savanna communities. The farmers will learn biological and ecological processes underpinning IPM options, and use the newly acquired knowledge to choose compatible methods to reduce losses in production and post-harvest storage.

A foundation element of the capacity building exercise is the accurate diagnosis of the pest problem and to provide baseline information that will enable stakeholder groups to develop a shared vision on felt needs and IPM strategies. Through informal interviews, field visits, and planning meetings, stakeholder groups will develop joint understanding of the key issues affecting production and develop a common IPM plan based on agreed concerns.

The PMP implementation will be anchored at the district level with field action by farmer groups which will receive training and advisory services from MoFA, appropriate NGOs, and community leaders who would have graduated from Training of Trainers (ToT) sessions. Training at all levels will be based on participatory learning modules for capacity building in IPM information delivery. The participants will be equipped with skills in facilitation, group dynamics, and non-formal education methods to encourage adult learning. Farmer training will focus on farmers' group learning for informed decision making on IPM issues. Group learning will be experimental through farmer-led field trials and discussions on practical aspects of crop and livestock production and pest management including indigenous knowledge/technologies. Farmer group learning will be facilitated by ToT trained men and women extension agents.

Group decision making will be achieved through AgroEcosystem Analysis (AESA) involving a comparison of IPM practices with normal farmer practices. At each AESA, farmers observe, record and monitor changes in soil, crop/livestock and trophic relationships affecting crop/livestock growth. Farmers analyse and discuss their findings and recommend corrective action based on the results of their own analyses. Group learning helps to increase scientific literacy, ownership of biological and ecological information and knowledge, and informed decisions making habits in the communities. Also trained farmers will be expected to promote secondary adoption of proven options. For example, each farmer trained will train at least 10 new farmers through demonstrations and farm visits. Additionally the farmers will organize field days to train other farmers and explain new/improved IPM practices they have learnt. Field day participants will include representatives of national and local policy makers from government, development agencies, NGOs, rural and national press media, researcher institutes, and national extension services.

Institutional Arrangements

Annual work plans will be developed in consultation with participating communities and in line with their respective local action plans to indicate institutions and networks that will be required to provide research and development support. The principal actors will include a number of local institutions directly involved in implementing the PMP while other agencies (partners) will include international and national institutions to provide technical and other support for implementation of the plan. These are explained in the table below.

Table 4: Actors and partners

Actors	Partners
The actors will collaborate with the project: • Contribute field staff to be trained as IPM Trainers. • Organize its members into farmer groups for training and promotion of IPM practices. • Facilitate extension and farmer training • Prepare and produce field guides and other relevant IPM information materials • Provide policy guidance/oversight for implementation of the PMP • Monitor, supervise and coordinate IPM activities • Document user compliance on pesticide use Examples of actors: 1. Ministry of Food and Agriculture (MoFA) 2. Research Institutes (Council for Scientic and Industrial Research, CSIR), and Universities. 3. DAs 4. Regional EPA of Ministry of Environment Science and Technology (for environmental management) 5. Ministry of Health (for disease vector control)	The partners will be IPM experts who: • Serve as technical reviewers for IPM activities. • Provide technical support in pest and natural enemy identification • Assist to organize study tours and networking with international IPM groups. • Provide expertise in planning, training and field implementation of IPM Examples of partners: 1. The CGIAR System wide Program on Integrated Pest Management (SP-IPM) which is dedicated to breaking isolation barriers to the full realization of IPM research results 2. The Global IPM Facility which assists interested Governments and NGOs to initiate, develop and expand IPM programmes mostly through farmer field school training. 3. Research institutes and NGOs

Coordination Responsibilities

EPA, with input from MoFA thru the NSLMC, would standardize training needs across sites; and organize national workshops to develop participatory learning modules. They will liaise with DAs to plan training implementation; provide technical support such as in preparing and delivering specific training materials, and evaluating resource materials; identify and select suitable local training resource persons and materials; and prepare training progress reports.

The DAs will collaborate with MoFA and EPA to identify and organize farmers groups for training; prepare, organize and supervise training implementation plan; verify reports of persisting pest problems and farmers training needs; monitor performance of farmer trainers and post-training assignments; and prepare training progress reports

Monitoring and Evaluation

The following monitoring indicators will be incorporated into a participatory monitoring and evaluation plan.

Table 5: Monitoring Indicators

No	Area	Indicators
1.0	Training and awareness creation	Types and number of participatory learning modules (PLM) delivered; Category and number of extension agents and farmers trained and reached with each PLM; Category and number of participants reached beyond baseline figures; Practical skills/techniques most frequently demanded by extension agents and farmers; and Crop/livestock management practices preferred by farmers.
2.0	Technology acceptance/ field application	Category and number of farmers who correctly apply the skills they had learnt; New management practices adopted most by farmers; Category and number of other farmers trained by project trained farmers; Types of farmer-innovations implemented; Level of pest damage and losses; Rate of adoption of IPM practices; Impact of the adoption of IPM on production performance of farmers
3.0	Project direct benefits	*Increase in crop/livestock production;* *Increase in farm revenue;* *Social benefits: e.g., improvement in the health status of farmers;* *Level of reduction of pesticide purchase and use; and* *Number of FCA families using preventive mechanisms against diseases.*

Sustainability issues

Scientific information, adapted into user-friendly format will strengthen training and extension delivery, and increase IPM literacy in project communities.

Strategic alliances with international IPM groups will strengthen national capacities to integrate new IPM options in crop and livestock production. Farmer-educational activities will be central to the exit strategy which will feature increased roles and responsibilities of committed national and local communities to take primary responsibilities in the development of action plans and expertise exchange for IPM development and promotion.

Implementation Budget

A budget estimate of USD229,500 is required to implement the Contingency Plan during a 5-year period, and this is provided in the table below.

Table 6: Budget estimates

	Activity	Budget, USD					
		Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.0	**Capacity Building**						
1.1	IPM orientation workshop	8,0000	5,000				13,000
1.2	Training of trainers	15,000					15,000
1.3	Farmer group training	7,000	6,000				13,000
1.4	Study visits	10,000	10,000	10,000	10000		40,000
	Sub total	*36,000*	*16,000*				*72,000*
2.0	**Advisory services**						
2.1	IPM problem diagnosis	6,000	5,000	5,000			16,000
2.2	Field guides/ IPM materials	5,000	6,000	5,000			16,000
2.3	Public awareness/ sensitization campaigns	5,000	6,000	6,000	5,000	5,000	27,000
2.4	Pest/ vector surveillance	4,000	4,000	3,000	3,000	3,000	17,000
	Sub total	*20,000*	*21,000*	*19,000*	*8,000*	*8,000*	*76,000*
3.0	**Environmental management**						
3.1	Equipment, bed nets, chemicals	3,000	6,000	3,000	3,000		15,000
3.2	Support to IPM R&D	7,000	10,000	5,000	5,000		27,000
	Sub total	*10,000*	*16,000*	*8,000*	*8,000*		*42,000*
4.0	**Project management**						
4.1	PMP coordination	2,500	2,500	2,500	2,500	2,500	12,500
4.2	Monitoring and evaluation	5,000	5,000	10,000	7,000		27,000
	Sub total	*7,500*	*7,500*	*12,500*	*9,500*	*2,500*	*39,500*
	FINAL TOTAL						**229,500**

LIST OF BANNED AND PERMITTED PESTICIDES IN GHANA

Environmental Protection Agency, Accra, Revised Register of Pesticides as at December 2009 under the Part II of the Environmental Protection Agency Act, 1994 (Act 490).

(A) FULLY REGISTERED PESTICIDES (FRE)

(A1) Insecticides

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
1.	Abate 500E	FRE/0908/00250G	Temephos (500g/l)	III	Larvicide for	Dizengoff
12.	Cymethoate Super EC	FRE/0805/00206G November 2008	Dimethoate (400g/l) + Cypermethrin (36g/l)	II	Insecticide for the control of aphids, caterpillars, whitefly, grasshoppers, bollworms in vegetables and cotton	Chemico Limited, Tema
13.	Cypadem 43.6% EC	FRE/0857/00216G November 2008	Cypermethrin (36g/l) + Dimethoate (400g/l)	II	Insecticide for the control of insect pests of vegetables and field crops	Sunshine (Ghana) Agric Products & Trading Co.Accra
14.	Cypercal 50EC	FRE/0706/00125G July 2007	Cypermethrin (50g/l)	II	Insecticide for the control of pests in cotton	Calli Ghana Company Limited, Tema
15.	Cypertex 10 EC	FRE/0824/00212G November 2008	Cypermethrin (10%)	III	Insecticide for the control of pests in cotton and vegetables	Saro AgroSciences, Accra
16.	Cypex Maxi Smoke Generator	FRE/0902/00259 G March 2009	Cypermethrin (13.5% w/w) + Potassium Chlorate(20% w/w)	II	Insecticide smoke generator for general indoor disinfection	Agrimat Limited, Madina, Accra
17.	Decis 25 EC	FRE/0858/00180G April 2008	Deltamethrin (25.5g/L)	II	Insecticide for the control of insect pests of vegetables	Golden Stork Ghana Limited, Tema
18.	Degesch Plate	FRE/0701/00126R July 2007	Magnesium phosphide (56%)	1b	Insecticide for the control of pests in stored grain.	Wienco Limited, Accra
19.	Delete 2.5 SC	FRE/0752/00117G February 2007	Deltamethrin (2.5%)	III	Insecticide for public health purposes	Newlife Medical Centre, Tamale
20.	Detia Gas Ex-B	FRE/0701/00127R July 2007	Aluminium phosphide (57%)	1b	Insecticide for the control of pests in stored grain.	Wienco Limited, Accra
21.	Diazol 50 EW	FRE/0708/00121G March 2007	Diazinon (500g/l)	II	Insecticide for the control of pests in vegetables	Dizengoff (Ghana) Limited, Accra
22.	Dice 2.5 EC	FRE/0956/00257G March 2009	Deltamethrin (2.5%)	II	Insecticide for control of residual insect pests of dry cocoa beans and other residual insects	Sidalco Limited, Spintex, Accra
23.	Dizen-combi SC	FRE/0708/00412G August 2007	Fenvalerate (10%) + Fenithrothion (20%)	III	Insecticide for the control of insect pests in stored produce	Dizengoff (Ghana) Limited, Accra
24.	Diz-Lambda 2.5 EC	FRE/0908/00252 March 2009	Lambda Cyhalothrin(25g/L)	III	Insecticide for control of pests in vegetables and flowers	Dizengoff Ghana Limited, Accra
25.	Dursban 4 E	FRE/0805/00200G	Chlorpyrifos	II	Insecticide for the	Chemico

		November 2008	(480g/L)		control of scale, borers, in cereals, vegetables ornamentals and for public health purposes	Limited, Accra
26.	Engeo 247 SC	FRE/0806/00156G March 2008	Thiamethoxam (141g/l) + Lambda-cyhalothrin (106g/l)	III	Insecticide for the control of sucking and chewing pests in vegetables	Reiss and Co. Limited, Accra
27.	Evisect S	FRE/0906/00241G January 2009	Thiocyclam Oxalate(500g/kg)	II	Insecticide for the control of leaf miner in oil palm	Calli Ghana Company Limited,Tema
28.	Falcon 10 EC	FRE/0927/00272G March 2009	Cypermethrin (10%)	II	Insecticide for the control of Aphids, Worms and Borers	Multivet Enterprise, Accra
29.	Fast Track 100 SC	FRE/0802/00178G April 2008	Alpha-cypermethrin (100g/l)	II	Insecticide for the control of mosquitoes, cockroaches and other public health pests	Agrimat Limited, Accra
30.	Fendona 5 WP	FRE/0708/00120G March 2007	Alpha-cypermethrin (50g/kg)	III	Insecticide for Public Health Purposes	Dizengoff Limited, Accra
31.	Fenitrothion 50 EC	FRE/0802/00189G November 2008	Fenitrothion (50%)	III	Insecticide for the control of chewing, sucking and boring insects and flies in tropical fruits, cereals, vegetables and animal houses	Agrimat Limited, Accra
32.	Frankocylon 2.5 EC	FRE/0739/00136G July 2007	Lambda-cyhalothrin (2.5%)	II	Insecticide for the control of insect pests in pulses	Frankatson Limited, Accra
33.	Frankofen 20 EC	FRE/0739/00135G July 2007	Fenvalerate (20%)	II	Insecticide for the control of insect pests in cotton, cowpea, soyabeans, vegetables and fruit crops	Frankatson Limited, Accra
34.	Goliath Gel	FRE/0908/00255G March 2009	Fipronil (0.05%)	II	Insecticide for public health purposes	Dizengoff Ghana Limited, Accra
35.	Hockli Combi 40 EC	FRE/0802/00190G November 2008	Fenvalerate (10%) + Fenitrothion (30%)	III	Insecticide for the control of aphids, mites and weevils in cotton, fruits and vegetables	Agrimat Limited, Accra
36.	Icon 10 CS	FRE/0710/00115G February 2007	Lambda-cyhalothrin (100g/l)	III	Insecticide for Public Health purposes	Reiss and Co. Limited, Accra
37.	ICONMAXX	FRE/0810/00221G November 2008	Lambda-cyhalothrin (100g/l)	II	Insecticide for Public Health purposes	Reiss and Co. Limited, Accra

