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GLOBAL ENVIRONMENT FACILITY TRUST FUND
IN THE AMOUNT OF US \$8.15 MILLION
TO THE REPUBLIC OF GHANA
FOR THE
SUSTAINABLE LAND AND WATER MANAGEMENT PROJECT
{DRAFT May 31, 2010}

CURRENCY EQUIVALENTS
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ABBREVIATIONS AND ACRONYMS

AAP	Africa Action Plan
AgDPO	Agriculture DPO
CAS	Country Assistance Strategy
CBRDP	Community Based Rural Development Project
CEA	Country Environmental Analysis
CIDA	Canadian International Development Agency
CREMA	Community Resource Management Area
DA	District Assembly
DFID	(UK) Department for International Development
DPO	Development Policy Operation
EAMP	Environmental Analysis and Management Plan
EPA	Environment Protection Agency
ESW	Economic and Sector Work
FAO	Food and Agriculture Organization
FASDEP	Food and Agriculture Sector Development Policy
FC	Forest Commission
FCPF	Forest Carbon Partnership Facility
FM	Financial Management
FSD	Forest Service Division
GDP	Gross Domestic Product
GECCA	Ghana Environmental Conventions Coordinating Authority
GEF	Global Environment Facility
GEO	Global Environment Objective
GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System
G-JAS	Ghana Joint Assistance Strategy
GoG	Government of Ghana
GNADO	Gia/Nabio Agro-forestry Development Organization

GPRS	Growth and Poverty Reduction Strategy
GRR	Gbele Resource Reserve
GSIF	Ghana Strategic Investment Framework
GTZ	German Technical Cooperation
IDA	International Development Association
IDDP	Integrated Drylands Development Programme
IPM	Integrated Pest Management
IRR	Internal Rate of Return
ISSER	Institute of Statistical, Social & Economic Research
JICA	Japan International Cooperation Agency
LADA	Land Degradation Assessment in Drylands
LCGP	Low Carbon Growth Plan
MEST	Ministry of Environment, Science and Technology
METT	Management Effectiveness Tracking Tool
MDAs	Ministries, Departments, Agencies
MLGRD	Ministry of Local Government and Rural Development
MTADP	Medium Term Agricultural Development Plan
M&E	Monitoring and Evaluation
MSP	Medium-Sized Project
NADMO	National Disaster Management Organization
NCO	National Coordination Office
NDVI	Normalized Difference Vegetation Index
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NREG	Natural Resources and Environmental Governance Program
NRGP	Northern Rural Growth Programme
NRM	Natural Resource Management
NSBCP	Northern Savannah Biodiversity Conservation Project
NSBSAP	Northern Savanna Biodiversity Strategy and Action Plan
NSLMC	National Sustainable Land Management Committee
NTFP	Non-Timber Forest Product
ODA	Official Development Assistance
PA	Protected Area
PAC	Project Advisory Committee
PAGEN	Partnership for Natural Ecosystem Management Project
PDO	Project Development Objective
PES	Payment for Environmental Services
PIM	Project Implementation Manual
REDD	Reducing Emissions from Deforestation and Degradation
RCC	Regional Coordinating Council
RPF	Resettlement Process Framework
SADA	Savanna Accelerated Development Authority
SDI	Sustainable Development Initiative (for the Northern Savanna)
SIL	Standard Investment Loan

SIP	Strategic Investment Program for SLM in Sub-Saharan Africa
SLWM	Sustainable Land & Water Management
SNV	Netherlands Development Organization
SOP	Social Opportunities Project
SSA	Sub-Saharan Africa
TCO	Technical Coordination Office
UNDP	United Nations Development Program
UNEP	United Nations Environment Programme
US\$	United States Dollar
WD	Wildlife Division
WDR	World Development Report

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REPUBLIC OF GHANA

SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

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A. STRATEGIC CONTEXT AND RATIONALE