38.	Kilsect 2.5 EC	FRE/0825/00222G November 2008	Lambda-cyhalothrin (25g/l)	II	Insecticide for the control of Insect pests in vegetables	Bentronic Productions, Kumasi
39.	Kombat 2.5 EC	FRE/0924/00267G March 2009	Lambda-Cyhalothrin (2.5%)	II	Insecticide for the control of insect pests in vegetables and pulses	Saro AgroSciences, Accra
40.	K-Otab	FRE/0702/00129G July 2007	Deltamethrin (25%)	II	Insecticide for Public Health purposes	Agrimat Limited, Accra
41.	K-Othrine Moustiquaire SC 1%	FRE/0702/00130G July 2007	Deltamethrin (1% w/w)	III	Insecticide for Public Health purposes	Agrimat Limited, Accra
42.	Kuzithrine 2.5 EC	FRE/0929/00238G January 2009	Lambda-cyhalothrin (25g/l)	II	Insecticide for the control of insect pests in vegetables cowpea, soybean, etc.	Kusiwaa Agrochemicals ,Kumasi
43.	Lambda Super 2.5 EC	FRE/0943/00230G January 2009	Lambda-cyhalothrin (25g/l)	II	Insecticide for the control of Insect pests in vegetables	Kumark Trading Enterprise, Kumasi
44.	Marshal 480 EC	FRE/0805/00205G November 2008	Carbosulfan (480g/l)	II	Insecticide for the control on scale, nematodes and symphylids in pineapples	Chemico Limited, Tema
45.	Mitox 200 EC	FRE/0825/00211G November 2008	Fenvalerate (20%)	II	Insecticide for the control of pests in vegetables	Bentronic Productions, Kumasi
46.	Mosquiron 10 EC	FRE/0708/00141G August 2007	Novaluron (100g/l)	III	Insecticide for Public Health purposes	Dizengoff Ghana Limited, Accra
47.	Mostyn BA 15 ULV	FRE/0801/00181G November 2008	Permethrin (10.8%) + S-Bioallethrin (0.15%) + Piperonyl Butoxide (11.0%)	III	Insecticide for Public Health purposes	Wienco Limited, Accra
48.	Orthene 75 SP	FRE/0806/00153G March 2008	Acephate (75%)	III	Insecticide for the control of insect pests in tobacco and ornamentals	Calli Ghana Company Limited, Tema
49.	Ortho Home Defense Max	FRE/0751/00139G August 2007	Bifenthrin (0.05%)	II	Insecticide for Public Health purposes	Mozart Global Technologies, Accra
50.	Pawa 2.5 EC	FRE/0805/00204G November 2008	Lambda-cyhalothrin (25g/l)	II	Insecticide for the control of pests in cereals, vegetables and ornamentals.	Chemico Limited, Tema
51.	Perfekthion	FRE/0808/00184G November, 2008	Dimethoate (400g/l)	II	Insecticide for the control of sucking insects, biting insects and spider mites	Dizengoff Ghana Limited, Accra
52.	Polygard Kilit Aerosol	FRE/0856/00196G November 2008	D'allethrin (0.06% w/w) + D'tetramethrin (0.135% w/w) + Cypermethrin	III	Insecticide for public health purposes	Evergreen Limited, Kumasi

					produce	
65.	Tanalith C3310	FRE/0932/00271R March 2009	Cupric oxide(11.29%) +Arsenic pentoxide(17.3%) + Chromium trioxide(30.29%)	II	Insecticide for wood treatment	Du Paul Wood Treatment Gh. Limited, Takoradi
66.	Termidor 25 EC	FRE/0908/00251G March 2009	Fipronil(25g/l)	II	Broad spectrum insecticide for control of insects in cabbage, onion, egg plant, maize, and for termite control	Dizengoff Ghana Limited
67.	Trigger 10 CS	FRE/0708/00143G August 2007	Lambda - cyhalothrin (10%)	II	Insecticide for Public Health purposes	Dizengoff (Ghana) Limited, Accra
68.	ULV 600 S	FRE/0714/00133G July 2007	Tetramethrin (6%) + Piperonyl butoxide (10%)	II	Insecticide (fumigant) for the control of pests in stored produce	Afropa (Ghana) Limited, Accra
69.	ULV 810 IC	FRE/0914/00242G January 2009	Pyrethrum (12g/l) +Alpha-cypermethrin (24g/l)	III	Insecticide for the control of flying and crawling insect pests in cocoa stored produce and public health purposes	Afropa (Ghana) Limited, Accra
70.	ULV 900 IC	FRE/0814/00176G November 2008	Pyrethrum (12g/l) +Alpha-cypermethrin (24g/l)	II	Insecticide for the control of flying and crawling insect pests in cocoa beans	Afropa (Ghana) Limited, Accra
71.	Vectoguard 40 WP	FRE/0802/00192G November 2008	Pirimiphos methyl (400g/kg)	III	Insecticide for Public Health purposes	Agrimat Limited, Accra
72.	Wreko 2.5 EC	FRE/0823/00169G April 2008	Lambda-cyhalothrin (2.5%)	II	Insecticide for the control of insect pests of vegetables	Thomhcof Enterprise, Kumasi

A2): Fungicides

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
1.	Athelete 80 WP	FRE/0958/00262G	Fosetyl Aluminium(800g/kg)	III	Fungicide for the control of mildew and phytophtora diseases of vegetables, fruits tree crops and pineapples	Golden Stork Ghana Limited, Tema
2.	Benco 80 WP	FRE/0825/00223G November 2008	Mancozeb(800g/kg)	III	Fungicide for control of leaf spots, mildew, leaf blight and scab in	Bentronic Productions, Kumasi

					vegetables, fruits and ornamentals	
3.	Calliete 80 WP	FRE/080600152G March 2008	Fosetyl aluminium (800g/kg)	III	Systemic fungicide for the control of phytophtora diseases in pineapple	Calli Ghana Company Limited, Tema
4.	Callis 400 OL	FRE/0806/00144G March 2008	Thiophanate methyl (400g/l)	III	Fungicide for the control of yellow and black sigatoka in bananas	Calli Ghana Company Limited, Tema
5.	Carbendazim 50 WP	FRE/0802/00195G November 2008	Carbendazim (500g/kg)	III	Fungicide for the control of diseases in mangoes, pineapples and vegetables	Agrimat Limited, Accra
6.	Champion 80 WP	FRE/0705/00124G July 2007	Copper Hydroxide (77%)	III	Fungicide for control of diseases in cocoa and coffee	Chemico Limited, Tema
7.	Creosote Substitute	FRE/0831/00210G November 2008	Dichlofluanid (3.96g/l)	IV	Fungicide and algaecide for wood preservation	TM3, Accra
8.	Dithane M45	FRE/0805/00198G November 2008	Mancozeb (800g/kg)	III	Fungicide for the control of leaf spots, mildew, leaf blight and scab in vegetables and mango	Chemico Limited, Tema
9.	Foko 80% WP	FRE/0823/00165G April 2008	Mancozeb (800g/kg)	III	Fungicide for the control of fungal diseases of vegetables	Thomhcof Enterprise, Kumasi
10.	Fungukill 80WP	FRE/0905/00260G March 2009	Copper(35%) + Metalaxyl(15%)	III	Fungicide for the control of brown rot in cocoa	Chemico Limited, Tema
11.	Funguran-OH 50WP	FRE/0708/00128G July 2007	Copper Hydroxide (77%)	III	Fungicide for control of cocoa diseases.	Dizengoff Ghana Limited, Accra
12.	Ivory 80WP	FRE/0806/00150G March 2008	Mancozeb (800g/kg)	III	Protective fungicide for the control of diseases in pineapple, rubber and vegetables	Calli Ghana Company Limited, Tema
13.	Kadmaneb	FRE/0833/00209G November 2008	Maneb (800g/kg)	III	Fungicide for the control of leaf spots, mildew, leaf blight, and scab in vegetables	Adu & Yeboah Enterprise, Kumasi
14.	Kilazeb 80 WP	FRE/0843/00229G	Mancozeb (800g/kg)	III	Fungicide for the control of leaf	Kumark Trading

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		November 2008			spots, mildew, leaf blight, and scab in vegetables,fruits, ornamentals and field crops	Enterprise, Kumasi
15.	Kocide 2000	FRE/0906/00245G January 2009	Cupric hydroxide (53.8%)	III	Fungicide for the control of cocoa diseases	Reiss and Company Limited, Accra

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
16.	Metalm 72 WP	FRE/0916/00261G	Metalaxyl(12%) + Copper oxide(60%)	III	Fungicide for control of black pod disease in cocoa	Kurama Company Limited, Accra
17.	Nordox Super 75 WP	FRE/0701/00131G July 2007	Cuprous Oxide (86.2%)	III	Fungicide for control of diseases in cocoa and coffee.	Wienco (Ghana) Limited, Accra
18.	Nordox 75 WP	FRE/0701/00112G January 2007	Cuprous Oxide (86%)	III	Fungicide for control of diseases in cocoa and coffee	Wienco (Ghana) Limited, Accra
19.	Ridomil Gold 66 Plus WP	FRE/0701/00123G July 2007	Metalaxyl-M (6%) + Cuprous oxide (60%)	III	Fungicide for control of cocoa diseases	Wienco (Ghana) Limited, Accra
20.	Suncozeb 80 WP	FRE/0857/00220G November, 2008	Mancozeb (800g/kg)	III	Fungicide for control of leaf spots, mildew, leaf blight, and scab diseases in vegetables, fruits and ornamentals	Sunshine (Ghana) Agric Products & Trading Co., Accra
21.	Tilt	FRE/0806/00146G March 2008	Propiconazole (250g/l)	III	Fungicide for the control of fungal diseases in banana	Calli Ghana Company Limited, Tema
22.	Trimangol 80 WP	FRE/0805/00197G November 2008	Maneb (80%)	III	Fungicide for the control of leaf spots, downy mildew, fruit rots in cereals, vegetables and ornamentals	Chemico Limited, Tema
23.	Victory 72 WP	FRE/0908/00253G March 2009	Metalaxyl(8%) + Mancozeb(64%)	III	Systemic fungicide for the control of blight and rots in vegetables and pineapple	Dizengoff Ghana Limited, Accra

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A3: Herbicides

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
1.	Ado Wura SL	FRE/0962/00274G March 2009	Glyphosate(41% w/w)	III	Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables	North Gate Agrochemicals, Techiman
2.	Adom 480 SL	FRE/0954/00243G January 2009	Glyphosate (480g/l)	III	Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables	Jakess Agro Company Ltd, Kumasi
3.	Agil 100EC	FRE/0808/00162G April 2008	Propaquizafop (100g/l)	III	Herbicide for the control of grasses	Dizengoff Ghana Limited, Accra
4.	Agristomp 500 E	FRE/0802/00194G November 2008	Pendimethalin(500 g/l)	III	Herbicide for the control of pre-emergence weeds in maize, rice, cotton and soybean	Agrimat Limited, Accra
5.	Alligator 400 EC	FRE/0858/00161G April 2008	Pendimethalin(400 g/l)	II	Herbicide for control of grasses and weeds in rice	Golden Stork Ghana Limited, Tema
6.	Basagran 480 SL	FRE/0808/00183G November, 2008	(Bentazon 480g/l)	II	Herbicide for the control of broadleaf weeds, nutsedges in beans, groundnut and maize	Dizengoff Ghana Limited, Accra
7.	Basta 200 SL	FRE/0958/00264G March 2009	Glufosinate Ammonium(200g/l)	II	Herbicide for the control of narrow and broad leaf weeds in banana	Golden Stork Ghana Limited, Tema
8.	Bextra - 72% SL	FRE/0825/0022G November, 2008	2,4 D Amine (720g/l)	II	Selective herbicide for the control of broadleaf weeds in maize, rice and sorghum	Bentronics Productions, Kumasi
9.	Chemosate 360 SL	FRE/0705/00114G February 2007	Glyphosate (360g/l)	III	Herbicide for the control of annual and perennial weeds in cereals	Chemico Limited, Tema
10.	Chemovar 80 WP	FRE/0805/00208G November 2008	Bromacil (800g/kg)	III	Selective herbicide for the control of annual and perennial grasses and broadleaf weeds in pineapples	Chemico Limited, Tema
11.	Chemuron 80 WP	FRE/0805/00207G November 2008	Diuron(80%)	III	Herbicide for the control of grass weeds in pineapples, avocados, citrus and mangoes	Chemico Limited, Tema

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No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
12.	Diuron 80 WP	FRE/0802/00191G November 2008	Diuron (82.5% w/w)	III	Herbicide for the control of weeds in sugarcane and cotton	Agrimat Limited, Accra
13.	Fusilade Forte	FRE/0806/00148G March 2008	Fluazifop-p-butyl (150g/l)	III	Selective herbicide for the control of annual and perennial grasses in broadleaf crops	Calli Ghana Company Limited, Tema
14.	Gallant Super	FRE/0805/00203G November 2008	Haloxyfop (108g/l)	III	Post emergence herbicide for the control of broadleaf weeds in vegetables	Chemico Limited, Tema
15.	Garlon 2	FRE/0805/00202G November 2008	Triclopyr (240g/l)	III	Herbicide for the control of annual and perennial weeds and grasses	Chemico Limited, Tema
16.	Garlon 4	FRE/0805/00201G November 2008	Triclopyr (480g/l)	III	Herbicide for the control of woody planst and broad Leaf weeds in oil palm and pastures	Chemico Limited, Tema
17.	Gramoxone Super	FRE/0806/00149R March 2008	Paraquat (200g/l)	II	Contact herbicide for the control of grasses and other weeds	Calli Ghana Company Limited, Tema
18.	Glycel 41% SL	FRE/0910/00248G January 2009	Glyphosate (41%)	III	Non-selective herbicide for the control of annual and perennial broad leaf weeds and grasses	Reiss and Company Limited, Accra
19.	Glycot 41% SL	FRE/0958/00236G January 2009	Glyphosate (41%)	III	Herbicide for control of annual and perennial weedscereals and vegetables	Afcott Ghana Limited, Kumasi
20.	Glygold	FRE/0753/00118G February 2007	Glyphosate (41%)	III	Herbicide for control of annual and perennial weeds	L'espoir Company Limited, Accra
21.	Glyphader 75 SG	FRE/0858/00158G April 2008	Glyphosate (680g/kg)	III	Herbicide for the control of emerged annual and perennial broad leaved weeds, sedges and grasses	Golden Stork Ghana Limited, Tema

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
22.	Glyphader 480 SL	FRE/0858/00159G April 2008	Glyphosate (480g/l)	III	Herbicide for the control of emerged annual and perennial broad leaved weeds, sedges and grasses	Golden Stork Ghana Limited, Tema
23.	Glyphos 41% SL	FRE/0802/00174G April 2008	Glyphosate (41%)	III	Herbicide for control of annual and perennial broad leaved weeds and	Agrimat Limited, Accra

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					grasses	
24.	Gramoquat Super	FRE/0943/00246G January 2009	Paraquat (20%)	II	Contact herbicide for the control of grasses and other weeds	Kumark Trading Enterprise, Kumasi
25.	Herbextra	FRE/0943/00247G January 2009	2,4-D Amine (720g/l)	II	Selective herbicide for the control of broadleaf weeds in rice, maize, sorghum, millet and sugarcane	Kumark Trading Enterprise, Kumasi
26.	Komanda 41% SC	FRE/0827/00163G April 2008	Glyphosate (41%)	III	Herbicide for the control of annual and perennial broadleaved weeds and grasses	Multivet, Accra
27.	Kamaxone 20 SL	FRE/0935/00233R January 2009	Paraquat (200g/l)	III	Herbicide for the control of annual and perennial broadleaved weeds and grasses	K. Badu Agrochemicals, Kumasi
28.	Kamocel 41% SL	FRE/0929/00237G January 2009	Glyphosate (41%)	III	Foliar acting herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetable	Kusiwaa Agrochemicals, Kumasi
29.	Kalach Extra 70SG	FRE/0806/00155G March 2008	Glyphosate (700g/kg)	III	Herbicide for the control of deep rooted annual, biannual, perennial grasses and broad-leaved weeds	Calli Ghana Company Limited, Tema
30.	Kalach 360 SL	FRE/0806/00157 March 2008	Glyphosate (360g/l)	III	Herbicide for control of annual and perennial broad leaf weeds and grasses	Calli Ghana Company Limited, Tema
31.	Kum Nnwura	FRE/0725/00116G February 2007	Glyphosate (360g/l)	III	Herbicide for the control of annual and perennial grasses and broadleaved weeds	Bentronic Productions, Kumasi
32.	Kwatriqua 276 SL	FRE/0802/00175R April 2008	Paraquat (276g/l)	II	Herbicide for the control of grasses and broadleaved weeds	Agrimat Limited, Accra

No.	**Trade Name**	**Registration No. / Date of Issue**	**Concentration of Active Ingredient**	**Hazard Class**	**Crops/Uses**	**Company**
33.	Londax 60 DF	FRE/0706/00134G July 2007	Bensulfuron methyl (60%)	III	Herbicide for the control of broadleaf and grass weeds in rice	Calli Ghana Company Limited, Tema
34.	Osagyefo 72 SL	FRE/0823/00166G April 2008	2,4-D Amine (720g/l)	III	Herbicide for the control of broadleaved weeds	Thomhcof Enterprise, Kumasi
35.	Ogyatanaa 41% SL	FRE/0935/00232G January 2009	Glyphosate (41%)	III	Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables	K. Badu Agrochemicals,Kumasi

36.	Power 41% SL	FRE/0945/00234G January 2009	Glyphosate (41%)	III	Herbicide for the control of annual, perennial grasses and broadleaf weeds in cereals and vegetables	J. K. Duku Enterprise , Kumasi
37.	Propanil 36 EC	FRE/0802/00188G November 2008	Propanil (35% w/w)	III	Herbicide for the control of grasses and weeds in rice	Agrimat Limited, Accra
38.	Ristar 435 EC	FRE/0806/00213G November 2008	Propanil (260g/l) + 2 ,4 D-Isoctyl ester (175g/l)	II	Selective herbicide for the control of annual and perennial grasses and broadleaf weeds in rice	Calli Ghana Company Limited, Tema
39.	Rondo 48 SL	FRE/0734/00113G January 2007	Glyphosate (41%)	III	Herbicide for the control of annual and perennial weeds in cereals	C. Woermann Ghana Limited, Accra
40.	Round Up 360 SL	FRE/0708/00132G July 2007	Glyphosate (360g/l)	III	Herbicide for the control of annual and perennial broad leaf weeds and grasses	Dizengoff (Ghana) Limited, Accra
41.	Roundup 450 Turbo	FRE/0808/00173G April 2008	Glyphosate (450g/l)	III	Herbicide for the control of annual and perennial broadleaved weeds and grasses	Dizengoff Ghana Limited, Accra
42.	Sarosate 360 SL	FRE/0924/00269G March 2009	Glyphosate (360g/l)	III	Herbicide for the control of annual and perennial broad leaf weeds and grasses	Saro AgroSciences Co., Kumasi
43.	Select 720 SL	FRE/0924/00244G January 2009	2,4-D Amine (720g/l)	II	Selective herbicide the control of broadleaf weeds in rice, millet, maize, sorghum and sugarcane	Saro AgroSciences Co., Kumasi
44.	Sharp 480 SL	FRE/0843/0022G November 2008	Glyphosate (480g/l)	III	Herbicide for the control of annual and perennial grasses and broadleaved weeds in cereals and vegetables	Kumark Trading Enterprise, Kumasi

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
45.	So Far SL	FRE/0755/00138G August 2007	Glyphosate (41%)	III	Herbicide for the control of annual and perennial grasses and broad leaf weeds	Adu and Yeboah Agrochem Limited, Kumasi
46.	Stam F34	FRE/0805/00199G November 2008	Propanil (360g/l)	II	Herbicide for the control of post emergent annual weeds in rice	Chemico Limited, Tema
47.	Stomp 500 E	FRE/0808/00186G November, 2008	Pendimethalin (500g/l)	II	Herbicide for the control of broadleaf weeds and grasses in maize, cotton and	Dizengoff Ghana Limited,

					tomatoes	Accra
48.	Sun-2,4 D Amine 72% SL	FRE/0857/00215G November 2008	2,4 D Amine (720g/l)	II	Selective herbicide for post emergence weed control in rice, maize and sorghum	Sunshine (Ghana) Agric Products & Trading Co., Limited, Accra
49.	Sunphosate 360 SL	FRE/0857/00214G November 2008	Glyphosate (360g/l)	III	Non-selective systemic herbicide for control of annual and perennial grasses and broadleaf weeds in cereals and vegetables	Sunshine (Ghana) Agric Products & Trading Co., Limited, Accra
50.	Supersate 41% SC	FRE/0817/00164G April 2008	Glyphosate (41%)	III	Herbicide for the control of annual and perennial grasses and broadleaved weeds	Julius and Adu Trading Enterprise, Kumasi
51.	Supraxone 200 SC	FRE/0858/00160R April 2008	Paraquat (200g/l)	II	Herbicide for the control of annual and perennial broad leaved weeds and grasses	Golden Stork Ghana Limited, Tema
52.	Tempra 80 WP	FRE/0806/00151G March 2008	Diuron (800g/kg)	III	Herbicide for the control of a wide variety of annual and perennial broadleaf and grassy weeds	Calli Ghana Company Limited, Tema
53.	Thomabest Super 200 SL	FRE/0823/00167R April 2008	Paraquat (200g/l)	II	Herbicide for the control of grasses and broadleaved weeds	Thomhcof Enterprise, Kumasi
54.	Touch down	FRE/0960/00258G March 2009	Glyphosate (41%)	III	Herbicide for the control of annual and perennial broad leaf weeds and grasses	Liyank Trading Enterprise, Kumasi
55.	Uproot 360 SL	FRE/0924/00268G March 2009	Glyphosate (360g/l)	III	Herbicide for the control of annual and perennial broad leaf weeds and grasses	Saro AgroSciences Co., Kumasi

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
56.	Weedmasta 41% SL	FRE/0857/00170G April 2008	Glyphosate (41%)	III	Herbicide for the control of annual and perennial broad leaf weeds and grasses	Obek Agro Services, Suame-Kumasi
57.	Winner 41% SL	FRE/0823/00168G April 2008	Glyphosate (41%)	III	Herbicide for the control of annual and perennial broadleaved weeds and grasses	Thomhcof Enterprise, Kumasi

(A4): OTHERS (Rodenticides, Desiccants, Growth Regulators and Biocides)

No.	Trade Name	Registration No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company

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1.	Boni Rat Pasta	FRE/0908/00254G March 2009	Difenacoum (0.005%)	I	Rodenticide for the control of rodents	Dizengoff Ghana Limited, Accra
2.	Callel 5% PA	FRE/0906/00240G January 2009	Ethephon(5%)	III	Plant Growth regulator for degreening pineapple	Calli Ghana Company Limited, Tema
3.	Raccumin	FRE/0961/00266G	Coumatetralyl(0.03	III	Rodenticide for the	Huge

No.	Trade Name	Provisional Clearance Permit No. / Date of Issue	Concentration of Active Ingredient	Hazard Class	Crops/Uses	Company
1.	Atrazina 500 SC	PCL/0902/00136G January 2009	Atrazine (500g/l)	III	Herbicide for the control of annual perennial grass and broadleaf weeds	Agrimat Limited, Madina-Accra
2.	Atraxine 50 SC	PCL/0960/00142G January 2009	Atrazine (50%)	III	Contact herbicide for the control of grasses and other weeds	Chinese Woman Agrochemicals, Kumasi
3.	Atrazine Super 80 WP	PCL/0902/00137G January 2009	Atrazine (800g/kg)	III	Herbicide for the control of annual, perennial grass and broadleaf weeds	Agrimat Limited, Madina-Accra
4.	Atrazine 80 WP	PCL/0905/00130G January 2009	Atrazine (800g/kg)	III	Herbicide for the control of annual perennial grass weeds in maize, sorghum, pineapples etc	Chemico Limited, Tema
5.	Atrazine 500 SC	PCL/0905/00129G January 2009	Atrazine (500g/l)	III	Herbicide for the control of annual perennial grass weeds in maize, sorghum, pineapples etc.	Chemico Limited Tema
6.	Atrazila 80 WP	PCL/0843/00154G January 2009	Atrazine (800g/kg)	III	Herbicide for the control of broadleaved weeds and annual grasses	Kumark Trading Enterprise, Kumasi
7.	Atrazila 500 SC	PCL/0943/00153G January 2009	Atrazine (500g/l)	III	Herbicide for the control of broadleaved weeds and grasses	Kumark Trading Enterprise, Kumasi
8.	Balton 2, 4 D Amine SL	PCL/0908/00155G March 2009	2, 4 D Amine(720g/l)	II	Selective herbicide for post emergence weed control in rice, maize and sorghum	Dizengoff Ghana Limited, Accra
9.	Bellazine 500 SC	PCL/0905/00131G January 2009	Atrazine (250g/l) + Cyanazine (250g/l)	III	Herbicide for the control of annual perennial grass weeds in maize, sorghum, pineapples etc	Chemico Limited, Tema
10.	Cotraxine 500 SC	PCL/0958/00143G January 2009	Atrazine (500g/l)	III	Herbicide for the control of annual, perennial grass and broadleaf weeds	Afcott Ghana Limited, Kumasi
11.	Dragon 24 SC	PCL/0959/00133R January 2009	Paraquat (24%w/w)	II	Herbicide for the control of annual, perennial grass and broadleaf weeds	West Africa Cotton Company Limited Accra
12.	Gramafast	PCL/0960/00141G	Paraquat (20%)	II	Contact herbicide for	Chinese

	Super 20 SL	January 2009			the control of grasses and other weeds	Woman Agrochem., Kumasi
13.	Kb Super Traz 500 SC	PCL/0935/00135G January 2009	Atrazine (500g/l)	III	Herbicide for the control of annual, perennial grass and broadleaf weeds	K. Badu Agrochemicals, Kumasi
14.	Sun-Atrazine 80 WP	PCL/0957/00148G January 2009	Atrazine (800g/kg)	III	Herbicide for control of broadleaves and annual grasses	Sunshine Agric. Products&

(C) BANNED PESTICIDES

1. 2,4,5-T and its salts and esters
2. Aldrin
3. Binapacryl
4. Captafol
5. Chlordane
6. Chlordimeform
7. Chlorobenzilate
8. DDT
9. Dieldrin
10. Dinoseb and its salts and esters
11. Dinitro-*ortho*-cresol (DNOC) and its salts (such as ammonium salt, potassium salt and sodium salt)
12. Endrin
13. HCH (mixed isomers)
14. Heptachlor
15. Hexachlorobenzene
16. Parathion
17. Pentachlorophenol and its salts and esters
18. Toxaphene
19. Mirex
20. Methamidophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
21. Methyl-parathion (emulsifiable concentrates (EC) with at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient)
22. Monocrotophos (Soluble liquid formulations of the substance that exceed 600 g active ingredient/l)
23. Parathion (all formulations - aerosols, dustable powder (DP), emulsifiable concentrate (EC), granules (GR) and wettable powders (WP) - of this substance are included, except capsule suspensions (CS))
24. Phosphamidon (Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)
25. Dustable powder formulations containing a combination of Benomyl at or above 7%, Carbofuran at or above 10% and Thiram at or above 15%

Legend to Register of Pesticides

Full registration certificate (3 years)	The Agency may approve and register a pesticide subject to such other conditions as it may determine and may only register a pesticide if it is satisfied that the pesticide is safe and effective for the use for which it is intended and that the pesticide has been tested for efficacy and safety under local conditions (Section 8, Part II of Act 490)
Provisional clearance permit (Maximum of 1 year)	Where in respect of an application for registration of a pesticide, the Agency is satisfied that most information required for its registration has been provided to the Agency, and the pesticide does not present a toxicological risk to people, animals, crops or the environment, it may clear the pesticide for use without the registration, and this clearance shall be known as provisional clearance and shall be temporary pending the registration by the Agency of the pesticide (Section 9, Part II of Act 490)
Experimental permit	The Agency may authorise the importation of unregistered pesticide if the pesticide is imported for experimental or research purposes and not for distribution Section 2, (1), (a), (i).
General use pesticides (G)	Pesticides when applied for the use for which it is registered will not have unreasonable adverse effects on people, animals, crops or on the environment (Section 5, Part II of Act 490)
Restricted use pesticides (R)	Pesticide when used in accordance with widespread commonly recognized practice in the absence of additional regulatory restrictions may cause unreasonable adverse effect on people, animals, crops or on the environment (section 6, Part II of Act 490). Such pesticides are restricted for use on only selected crops by competent pesticide applicators and should be sold by dealers licensed to handle restricted pesticides
Banned Pesticides	Pesticide when used in accordance with widespread commonly recognized practice even in the presence of additional regulatory restrictions will cause unreasonable adverse effect on people, animals, crops or on the environment. Such pesticides are prohibited for use in the country.