1. Country and sector issues

Background context

1. **Ghana's rural land generates much of the country's income and employment, directly and indirectly, but is highly vulnerable to degradation.** The agriculture sector contributes 38% of the GDP, accounts for about 75% of the export earnings, and contributes over 90% of the food needs of the country. The majority of rural households (63% of the total population) directly depend upon land resources for their livelihoods. Agriculture is largely based on smallholder farm characterized by low input and output technologies. About 90% of farm holdings are less than 2 hectares. Agricultural GDP grew at an average annual rate of 4.5% from 1997 – 2008, amongst the highest rates in Sub-Saharan Africa (SSA), and its share of the economy fell only three percentage points. Much of the increased production has come from expansion of agricultural land, which combined with traditional swidden and grazing practices, and with rising demands for water, is becoming increasingly unsustainable. It is estimated that about 69% of the total land surface is already prone to severe or very severe soil erosion (above the average in SSA of 43%).

2. **Natural habitats and biodiversity are being lost as part of the broader process of land degradation.** Current area of intact forest is estimated at 10.9 to 11.8% of the original cover and 6.9% of the country's total area, and annual deforestation rates average 22,000 ha or 1.3%. Remaining forest and natural habitat areas are increasingly degraded by agricultural encroachment, commercial logging, extraction of non-timber forest products, mining, hunting and grazing, and associated burning. The underlying causes involve a complex of demographic, economic and policy influences and the immediate drivers include: forest industry over-capacity; policy/market failures in the timber sector; population growth in both rural and urban areas; increasing local and international demand for agricultural and forest products; heavy dependence on wood fuel for rural and urban energy; outdated farming methods and use of fire as a tool in land management (see Annex 1).

3. **Land degradation has a direct economic impact.** Soil erosion is estimated to cost around 2% and forest degradation to cost about 5% of the national GDP (World Bank, DFID, ISSER, 2005). This is equivalent to about US\$ 530 million, or more than one third of Ghana's annual ODA. Land degradation directly affects rural households, which directly depend upon land resources for their livelihoods and constitute the most vulnerable part of the population.

4. **Land also provides critical environmental services and important biodiversity values.** Degradation severely compromises services including nutrient cycling, regulation of hydrological flows, provision of natural resources, and amelioration of climatic extremes and floods. Biodiversity values at risk are considerable; Ghana's vegetation comprises all major West African forest types (from moist evergreen to dry semi-deciduous) containing many unique biological features of conservation importance. Forest, savanna, wetland, and coastal ecosystems provide habitats for at least 2,975 plant species (at least nine of which are endemic), 504 fishes, 728 birds, 225 mammals, and 221 amphibians and reptiles. Sixteen percent of Ghana's land surface is under some form of protection as forest reserves, national parks and other wildlife reserves including traditional forms of conservation.

5. Climate change is expected to exacerbate land degradation pressures, reducing capacity to buffer further climate change impacts. Initial assessments indicate that Ghana is very vulnerable to climate change impacts, particularly the savanna regions. Decreased rainfall, increased rainfall variability and temperature rises would have negative impacts on agricultural productivity, increase the incidence of droughts and floods, and exacerbate desertification (particularly in the northern regions), with consequences in terms increased migration (from North to South and from rural areas to urban centers).

6. There is a visible development gap between northern and southern Ghana, in part due to the greater aridity and environmental fragility of the north. The north is home to 17.2% of Ghanaians overall, but 53.7% of Ghanaians living in extreme poverty. The vulnerabilities that afflict the people of northern Ghana are related to climate and geography. The northern region is landlocked and in comparison with the south, is subject to lower rainfall, greater land and soil degradation, and a pre-disposition to droughts and floods. The region experienced devastating floods in 2007, with less severe, but still significant impacts again in 2008 and 2009. This forces agricultural households to adopt low-risk and low-input strategies, creating a cycle of poverty. Bridging the developmental gap has been a goal of most post-independence governments, but despite attempts to address the challenge, poverty reduction has not been evenly distributed and the poor therefore continue to be concentrated in the Northern Savannah ecological zone.