ANNEX 2 REPORTS ON CONSULTATIVE WORKSHOP WITH STAKEHOLDERS

REPORT ON PUBLIC SECTOR CONSULTATIVE WORKSHOP WITH STAKEHOLDERS FOR THE SUSTAINABLE LAND AND WATER MANGEMENT (SLWM) WORKSHOP FOR MDA'S AND NGO'S ON THE 4TH OF MAY, 2010, BOLGATANGA.

Invitation and Attendance List

Invitation List Participants (MDA'S and NGO'S)

MINISTRY,DEPT, AGENCY (MDA'S) & NGO's	NO. OF PARTICIPANTS	REMARKS
District Planning Officers	8	Builsa, Bawku-West, Bolgatanga, Kassena-Nankana West
District Coordinating Directors (DCD)	8	Builsa, Bawku-West, Bolgatanga, Kassena-Nankana West
Regional Planning Coordinating Unit (RPCU)	1	Bolga
Regional Coordinating Council (RCC)	4	Bolga
Wildlife Division	3	Bolga, Gbele, Mole
White Volta Basin Office	1	Bolga
MOFA	11	3 Regional Directors and 8 District heads
Forestry Services Division (FSD)	3	Bolga, Wa, Tamale
GNADO	1	Kassena-Nankana West
ZOVFA	1	Bawku-West
TRAX	1	Bolgatanga Municipality
Total	**42**	

ATTENDANCE LIST

D.	NAME	INSTITUTION	ADDRESS	DISTRICT/ MUNICIPALITY	E-MAIL/PHONE NO.
	Hon. Mark Wayongo	Regional Minister	Box 50, Bolga	Bolgatanga	--
	Isaac C. Acquah	EPA	Box M326, Accra	Accra	iacquah@epafna.org
	Julius Awaegra	GNADO	Box 55, Paga	Kassena-Nankana West	Gnado2009@hotmail.com
	Samuel Abaane Anaba	The Enquirer	Box 94, Bolga	Bolgatanga	Sammyanaba#@jyahoo.com
	Musah Lansah	Style Radio	Box 595, Bolga	Bolgatanga	alikjl@yahoo.com
	Akolgo Ayamdo	EPA, Bolga	Box 80, Bolga	Bolgatanga	0245716803
	Mukasa Zoogah	Talensi-Nabdam District Assembly	Box 576, Bolga	Talensi-Nabdam	0208288666
	Jibriel A. Ustayz	Kassena-Nankana West District Assembly	Box 1, Paga	Kassena-Nankana West	0278541969
	S. M. Billey	Bawku West District Assembly	Box1, Zebilla	Bawku West	0244021907
	Mohaw Issahaku	Builsa District Ass.	Box 3, Sandema	Builsa	0244154842
	Abukari alhassan	Ghana Broad. Corporation	Box , Bolga	Bolga	07223066
	Zenabu Wasai-King	EPA	Box 80, Bolga	Bolga	
	Owiredu Gideon	MOFA	Box , Tongo	Talensi-Nabdam	Owiredobi2005@yahoo.com
	Dr. Nicholas Kilddi	MEST	Box M232, Accra		micholasiddi@yahoo.com
	Henry Aryeetey	Energy Commission	PM6, Ministries, Accra		Henry.aryeetey@guel.com
	Delah Nutsukpo	MOFA	Box M37, Accra		delahNusukpo@hotmail.com
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	Osman Gyasi	World Bank	Accra		kgyasi@worldbank.org
	Asher Nkegbe	EPA	Box 179, Wa	Wa West	ashernkegbe@yahoo.com
	Abu Iddrisu	EPA	Box 620, Tamale	Northern Region	Abu5552001@yahoo.com
	John Naada	Wildlife Division	Bolga	Bolgatanga	jnaadamajam@hotmail.com
	Nana Owusu-Ansah	Wildlife Division	Gbele	Tumu	Naowu74@yahoo.uk
	Bukari Yahaya	Green Sahara	Tumu	Sissala	mohammedbalu@yahoo.com
	Jacob Kahanda	Wildlife Division	Bolga	Bolgatanga	jacobkahanda@yahoo.com
	Kazaare Francis	Forest Service. Division	Bolga	Bolgatanga	0209739476
	Steve Ampofo	EPA	Bolga	Bolgatanga	0244521359
	Yussif Sulemana	MOFA	Zabilla	BawkuWest	0244131653
	D. Umaru Farouk	Mole Nat. Park	Damongo	West Gonja	0244779389
	Omanhene, K. Boateng	EPA	Box 80, Bolga	Bolgatanga	Boatkb2003@yahoo.com
	Tongye Lawrence	Builsa District Assembly	Box 3, Sandema	Builsa	0243668268
	Andrew Kyei Agyane	Wildlife Division	Accra	Accra	0208888100
D.	**NAME**	**INSTITUTION**	**ADDRESS**	**DISTRICT/**	**E-MAIL/PHONE NO.**

				MUNICIPALITY	
	Nuh K. Yousif	Wa West District Assembly	Wechian	Wa West	0207180601
	Adam Habib	- do -	Wechian	- do -	0248940704
	Kwasi Wili	MOFA	Wa	Wa	kwasiwili@yahoo.com 0208294487
	Enoch Asare	W R C	Accra	Greater Accra	enochasare@hotmail.com 0272888499
	Edward Aleti	Daily Despatch	Box , Bolga	Bolgatanga	0246724902
	Karl-Zange	New Punch	Box , Bolga	Bolgatanga	0250764
	Ernest Aayel	TRAX	Box , Bolga	Bolgatanga	0208815415
	Pius Dumda	Forest Services Division	Box , Bolga	Wa	0208094123
	Abraham Diwunie	GTV	Box , Bolga	Bolgatanga	0244764096
	David Naab	GTV	Box , Bolga	Bolgatanga	0244948918
	Abdulai Issaka	Metro TV	Box , Bolga	Bolgatanga	0249689788
	Khassim Medjida	RCC	Box 50, Bolga	Bolgatanga	0208416547
	Afia Afrifa	GBC	Box , Bolga	Bolgatanga	0242124247
).	NAME	INSTITUTION	ADDRESS	DISTRICT/ MUNICIPALITY	E-MAIL/PHONE NO.
	Alhandu Hamid	Daily Graphic	Box , Bolga	Bolgatanga	0208544214
	Issifu Salifu	West Mamprusi Dist. Assembly	Box 6, Walewale	West Mamprusi	sbagarialuki@yahoo.com
	Salifu Yidna	- do -	- do -	- do -	--
	A. W. A. Bila	Bawku West Dist. Assembly	Box 1, Zebilla	Bawku West	billaahmedd@yahoo.com
	Joan Atulley	Water Res. Com.	Box 489, Bolga	Bolgatanga	joantigbuna@yahoo.com
	Gyebi Samuel Aboagye	Radio A1	Box , Bolga	Bolgatanga	deatrode@vocwmail.com
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	Saliatu Yakubu	MOFA,	Box 2, Sandema	Builsa	0207094219
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	Samuel Akapule	G N A	Box 14, Bolga	Bolgatanga	0205778786
	Ibrahim A. M.	Ghanaian Times	Box 49, Bolga	Bolgatanga	0205679046
	Frank Alormene	EPA	Box 80, Bolga	Bolgatanga	falormene@yahoo.com
	Eben Jab	Forest Serv. Div.	Box , Tamale	Tamale Metro.	edjagbleete@yahoo.com
	Clement Anaba	E P A	Box 80, Bolga	Bolgatanga	0276898498
	Asariga, William	E P A	Box 80, Bolga	Bolgatanga	0209656747
	Gilbert Nuuri-Teg	R C C	Box 50, Bolga	Bolgatanga	07222414

1.0 INTRODUCTION

The consultative workshop held for both private and public sector stakeholder agencies was held to review the project programmes and solicit inputs of these relevant organisations. The meeting started at about 9.30 am with an opening prayer, followed by self introduction by participants. The chairman for the occasion was Mr. Enoch Asare, Head of the Ground water Division of the Water Resources Commission (WRC).

In his welcome and Keynote address, the Upper East Regional Minister, Hon. Mark Woyongo stated that the Region was the youngest in the country and needed platforms of this kind to showcase its numerous challenges. He stressed that the workshop is very essential because of the fact that the region is located close to the Sahara Desert and is under the threat of desertification. He noted that the numerous environmental challenges have a very devastating effect n the livelihood of the people of the region.

He therefore added that the SLWM project implementation will not only provide a comprehensive approach to land management but also go a long way to provide sources of investment and development to our people. He therefore charged all involved in the implementation of the project to ensure the success of the project. Lastly he informed participants that government has started a Greening Ghana Project where each of the 9 districts in the region is to engage 300 acres of afforestation resulting in about 2700 acres of land being greened. The programme would engage the services of about 2700 people to manage at least an acre of tree planted.

2.0 PRESENTATIONS

There was two blocks of presentations by the resource persons drawn for the Ministry of Environment, Science and Technology (MEST), Forestry Services Division (FSD) of the Forestry Commission (FC), Environmental Protection Agency (EPA), Crop Services Directorate of MOFA, and the World Bank. The presentations highlighted the project areas, activities, structures for implementation, safeguards, etc.

2.1 OVERVIEW OF FIRST PRESENTATIONS

The first block of presentations was on the following topics;

1. Overview of the sustainable land and water management project and activities under agricultural lands by Mr. I.C. Acquah, EPA- Accra.
2. Activities under the wildlife corridors by Yaw Kwakye, Forestry Commission, Accra

Discussion of presentation (Questions & comments)

Issue 1: What is to be done under this project on awareness creation, establishment of byelaws on bushfire control and management?
Issue 2: There is the need for incorporation of local expert knowledge (LEK) in project design and implementation.
Issue 3: There is the need for the design of a communication strategy
Issue 4: Is there a provision for a gender component to address the issue of gender in Northern Ghana.
Issue 5: Provision of water, access roads and tracks and housing for staff for the Gbele reserve
Issue 6: How is the project going to collaborate with District Assembly's on the issue of mining in reserves and protected areas?
Issue 7: Watering points usually provided for wildlife under such products usually become baiting and trapping points for hunters
Issue 8: How would the project address conflict management in resource use among various stakeholders?

Responses

1. Awareness creation is cardinal to the success of the project especially at the communities and the 8 districts involved in the three (3) northern regions.

2. Local people would be involved in the planning and implementation of the project, dialogue would be the process of engagement.

3. The project also recognises the enormous roles that should be played by NGO's to ensure successful implementation.

4. SLWM like all other environmental management projects aims at incorporating gender related in the project issues; it was not mentioned because of the time frame for the presentations. A gender action plan is being developed under GEMP for implementation

5. Issues of wildlife conservation are guaranteed

6. Use of watering points as baits to hunt is a very serious issue and all must be involved to curb the menace. Watering points are so useful and need to be provided to this wildlife moving within the corridor.

7. The project is a preparatory project in spatial planning for water shed management.

2.2 OVERVIEW OF SECOND PRESENTATIONS

The second block of presentations was on the following topics;

1. Environmental issues and World Bank safeguard policy (s) by Steve- World bank.

2. Mitigation of negative social and environmental impacts by Dr. Nicholas Iddi, MEST, Accra

Discussion of presentation (Questions & comments)

Issue 1: Why is extensive mono-cropping an issue with the World Bank, is it the scale or the continuous nature that is the issue? The intensity should be the matter for consideration.
Issue 2: How are some of the interventions going to be sustained after the project implementation phase?
Issue 3: What is the mandatory distance for cropping along a river bank?
Issue 4: Why is the project going in for solar pumps, MOFA has already acquired some diesel pumps?
Issue 5: How does the issue of involuntary resettlement arise in the context of this project?
Issue 6: Can the project offer capacity building on conflict resolution for organisations in the project implementation area?
Issue 7: would land acquisitions be made? How would affected farmers who may lose their land be dealt with under this project?

2.3 GROUP WORK

The group work was done to collect basic information from the various districts in their capacity in terms of equipments, collaborators, resources and human resource capacity for implementation of the project. Groups were formed for the various participating districts assembly's with its decentralised departments.

2.4 NORTHERN REGION

3.1.1 West Mamprusi District

1. Equipments and staff capacity

MOFA	**FORESTRY**
• 29 staff (16 AEAs and 13 other staff)	• 20 staff (1 manager and 3 technical officers and 9 guards). The rest are support staff.
LOGISTICAL BASE • Office accommodation,	LOGISTICAL BASE • Office building,

• Logistics – Pick Up, • 5 serviceable motorbikes, • 4 unserviceable motorbikes, • 2 GPS machines, • 3 computers and 1 multi-purpose printer but 1 computer is not functioning. • Internet connectivity	• Tractor, • Pick Up, • Measuring tapes, • Compasses, • Surveying equipment, • 3 motorbikes, • Nursery for seedling Production, • Nursery equipment. • Computers • 9 bicycles

MOLE	**DWST**
• 200 staff • 1 motorbike • 1 landcruiser • Computer and Accessories	• 3 staff members (1 technical officer and two field staff) • office space , • 2 weak motorbikes, • 2 computers and accessories

2. Agriculture extension approach

- Modified T & V (Training and Visit) system of extension.
- Contact Group/Individual Farmer Approach
- Other information dissemination methods are:
  - Mass Media approach
  - Demonstrations
  - Focus Groups

3. List of projects in the District/About to take off

- Ghana Environmental Management Project
- Natural Resource and Environmental Governance – NREG.
- National Forestry Plantation Development Project- NFPDP - Tree Plantations
- EU Jatropha Project
- JICA Rice Project

- RICE Sub-sector Support Project
- Drylands Project
- CBRDP NRM Project
- Rural Safety Net Project
- MiDA
- Northern Rural Growth Programme
- NORPREP
- ITFC
- JICA
- CIDA – DWAP
- WFP
- WVG
- ZAGSILARI Ecological Farms Project
- PROCESS
- NEWENERGY
- CAHRA BIISI FARA
- NEA Project
- NEINFOUND
- AID

4. CBO's active In Agric.

- ZAGSILARI Ecological Farms Project
- ITFC
- CHARA BIISI FARI
- WVG
- PROCESS

5. Commercial Organistions

- ITFC–Mangoes production for export
- YARA–Fertilizer trade

2.5 UPPER EAST REGION

2.5.1 Builsa District

1. **Staff strength**

MOFA staff

Category	No.
Professional	5
Sub-professional	2
Technical officers	17
Tech assistants	4
Other supporting staff	6
Total	**34**

Forestry staff

3 staff

2. **Agriculture extension approach**

- Farm /home visits(Individual contacts and group contacts)
- On farm demonstrations
- Field days
- Trainings

3. **List of projects in the District/About to take off**

- LEAP
- MASLOC
- DA PROFESION OF SOCIAL SERVCICES
- FORESTERY PLANTATION
- NYEP
- RURAL ENTERPRISE PROJECT
- RURAL ELECTRIFICATION

- LIVESTOCK DEVELOPMENT PROJECT(LDP)
- RICE SECTOR SUPPORT PROJECT (RSSP)
- VOLUNTARY SERVICES ORGANIZATION
- NORTHERN RURAL GROWTH PROJECT
- GHANA ENVIRONMENTAL MGT PROJECT (GEMP)

4. List Of NGO's

- Presby Agric
- SEND-Ghana
- Care International
- BUCO Bank

5. Equipments

MOFA	FORESTRY
• 12 MOTORBIKES • MEASURING INSTRUMENTS • COMPUTER AND ACCESSORIES • 2 PICK UPS (OLD) • 10 WATER PUMPING MACHINES • STAFF ACCOMMODATION • PRINTER • FAX MACHINE • PHOTOCOPIER	• 1 MOTOR BIKE • WATER TANK • NUSERY • STAFF ACCOMMODATION

2.5.2 Talensi- Nabdam District

1. Staff strength

MOFA STAFF; 28 **EQUIPMENTS**: 1 Computer

1 Photocopier 1 pick-up truck 5 Motor bikes

2. Agriculture extension approach

- Credit in kind
- Field & home visits
- On farm demonstrations
- Adaptive trials through research
- Use of indigenous knowledge

3. List Of NGO's

- World Vision International
- Action Aid
- VSO
- TIPCEE
- Widows and Orphans Ministry
- Technoserve
- TRAX

3.2.3 Bawku-West District

1. Staff strength & Equipments

MOFA staff : 26	FORESTRY staff:3
Equipments 10 motor bikes 1 old pick-up 1 computer and accessories 1 photocopier	

Equipment needs: Equipments for measuring fields- GPS	

2. Agriculture extension approach

- Field and home visits
- On-farm demonstrations
- Farmer training
- Adaptive trials through research (SARI)
- Use of indigenous knowledge

3. Input support

- Water pumps for dry season farming
- Seeds and fertiliser
- Irrigation
- Individual/farmer groups/FBO's

4. List of projects in the District/About to take off

- NRGP
- Oncho-Transborder project

5. List Of NGO's

- Technoserve
- BACH

- ZOVFA

3.2.4 Kassena-Nankana West District

1. Staff strength

MOFA	Forestry	WILDLIFE
Inadequate Agric extension agents	District Manager: 1 Service officer: 1 Rangers Supervisors: 2 Forest guards: -	Rangers: 2

2. Equipments & Logistics

- Pick-up truck
- Motor bikes
- Bicycles
- Wellington boots
- Rain coats
- ITN
- First Aid Box
- Rural radios
- Lanterns
- Solar lamps
- Handset/wireless

3. Agriculture extension approach

- Field and home visits
- On farm demonstrations
- Individual farmers and farmer groups

- Field day

4. List of projects in the District/About to take off

- CBRDP
- DWAP
- LEAP
- World Food Programme
- GEMP

5. NGO"S & CBO's active In Agric.

- Gia/ Nabio Agroforestry Development Organisation (GNADO)
- Calabash Foundation
- Afrikids
- SWOPA
- World Vision

6. Additional information

Communities along river banks;

- Nakong
- Katiu
- Kayoro
- Sirigu
- Mirigu
- Wuru
- Nakolo
- Kazugu
- Nabogu
- Kajelo

Degraded areas;

- North zone
- East zone
- Parts of the east zone

Flood prone areas;

- Kandiga
- Mirigu
- Sirigu
- Kayoro
- Parts of paga
- Navio
- Nakolo
- Batiu
- Kayilo
- Parts of Chiana

2.6 UPPER WEST REGION

1.0 Staff strength

District	MOFA-DADU	Gbele
Sissala East District	14	38
Sissala West District	-	
Nadowli	18	
WA west	16	

NB.: Gbele Reserve covers Sissala East & West, Wa East, Nadowli districts

2.0 Equipments & Logistics

District	MOFA-DADU	Gbele

Sissala East District	Motorbikes- 9 Computers- 1 Printer - 1	Motor Vehicle - 1 GPS – 11 Tractor – 1 Computers – 2 Printer- 1 Fax Machine- 1
Sissala West District	-	
Nadowli	-	
WA west	-	

3.0 Agriculture extension approach

- Individual and group extension
- Durbars
- Videos
- Farmer meetings
- Radio
- Demonstrations
- Extension through NGO's

Types of support

- Technical support /advice
- Watering for community animals (Gbele)
- Extension

4.0 NGO"S & CBO's active In Agric.

- Action Aid
- Plan Ghana
- TUDRIDEP
- Green Sahara
- World Vision
- RAAP
- Nature Conservation Research Centre (NCRC)- Wechiau

CBO's;

- Dupari Integrated Wildlife project
- Fian Community forest reserve
- Sissala Farmers associstion
- Zukpuri Intl. Wildlife project
- Community Resource Management Committee (20)

5.0 List of projects in the District/About to take off

- Block farming
- NRGP
- GEMP
- N"azara Ariziki (WIENCO)

ENVIRONMENTAL PROTECTION AGENCY (EPA), UPPER EAST REGION

A REPORT ON GHANA SUSTAINABLE LAND & WATER MANAGEMENT (SLWM) PROJECT: COMMUNITY CONSULTATIVE WORKSHOP WITH STAKEHOLDERS HELD ON WEDNESDAY, 5TH MAY 2010 AT SSNIT CONFERENCE HALL, BOLGATANGA

Invitation List

DISTRICT	COMMUNITY	NO. OF PARTICIPANTS	REMARKS
BAWKU-WEST DISTRICT	Zongoyiri	1	
	Bazua	1	
	Kusanaba	1	
	Sapeliga	1	
	Binaba	1	
TALENSI –NABDAM DISTRICT	Nangodi	1	
	Numou	1	
	Datoko	1	
	Pwalugu	1	
KASSENA -NANKANA WEST DISTRICT	Kayoro	1	
	Nakong	1	
	Katiu	1	
	Wuru	1	
BUILSA DISTRICT	Siniensi	1	
	Fumbisi	1	
	Doninga	1	
	Wiasi	1	
MAMPRUSI WEST	Yagaba	1	
	Manga	1	
	Karimenga	1	
SISSALA- EAST	District Assembly	1	
	Duwie	1	
	Gbele	1	
SISSALA- WEST	District Assembly		
	TOTAL	**26**	

Attendance List

NO.	NAME	COMMUNITY/ INSTITUTION	ADDRESS	DISTRICT	E-MAIL/PHONE NO.
1.	James Abanka	Fumbisi	Builsa Dist. Assembly	Builsa	0249287615
2.	Esther amoabil	Wiesi	Builsa Dist. Assembly	Builsa	0246288444
3.	Ajuik William	Doninga	Builsa Dist. Ass.	Builsa	-
4.	Asana Atanga	Kalimiang	Azaksa House	West Mamprusi	0249766707

5.	Anaba Moses	Kusanaba	Kusnaba Chief	Bawku West	0249397131
6.	Chimsi Adam	Yagaba	Yagaba Chimsi House	West Mamprusi	0207155224
7.	Abdul Razak	Yama	Takora House	West Mamprusi	-
8.	Mohammed Al-Gadafi	Gbelle,	Box 99, Sissala West	Sissala West	0245672521
9.	Bukari Yahaya	Duwie (GSO)	Box TM 109	Sissala West	0243553207
10.	Victoria Azukwari	Kassena-Nankana West Dist. Assembly	Box 1, Paga	Kassena-Nankana West	0244436327
11.	Ali Kwabalugu	Sissala East Dist. Assembly	Box 12, Sissala East	Sissala East	Akwash75@yahoo.com 0248666147
12.	Steve Ampofo	EPA	Box 80, Bolga	Bolgatanga	steveampofo@yahoo.co.uk
13.	Atanga Maxwell	EPA	Box 80, Bolga	Bolgatanga	maxwellatanga@yahoo.co.uk
14.	Frank Alormene	EPA	Box 80, Bolga	Bolgatanga	falormene@yahoo.com
15.	John Akeliba	W F	Sapelliga Chief's House	Bawku West	0243565467
16.	Asariga, William	EPA	Box 80, Bolga	Bolgatanga	0209656747
17.	Akolgo Ayamdo	EPA	Box 80, Bolga	Bolgatanga	0245716803
18.	Oliver atibila	Pwalugu	Box 680, Bolga	Talensi-Nabdam	0248086722
19.	Pwomebam k. Frank	Kayoro-Balia	Kayoro J H S	Kassena-Nankana West	0208498304
20.	Musah Lansah	Style Radio	Box 595, Bolga	Bolgatanga	0546803128/0279621506
21.	Pe Oscar B. T. Yiamu II	Regional House of Chiefs (RHOC)	Box 27, Paga	Kassena-Nankana West	0244780849
22.	Charles Abu	Kayoro	Box 27, Paga	Kassena-Nankana West	0207389905
23.	Bukari J. Badazabra	Pusu-Namongo	GCCL Box 145, Bolga	Talensi-Nabdam	0243905536/0265669463
24.	Kpelem Nyanuba	Pusu-Namongo	GCCL Box 145, Bolga	Talensi-Nabdam	0208471658
25.	Andrew Kye Agyore	Wildlife Division	Box MB 239, Accra	Greater Accra	0208471658
26.	Isaac G. Wibonto	Gwolla	Box 99, Gwolla	Sissata West	0208550651/0245710790
NO.	**NAME**	**COMMUNITY/ INSTITUTION**	**ADDRESS**	**DISTRICT**	**E-MAIL/PHONE NO.**
27.	Omanhene, K. Boateng	EPA	Box 80, Bolga	Bolgatanga	Boatkb2003@yahoo.com 0244222941
28.	Yaw Kwakye	Forestry Commission	Box 527, Accra	Accra	0244769874
29.	Henry Yamgah	Nangodi	Box 1, Tongo	Talensi-Nabdam	0243362633
30.	Zenabu Wasai-King	EPA	Box 80, Bolga	Bolgatanga	0244577909
31.	Pe J. B. Afragachie II	Nakong	Chief's Palace	Kassena-Nankana West	0249551758
32.	E. R. Ameange	Nakong	Chief's Palace	Kassena-Nankana West	0547348216
33.	Charles Kaba	Katiu	Chief's Palace	Kassena-Nankana West	0248765279
34.	Abogbila Akolgo	Balungo	Chief's Palace	Talensi-Nabdam	0249582531
35.	Clement Anaba	EPA	Box 80, Bolga	Bolgatanga	0276898498
36.	Ayine Agana	EPA	Box 80, Bolga	Bolgatanga	-
37.	Patience Kpining	Send Ghana	Box 194, Bolga	Bolgatanga	0244986323

38.	Peter Ataya	Bawku-Kobole	Box 8, Zebilla	Bawku West	-
39.	Issac Hamadu	Bawku-Tilli	Box 8, Zebilla	Bawku West	-

1.0 INTRODUCTION

The programme began at 9.30 a.m. with an opening prayer said by Hon. Victoria Azukwari, an Assembly Lady of Kayoro community in the Kassena-Nankana West district in the Upper East Region.

This was followed by self introduction of participating members present from eight (8) selected communities which fall under the core target of the project.

Madam Zenabu Wasai-King, the Regional Director of the Environmental Protection Agency (EPA), Upper East Region gave an overview of the prioritized intention of the project and why such communities were considered as beneficiaries for the implementation of the project. She also introduced Enoch Asare (Water Resources Commission - Accra) to the Chair the proceedings of the day.

Mr. Enoch Asare gracefully accepted and appreciated such an honour given him as Chairman of the occasion.

2.0 PRESENTATIONS

The various presentations which were made by technical persons or facilitators concerning the project were as follows:-

(a) Overview of the Sustainable Land and Water Management (SLWM) Project and presentation of activities under Agricultural Lands – by Mr. Delali Nutsukpor (Ministry of Food and Agriculture (MOFA)- Accra).

(b) Presentation of activities under the Wildlife Corridors – by Andrew Kyei Agyare (Wildlife Division – Accra).

(c) Presentation of Environmental as well as Social Issues and Mitigation of Negative Potential Project Impacts by Dr. Iddi from the Ministry of Environment and Science (MES)

3.0 OPEN DISCUSSIONS

In the process of open discussions, the issues, concerns and suggestions which came from the participants were as follows:

- The need to integrate sacred groves into wildlife management;

- The need to introduce trees with economic value that would provide direct economic benefits to the communities instead of growing trees that would otherwise force farmers into forfeiting their farm lands for the establishment of reserves;

- The necessity to embark more on vigorous sensitization exercises about some bad human activities such as bushfires which could destroy the prime goal of the project within a single day.

- The need to ensure strict enforcement of existing environmental laws and by-laws to defer recalcitrant persons from engaging in such activities;

- The need to encourage Assembly Members to organize community durbars to serve as platforms for interactions and dialogue among community members on issues that have adverse impacts on their environment.

- The need to curb the activities of Fulani Herdsmen, local cattle owners, mining, roads construction and other activities that result into rapid environmental degradations;

- The need to give financial incentives to CREMA Leaders to boost their spirit and morale in the management of the community resources.

- The need to provide impartial mechanisms for the resolution of conflicts among members. This is because of the possibility of occurrence of conflict of interest among members in the same community. For instance, the situation where some members may agree on a particular decision while others may oppose it. This situation in the view of participants could bring about misunderstanding among members which may eventually lead into disunity among them and might thwart the efforts to effectively implement, manage and achieve the main objectives of the project.

4.0 RESPONSES

The responses which were provided to some of the issues and concerns raised by participants included the following:-

- With regards to the issue of integrating sacred groves into wildlife management, participants were informed that sacred groves will certainly be integrated because they also form part of the target areas which need protection. It is however important for community members to note that a lot will have to come from they themselves to ensure a successful management of the resources put under their care;

- It has been part of the objectives of the project to ensuring that opportunities and benefits exist for effective implementation and achievement of the set goals project. The implementation of the project will also ensure that local food security is not compromised;

- Also, there would be enough monetary inflow to ensure a successful and effective implementation of activities of the project so that the cardinal objectives of the project could be achieved. Financial support will however, be subjected to constant monitoring of beneficiary communities project activities and their results.

- The formation of Community Resource Management Areas (CREMA) leaders or committees would also help entrust the responsibility of taking care of resources in the project beneficiary communities. They would be responsible for determining how they want to use or share the benefits of the resources;

- Moreover, Assembly Members and their various communities would be encouraged to constantly organize durbars to serve as platforms for deliberations of issues affecting them;

- The issue of Fulani herdsmen and other local cattle owners activities could also be resolved by dialogue among themselves and framing of workable by-laws within communities;

- Besides, road contractors who do not make efforts to do land refilling after closure of projects should be reported to the necessary agencies;

However, Madam Zenabu Wasai-King of EPA added her voice by indicating that these contractors although stand to be blamed, part of it also comes from some of the local

authorities and communities. Sometimes, the road contractors do not go to the necessary laid procedures to acquire environmental permits but rather, illegally negotiate with the local authorities to dig any where they want for gravel and sand which eventually poses serious threat to the environment.

At times, some of the communities even propose to them that the pits/dugouts should be left to serve as watering points for their farm animals which are very unfortunate. This is therefore the more reason why CREMA has been proposed to be another effective form of environmental management alternative under this project.

5.0 CLOSING

The chairman in his closing remarks, emphasized that it should be noted clearly that this project is not to serve as a panacea of all the environmental problems we have been facing but rather, to assist in minimizing these challenges in the three (3) Northern Regions. The programme came to an end at 1.30 p.m. with a vote of thanks given by Madam Zenabu Wasai-King, EPA Regional Director in the Upper East Region.

ANNEX 3 ENVIRONMENTALLY SENSITIVE/CRITICAL AREA

NB: *Projects sited in these areas could have significant effects on the environment and the EPA could require a more stringent environmental assessment*
All areas declared by law as national parks, watershed reserves, forest reserves, wildlife reserves and sanctuaries including sacred groves
Areas with potential tourist value
Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna)
Areas of unique historic, religious, cultural, archeological, scientific or educational interest
Areas which provide space, food, and materials for people practicing a traditional style of life
Areas prone to disaster (geological hazards, floods, rainstorms, earthquakes, landslides, volcanic activity etc)
Areas prone to bushfires
Areas classified as prime agricultural areas
Recharge areas of aquifers
Water bodies characterized by one or any combination of the following conditions: Tapped for domestic purposes Within controlled/ protected areas Which support wildlife and fishery activities
Mangrove areas characterized by one or any combination of the following conditions: With primary pristine and dense growth Adjoining mouth of major river system Near or adjacent to traditional fishing grounds Which acts as natural buffers against shore erosion, strong winds and storm floods
Estuaries and lagoons
Other coastal areas of ecological, fisheries or tourism importance or which are subject to dynamic change
Wetlands
Rivers
Areas of high population density

ANNEX 4: CRITERIA FOR ENVIRONMENTAL SCREENING OF SUB-PROJECTS TO BE USED BY COMMUNITIES AND ASSISTED BY TAS

Impact area	Impact issue	Impact description	Yes	No	Don't Know
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			
	Low groundwater yields	Do you know of lowering groundwater levels in local/ neighbouring boreholes			
	Groundwater vulnerability to pollution	Is the local water table high			
	Natural contamination of groundwater	Do you know of high chloride, iron, manganese or fluoride levels in local/ neighbouring wells			
	Increased erosion risks	Do you have road drains in the community			
	Surface water quality	Is there a local stream in your community (less than 15 min walk)			
		Does it flow throughout the year			
	Vulnerability of groundwater to nitrate pollution	Are you a livestock rearing community			
	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			
Social and cultural conditions	Health and well- being	Is there any HIV- AIDS education groups in your community			
	Gender	Are there any women groups in your community			
	Gender	Is there a woman leader in any group			
	Work for local people	Are there local people available to provide unskilled labour			
	Community participation	Has there been any community projects previously			
	Access of poor to water	Will all sections of the community be able to pay for use of water			
		Will the project enhance access of poor people to water supply			

ANNEX 5: EPA REGISTRATION FORM, 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 6: GUIDE FOR COMPLETING AN ENVIRONMENTAL ASSESSMENT REGISTRATION FORM

GUIDE FOR COMPLETING AN ENVIRONMENTAL ASSESSMENT REGISTRATION FORM

The Environmental Assessment Registration form is designed to provide enough information to enable the EPA to set an appropriate level of assessment for a proposal referred to it. Failure to provide detailed information in a comprehensive manner may delay the assessment process. It is not expected that this form will be appropriate for all purposes and, depending on your proposal, a lengthier document may be necessary in addition to this form.

PROPOSAL

A simple brief description of the proposal or proposed undertaking is required and must include: input processes, end results, output quantities and timing. Please include flow diagram if available.

LOCATION

A map site plan is essential.

It should indicate the geographic coordinate of site (Longitude and Latitude), elevation and slope of the site, any nearby areas or features of environmental significance (e.g. proposed or declared reserves, water courses, wetlands), and adjacent land uses, including the nearest homes or areas zones residential.

SERVICES

Details of water supply, storm water drainage, power corridors, access to and impact on roads and transport can all be of significant and should be noted where relevant.

ENVIRONMENTAL IMPACT

Criteria for assessing a project and setting a level of assessment are:

1. The character of the receiving environment
2. The potential impact of the proposal
3. Resilience of the environment to cope with change
4. Confidence of predicting impact
5. Plans, policies or other procedures which provide ways to manage potential environmental impact
6. The input of other statutory decision-making bodies
7. Degree of public interest

The following potential environmental impacts may be relevant:

- Effects on geomorphology, land stability and landscape
- Effects on drainage and water quality (surface and ground)
- Effects on biota

- Effects on access and transport systems
- Effects on existing services including power, water, and telephone
- Effects on existing community facilities
- Effects on existing contingencies plans for safety and emergency services
- Effects of emission (gas, dust, noise and heat)
- Management of solid and fluid wastes and storm water
- Impact on adjacent land uses including any conservation and recreation aspects
- Impact of construction and operational activities
- Visual impact
- Social impact

Proponents would be required to pay appropriate processing and permit fees in accordance with the Environmental Assessment (Amendment) Regulations. 2002 (LI 1703)

Any false information provided constitutes an offence under the Environmental Assessment Regulations. 199, LI 1652 (section 29d)

Annex 7: LIMITED ENVIROMENTAL ASSESSMENT (LEA) FORM

Note: This form must be completed for sub project that may pose minor environmental problems. The form must be filled by designated Environmental Officer and form part of sub project application.

Sub project Name: …….
Location (Village, Ward, LGA)……..
Type of sub project: ……...
Number of people benefiting the sub project: ……
General Description of the sub project:-

Sub project objectives:
……..……
……..……
……

Sub project components:
……..……
……
……
……
……

Baseline Description of affected Environment

Description of physical chemical environment (soil, air, water,etc.)
……
……
……

Description of Biological Environment (habitats and Communities, Flora etc):
……
……
……
……
……

Description of Socio-economic Environment e.g. historical sites, aesthetic aspects, public health, infrastructure
……
……
……Identification of Negative Environmental Impacts

Impacts in the physical-chemical environment (soil, water, water
……
……
……

Impact on the Biological Environment (Flora, habitats and communities etc.)

……
……
……
……
……
Impacts on the Socio-economic Environment (Historical, sites, aesthetic, public health, infrastructure etc)
……
……
……

Mitigation Measures

Description of Impact Mitigation Measures
……
……
……
……
……..
……
……..
……

Report prepared by:

Name: …….
Position: ……..

Signature: ……

Date: ……

Approved by:

Name: …….

Position: ……..

Signature: ……

Date: ……

Annex 8: CHECKLISTS FOR IMPACT ASSESSMENT STUDY

This is basic and mandatory for all new undertakings.

Ecological impact assessment

1. The general character of the existing site in terms of fauna and flora; landscape and geological features, lakes, creeks, march, mangroves, coral, forest and bush, and aesthetics.

2. In that event, an ecological inventory of at least the most prominent and common species with major plant and animal habitats, particularly habitats critical to the preservation of threatened endangered species. The geographical relationship of species on the sites.

3. Artificial features of the site as existing, such as roads, railways, buildings and other facilities relating current uses to the local ecology: agricultural activities.

4. The present use of the area by natural history societies, youth groups, birdwatchers, etc.

5. Land Use: Intensive and casual, full time and seasonal, actual and projected, specially designated areas (marine sanctuaries, coral reefs, recreational beaches or seashores, parks, refuges, reservations, wilderness), man-made features.

6. Outstanding individuals such as the oldest or largest of the trees; rare or uncommon species, races variants, and population; unique or scarce habitats. Communities threatened or endangered.

7. Plants or animals that could affect public health or safety: allergenic plants, poisonous and venomous species, pest or might expand dramatically if the immediate environment were change.

8. The possible effects of the proposed undertaking on land species (plants and animals); on aquatic species (fauna, fish, coral); on habitats; on the aesthetics of the site; on natural resources such as soil, geological formations, dunes, beaches, lakes forest including the possible effects of noise.

9. Primary and secondary impacts, temporary and long-term, unavoidable impacts and risks; synergism; transboundary effects; possible irreversible changes.

10. The possible mitigation of effects by technical, or financial measures, by redesigning.
11. The existing and likely future amenity of the neighbourhood.

12. The implications of clear felling or selective logging for timber and other forest products; the effects of road-building, drainage of wet areas, and the

skidding hauling and yarding of logs; the possibility of replacement by monoculture plantations; the danger of forest fragmentation causing genetic isolation of animal populations.

13. Other related developments in the area, which might have a cumulative ecological impact.

Environmental health impact assessment

1. Aspects of the proposed development, which might present adverse risks to the health and well-being of the community, either near or far, in the short term either directly or indirectly; or any particularly vulnerable section of the community (the young, the old, the disadvantaged, the sick, females, ethnic minorities).

2. Emissions from the proposed development that might have a detrimental effect on the quality of air or water to the detriment of human beings either directly, or indirectly through the food chain; an inventory of pollutants with details of the handling or dispersal of these.

3. The risks of contamination of land from leachates or the dumping or storage of toxic materials; risk of contamination of aquifers.

4. Solid waste from the development and their management; possible dust and grit from waste piles; disposal area, vehicles, roads, ad-tipping operation.

5. The levels of noise blast and vibration that may occur, during the day, night, or weekend.

6. Odours likely to emanate at various times from various processes and disposal practices.

7. The risks and hazards of the activity: fire explosion, sudden harmful fumes, major spills of toxic materials within the plant or on the roads, radiation, failures of safety systems, effects of sustained temperature inversions in the atmosphere, failure of flares, unexpected discharges of toxic materials such as dioxins, chain reactions, failure of treatment plants, asbestos risks, sewage discharge, floods, failure of emergency procedures.

8. Possible synergistic effects of several pollutants reacting together.

9. Possible promotion of vector breeding such as flies or mosquitoes; the effects of water resource development.

10. The effect on workers at home who are exposed to detrimental conditions at both work and home, such as air pollution and odours.

11. The overall effects of the project on the health of neighbouring communities.

Hazard and risk impact assessment

1. Emergency services and response.

2. The choice of the location for the project, in particular the proximity of dwellings, other centres of employment, other vulnerable facilities such as schools and hospitals, and storage areas for inflammable and explosive materials.

3. Any proposed buffer zones, and any other planning restrictions.

4. The location of chemical and hazardous waste storage areas, process areas where hazardous materials are used, equipment-fuelling areas, routes of pipelines carrying dangerous materials, electrical equipment, and transmission lines.

5. The location and nature of wastewater treatment plant and air pollution control equipment; the disposal of their sludge and solids.

6. The risks of component, vessels, or system failure through material failure, leakage, corrosion, stress, explosion, breakdown, excessive pressure, fire, uncontrolled reactions, vibration, shock, collision, incorrect operation, inadequate design, lack of back-up and duplication of controls, inadequate monitoring; the risks of a boiling liquid expanding vapour explosion (BLEVE), or unconfined vapour cloud explosion (UVCE).

7. Compliance with all standards for the storage, moment, and use of dangerous goods; poisons and environmentally hazardous chemicals legislation; occupational health criteria; and probable license conditions.

8. The history of similar plant at other locations about safety and the lessons learnt.

9. The disposal of all wastes, with clear identification; recycling

10. Emergency measures, plans, and procedures.

11. Periodic review of safety measures and monitoring results; arrangements for independent audit.

12. Laboratory facilities; sampling and testing.

13. Management and operational controls; hazards procedures manual; fines and penalties.

14. Training of staff and allocation of duties.

Noise impact assessment

1. Identification of sources of noise from the proposed development and the prospective noise levels in dB or dBA. This step takes account of every piece of equipment, vehicle, operation, and activity on the site. The prospective noise levels should be correlated to distance, with emphasis upon noise levels beyond the site boundaries varying of the surrounding area about noise.

2. Description and measurement of existing noise levels, their incidence and characteristics, particularly during the day and hours of darkness; the background level. The history of the surrounding area about noise.

3. Noise standards and criteria; acceptability of noise according to the nature of the surrounding area such as agricultural, open space, commercial, industrial, or residential.

4. The predicted noise levels in relation to (2) and (3) and their acceptability in this locality, or alternative localities; the characteristics of the noise(s) emitted and their incidence over time.

Social impact assessment

1. Changes in circumstance, which are likely to result in social discontent, unhappiness, increased illness, and a loss of productivity, leading to loss of income.

2. Housing; concern is the ability to (a) provide workforce, (b) service new development and (c) absorb and adjust to growth (worker/family in-migration).

3. The consequences of the severance of communities by the project, both physical and psychological.

4. The effects of the project on general lifestyle of the people.

5. The effects of the project on group relationships.

6. The effects of the project on cultural life.

7. The effects of the project social tranquillity and attitudes and values.

8. Assessment of the services and infrastructure required by the new development and those required to ensure social sustainability; likely financial and other contributions by the developer.

9. The likely effect of the proposed development on neighbourhood property values by, for example, interfering with views and amenities, or introducing streams of noisy traffic.

10. The potential loss of ecological assets such as bush land, wetlands, rainforest, distinctive geological features, fauna and flora, mangrove, swamp, lakes and creeks, forest, and recreational areas and facilities, and natural areas, all of value to people.

11. The volume of traffic likely to be generated by the project, particularly heavy vehicles; the implications for community noise, parking, and congestion and for the safety of drivers and pedestrians, particularly children, the elderly, the physically disadvantaged.
12. The effect of the project in displacing low-income people and other disadvantaged people.

13. The effects on public transport, open space, community facilities such as childcare and youth centres, pedestrian access, and roads.

14. The implications of the development for social policy.

15. The implication for aesthetics, amenities and ecology at site and elsewhere; landscaping.

16. Potential damage to, or destruction of, archaeological, or historical sites.

17. Implications for sacred and cultural sites.

18. Implications of construction, of site preparation, access road, and other supporting infrastructure.

19. The housing of the construction workforce.

20. Housing for the permanent workforce.

21. Clearing of debris after construction and restoration of vegetation as well as site rehabilitation.

22. Risk and hazards of major structures.

23. The implications for employment and local industry.

24. The implications for training and the provision of highly skilled workforce.

25. Contribution to local infrastructure development and social facilities.

Water quality impact assessment

1. The characteristics of the water resources at risk: rivers, tributaries, lakes, streams, creeks, aquifers and aquifer recharge areas; the topography and ecological characteristics; seasonal and annual flows; rainfall and run-off; storage facilities; and other features.

2. Use of the present water resources: domestic, commercial, and industrial, agricultural or recreational.

3. Existing waste discharges and run-offs, which may be detrimental to existing water quality; remedial measures already adopted or planned.

4. The history of pollution or misuse of water resources; the incidence, for example, or eutrophication, or acidification; and any evidence of events detrimental to the health, safety, welfare or property of persons, or harmful to animals, aquatic life, birds, or fish.

5. Identified sources of waste discharges from the proposed project after all measures of waste minimisation, recycling, treatment, dilution, pounding, filtering, or otherwise, have been adopted.

6. The likely effects of soil disturbance during the construction phase and, subsequently, mitigation measures to be adopted.

7. The likely effects of run-off from surfaces, sealed and unsealed; mitigation measures to be adopted.

8. The likely effects under conditions of drought and flood.

9. The significance of the likely emissions, discharges, and run-offs particularly for state regulations, standards and classifications, and environmental objectives; the total ecological, chemical, and physical effects, and salinisation. Specific pollutants by toxic substances, minerals, metals, sludges, oil, pesticides, radioactive substances, acids, alkalis, intractable wastes, processing effluents, sewage effluents, phosphorus and nitrogen, suspended and dissolved solids, the likely biochemical oxygen demand (BOD) and chemical oxygen demand (COD).

10. The likely effects on fish, wildlife, communities, and vegetation.

11. The possible effects of the project on water flows, depths and widths of channels, erosion of banks, deposition rates (upstream and downstream), and turbulence.

12. The implications for other water users; existing and prospective.

13. The economic and social effects of prospective changes in watercourses, water quantity, and water quality for the wider community.

Air quality impact assessment:

Air pollutants include

- carbon dioxide,
- dioxins, furans, carcinogens,
- radiation
- oxides of sulphur, oxides of nitrogen,
- grit and dust, smoke, haze,
- odours and mercaptans
- carbon monoxide,
- CFCs, halogens (halons), fluorides
- Vapours, hydrocarbons,
- PCBs and other residual intractables.

The air quality assessment may involve complex mathematical modelling, wind turbine analysis or prediction calculations.

1. Description of the existing air quality levels. Identification of air pollutants by source; weight and volume of discharge; and by other characteristics

2. Variations of the emissions and other secondary reactions such as ozone and peroxyacetyl nitrate (PAN) on the existing air quality.

3. Meteorological characteristics diurnal, seasonal, and annual with particular reference or attention to wind direction and speeds, temperature inversions, incidence, type and depth; variations in turbulence, both vertical and horizontal. Data relating to abnormal meteorological events years should be commented.

4. Capacity of the atmosphere for the dispersal of pollutants to a harmless degree.

5. Comparison with EPA air quality standards, which should be achieved by the proponent in the short, medium and long term.

6. The modelling of the dispersal of pollutants in the context of the actual meteorological characteristics of the site, diurnal, seasonal, and annual; and taking account of abnormal meteorological conditions and any adverse topographical features.

Proposed Mitigation Measures

1. Details of mitigation measures to be adopted by the undertaking.

2. Contributions by the proponent to improving the health, social, and recreational facilities of the immediate locality.

3. The routeing of vehicles and trucks into and out of the proposed installation; the risk to life and limb of moving heavy trucks through the immediate communities.

4. The proposed use of techniques to minimise hazards and risks, for example, the use bunds (screens), sand-covered storage tanks, drip trays or barriers; indicators and alarms; leak detection systems; ground-water monitoring; soil testing; automatic diversion systems; storm water controls; secondary containment arrangement; clear identification of chemicals.

5. Mitigation measures to be adopted for the undertaking, with particular attention to the noisiest activities. The use of less noisy equipment and practices, the positioning of equipment and buildings, the noise-proofing of buildings, the erection of screens and sound barriers, the management of traffic noise, restrictions on working hours or the operational hours of certain equipment.

Annex 9: SUMMARY OF WORLD BANK ENVIRONMENTAL AND SOCIAL SAFEGUARD POLICIES

Environmental Assessment (OP 4.01)

Outlines Bank policy and procedures for the environmental assessment of Bank lending operations. The Bank undertaked environmental screening of each proposed project to determine the appropriate extent and type of EA process. This environmental process will apply to all sub-projects under the GEF-SLWM Project.

Natural Habitats (OP 4.04)

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that the overall benefits from the projects substantially outweigh the environmental costs. If the environmental assessment indicates that a project would significantly convert or degrade natural habitats, the project should include mitigation measures to the Bank. Such mitigation measures include, as appropriate, minimizing habitat loss (e.g. strategic habitat retention and post-development restoration) and establishing and maintaining an ecologically similar protected area. The Bank accepts other forms of mitigation measures only when they are technically justified.

Pest Management (OP 4.09)

The policy supports safe, effective and environmentally sound pest management. It promotes the use of biological and environmental control methods. An assessment is made for the capacity of the country's regulatory framework and institution to promote and support safe, effective, and environmentally sound pest management.

Involuntary Resettlement (OP 4.12)

The World Bank's safeguard policy on involuntary resettlement, OP 4.12, (December 2001) is to be complied with where involuntary resettlement, impacts on livelihoods, acquisition of land or restrictions to natural resources, may take place as a result of the project. It includes requirements that:

- Involuntary resettlement should be avoided where feasible, or minimised, exploring all viable alternative project designs.
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
- Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

Indigenous People (OD 4.20)

This directive provides guideline to ensure that indigenous peoples benefit from development projects, and to avoid or mitigate adverse effects of Bank-financed development projects on indigenous peoples

Project on International Waterways (O 7.50)

This policy applies to the following types of projects:

- hydroelectric, irrigation, flood control, navigation, drainage, water and sewerage, industrial, and similar projects that involve the use or potential pollution of international waterways
- detailed design and engineering studies of the above mentioned projects including those to be carried out by the Bank as executing agency or in any other capacity.

Projects on international waterways may affect relations between the Bank and its borrowers and between states (whether members of the Bank or not). The Bank recognizes that the cooperation and goodwill of riparians is essential for the efficient use and protection of the waterway. Therefore, it attaches great importance to riparians' making appropriate agreements or arrangements for these purposes for the entire waterway or any part thereof. The Bank stands ready to assist riparians in achieving this end. In cases where differences remain unresolved between the state proposing the project (beneficiary state) and the other riparians, prior to financing the project the Bank normally urges the beneficiary state to offer to negotiate in good faith with the other riparians to reach appropriate agreements or arrangements.

The Bank ensures that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity. If such a project is proposed, the Bank requires the beneficiary state, if it has not already done so, formally to notify the other riparians of the pro-posed project and its Project Details If the prospective borrower indicates to the Bank that it does not wish to give notification, normally the Bank itself does so. If the borrower also objects to the Bank's doing so, the Bank discontinues processing of the project. The executive directors concerned are informed of these developments and any further steps taken.

The Bank ascertains whether the riparians have entered into agreements or arrangements or have established any institutional framework for the international waterway concerned. In the latter case, the Bank ascertains the scope of the institution's activities and functions and the status of its involvement in the proposed project, bearing in mind the possible need for notifying the institution. Following notification, if the other riparians raise objections to the proposed project, the Bank in appropriate cases may appoint one or more independent experts to examine the issues in accordance with. Should the Bank decide to proceed with the project despite the objections of the other riparians, the Bank informs them of its decision.

Disputed Areas (OP/BP/GP 7.60)

Project in disputed areas may occur in the Bank and its member countries as well as between the borrower and one or more neighbouring countries. Any dispute over an area in which a proposed project is located requires formal procedures at the earliest possible stage. The Bank attempts to acquire assurance that it may proceed with the project in disputed area if the

governments concerned agree that, pending the settlement of the dispute, the project proposed can go forward without prejudice to claims of the country having a dispute. This policy is not expected to be triggered by the sub-projects.

Bank's Policy on Disclosure (BP17.50)

The Bank's policy on disclosure currently under review requires that all the people residing in the given areas of a project have the right to be informed of the proposed development project. Prior to project appraisal therefore, the summary of the study of the development action along with other relevant information should be disclosed to or at the level of the Bank and the project area.

ANNEX 10 DESCRIPTION OF SPILLWAY DYKES

When designing water impoundment structures for wildlife management areas, several basic principles must be borne in mind:

a) water must not necessarily be fully impounded; rather the flow down the waterway must be slowed down, as humidifying the drainage below the impoundment structure so that green pastures are produced during the dry season might be just as important as creating a larger body of water (depending upon the situation at each site, the trench may or may not be required to be sealed into the impervious layers of the waterway;

b) the impoundment structure should be inserted into the habitat as "naturally" as possible with cement and metal as little in sight as possible; this may not seem important right now, but as game viewing tourism activities are developed, the pertinence will become more obvious;

c) construction methods at water impoundment and ravine/gully crossing sites should optimise labour intensive methods, such as obtained when using rock as much as possible, rather than extensively using concrete; this also usually happens to be cost-effective and provides for a more "natural" look;

The figures 5, 6 and 7 portray the general scheme for rocked crossings using granite rock where the crossing traverses rock boulders and under laying rock forming a natural dam, such as at several sites (Barkafouo, Yelibi Junction, Malboba, Koboi 2), with a stronger structure to be built when the height of the flow exceeds 50 cm (Figure 6), and a dissipation basin to built into the existing rock structures (Figure 7). A trench must be built to anchor sections of packed clay, some of which will require a bulldozer and loader or a hydraulic shovel and will require opening by hand around boulders and rock foundations. Great care must be taken to seal the clay along rock surfaces so as to avoid leaks that will cause erosion of the clay core. A 20 cm thick poured reinforced concrete liner is proposed on the downstream side of crossings over a rock base (figures 5 – 7), so as to help ensure that erosion does not progressively wash out the packed clay core.

Other sites where rock does not form a base, the impoundment model proposed is that of a more-classically designed structure of packed clay built upwards out of an anchoring trench and covered with rock layers in a "fish-scale" rocking pattern developed at Nazinga (figures 8 and 9). The "fish-scale" surfaced spillway dike is cost-effective due to a relative reduction in the height of the earthwork and the design converts payment for machine use (rental and fuel) into salaries for the local community. The spillway dike can be built in the lower bed and even up onto the upper bed of the river. With the use of a dissipation basin to collect and channel the down-flow, the water swirls inside the rocked area and dissipates its extra energy before flowing peacefully down the river.

The spillway dikes can be built on rivers of considerable size such as the Sissili River, where several spillway dikes have been built that incorporate specially-designed vehicle passages along the crest of the spillway (figures 10, 11 and 12). This allows for vehicle passage most of the year, with flows of up to 1 m remaining navigable by experienced drivers using 4-wheel drive vehicles (non-experienced drivers will not want to cross flows of 0.75 m high over the dike), although, for several hours or days after big rains during the months of August

and September, vehicle crossing may not be possible; unless the length of the spillway has been especially designed to ensure passage even during those moments. Longer spillways to ensure crossing at all times, even after a very heavy rain, are entirely possible, but of course, more expensive.

But, at Gbele, very little laterite was located; with the laterite plateaux along the edge of Malboba pool representing the largest depot located. It might provide sufficient rock for 1 spillway. Due to the fact that laterite plateaux are very little represented at the GRR, methods employing cost-effective use of laterite rock have to be adapted for the use of granite rock.

Plenty of granite rock was found throughout the reserve, as well as quartz and granite rubble that could be used for the 15 cm thick under-layers. It would probably be a better idea to save the laterite for the under layer and use granite rock for the surface layer, such as done at Tougoumatenga (2008) in Burkina Faso (Figure 13).

Figure 1: Plan Proposed for River Crossings over Rock Foundations at Heights of Less than 50 cm

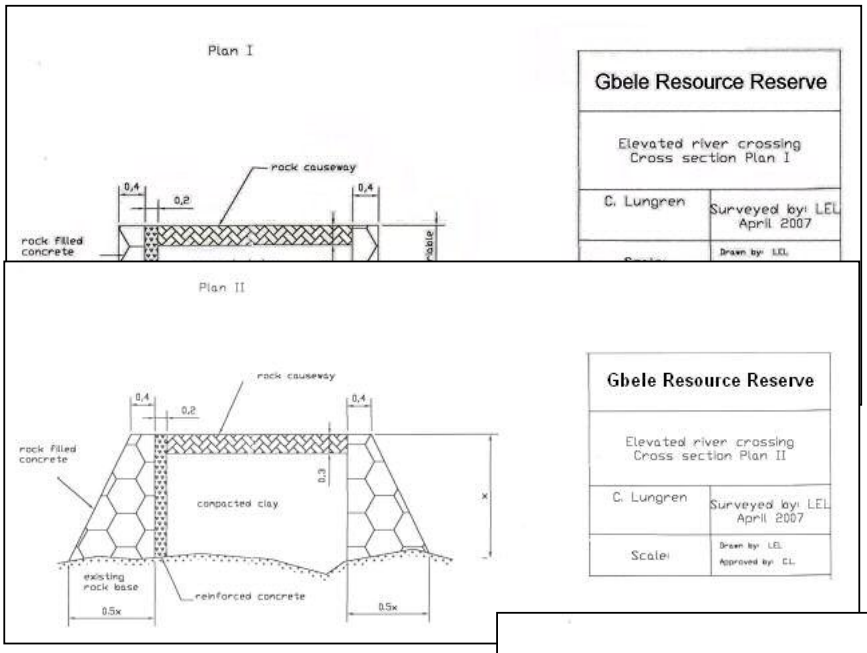
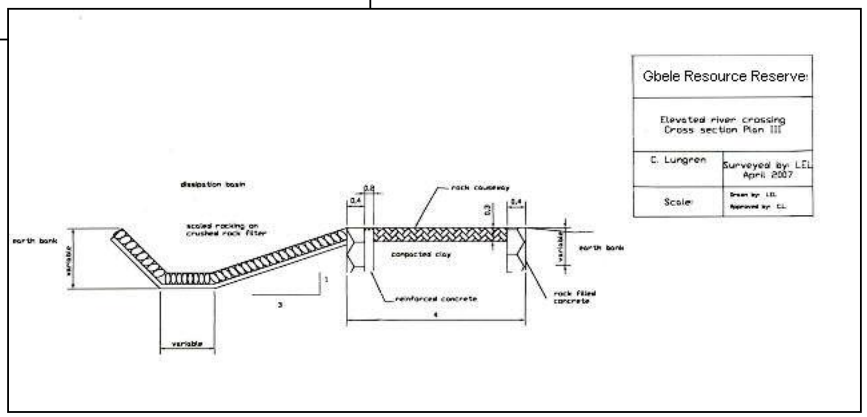


Figure 2: General Plan Proposed for River Crossings over Rock Foundations at Heights of 1 m or More

Figure 3: General Plan Proposed for Dissipation Bassins at River Crossings



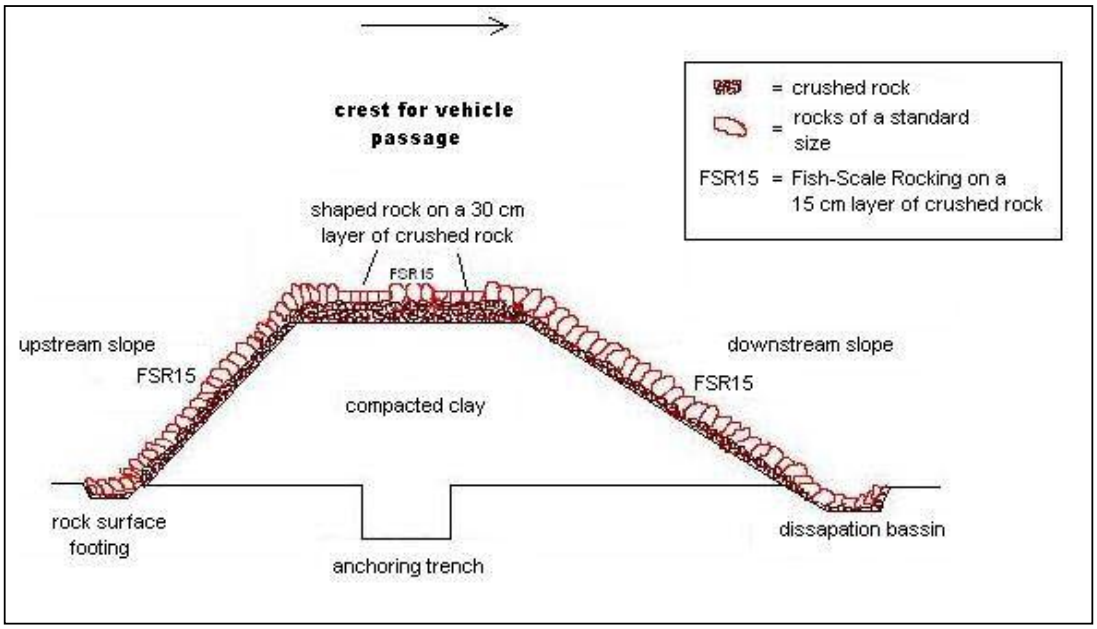


Figure 4: Spillway Dike Design Using a "Fish-Scale" Rocking System Developed at Nazinga

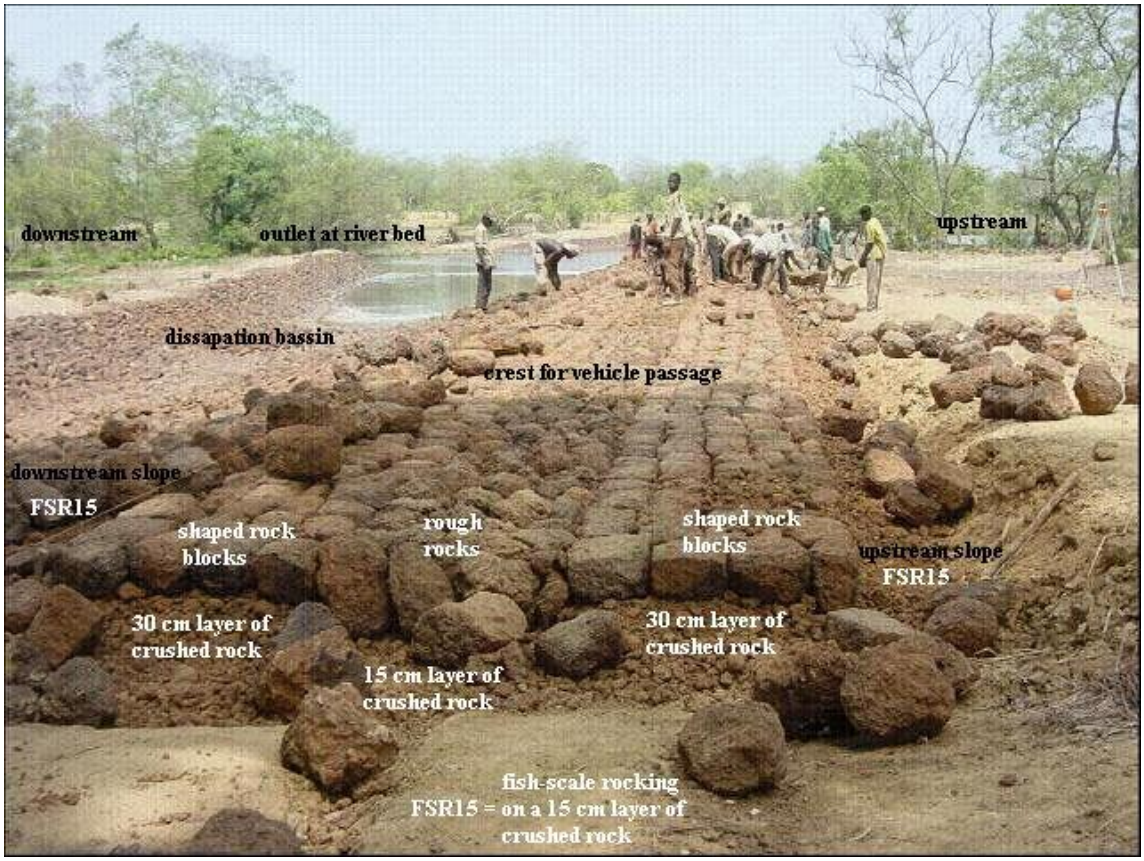


Figure 5: Details of the Labor-Intensive Fish-Scale Rocking System Utilizing Laterite or Granite Rock

Figure 6: Construction of a 180 m long spillway dike on the Sissili River at Naguio, Nazinga Game Ranch, using labour-intensive methods and locally-available materials that incorporate a dissipation basin

Figure 7: A shallow flow at the Naguio Spillway Dike, where the depth of the flow can be over 1 m in height (for reasons of cost-effectiveness the length of the spillway was designed to permit passage during the most, but not all, of the rainy season, as passage immediately after a heavy rain is not essential at this crossing)

Figure 8: Water retained at the end of the rains at the Naguio Spillway Dike creates a reservoir 6 km long (it has a very favorable impact upon the ecology of the gallery forest and humid area pastures along the river banks and flood plain, and of course for the wildlife

Figure 9: Combined Use of Granite and Laterite Rocks at the Tougoumatenga Spillway, Burkina Faso (2008)

Laterite rocks were scarce at the Tougoumatenga site, so were used on the non flooded surfaces and for the under-layers. Granite rocks of a similar size were used for the outer layer, placed in a "fish-scale" pattern that covers the surfaces in front, on the top and downstream, including the surface of the dissipation basin and 2 natural outlets opening into the drainage lines that will channel normal flows. Concrete, being non flexible, is not recommended; but was used at this site along the front and back edges of the crest, at the request of the client project.

This combined use might be possible at certain sites at Gbele.