Barriers to uptake of Sustainable Land and Water Management

7. Several efforts at promoting improved land management practices have been undertaken since the early 1990s. The Medium Term Agricultural Development Plan (MTADP) formulated in 1990 laid emphasis on promoting soil conservation and soil fertility improvement technologies as major steps towards mitigating degradation of agricultural land. The MTADP provided a framework for the formulation and implementation of a number of projects aimed at promoting sustainable land management, including the National Agroforestry Project (1989 – 1998), the Land Conservation and Smallholder Rehabilitation Project (1992 - 2005), the Sedentary Farming Systems Project (1995 – 2003), the Conservation Agriculture Project (2000 – 2003), the Land and Water Management Project (1994 – 2003) and the Savannah Resources Management Project (1998 - 2001). The Forestry Commission has also been active in protecting forest reserves and riverine buffers, but often with limited success.

8. Several barriers prevent a wider adoption of sustainable land management; these include: (1) a weak policy, legislative and incentive framework; (2) weak institutional capacity and limited institutional coordination in an area that demands high degree of cross-sectoral coordination; (3) a limited body of knowledge and information on sustainable land and water management (SLWM) to support decision-making; and (4) lack of financial incentives. Often projects had considerable success in promoting certain SLWM technologies, but failed to make a lasting impact because they were implemented in isolation, and didn't provide a clear evaluation of the financial benefits of different SLWM technologies that might have encouraged further action. In addition, efforts to tackle land degradation mainly focused on provision of inputs (e.g. seed, tree-planting, etc.), rather than exploring the possibility of promoting SLWM through output-based incentives (e.g. rewarding farmers and communities for the generation of

environmental services such as lower sedimentation, less flooding, carbon sequestration, biodiversity conservation etc.).

9. The conclusions of various analytical works, including the Ghana Country Environmental Analysis (CEA), suggest the adoption of a more *programmatic* and multi-sectoral approach to address land degradation and promote SLWM - consistent with the Paris Declaration on Aide Effectiveness and with the approach advocated under the TerrAfrica partnership¹. The *programmatic* approach (as opposed to a project-based approach):

- Consists of a set of different instruments (e.g. budget support, investment operations, technical assistance and advisory services) aligned against a commonly agreed set of objectives and priorities, and with a common monitoring and evaluation system.
- Allows for the alignment and harmonization of current and future SLWM interventions, thus increasing the impact of interventions and achieving greater economies of scale.
- Includes interventions in different landscapes and sectors (e.g. agricultural and nonagricultural land, forests, reserves, corridors and watersheds).

Government Strategies and Policies

10. The need to tackle land degradation is recognized in central development strategies. The Growth and Poverty Reduction Strategy (GPRS II) (2006 – 2009) identified the restoration of degraded environments and natural resource management as a key area to promote integrated ecosystem management as well as human-centered biodiversity conservation initiatives. Sustainable management of land and environment is also an objective of the new medium term National Development Policy Framework (2010-2013), along which the country assistance strategy is now being aligned. The same objective is therefore included within the current Food and Agriculture Sector Development Policy (FASDEP II).

11. The Government's on-going strategy to address the challenges in natural resource management are contained in the 1994 Forest and Wildlife Policy, the Forestry Development Master Plan (1996-2000), and the National Land Policy. Under the Forest and Wildlife Policy, Ghana has already embarked on a series of forest and natural resource governance initiatives. Most prominent are the Forest Law Enforcement, Governance and Trade Initiative, and the multi donor sector budget support through the Natural Resources and Environmental Governance Program (NREG). Additionally the GoG developed the Northern Savanna Biodiversity Strategy and Action Plan (NSBSAP)² which provides a framework for conservation of biodiversity in the Northern Savannah emphasizing: (i) maintaining ecosystem services; (ii) undertaking actions that improve species diversity; and (iii) optimizing the socio-economic benefits of biodiversity conservation and development to local people.

12. Specific SLWM strategies are being put in place in response to overarching policy directives, but they require suitable vehicles for their implementation. The Ghana

¹ TerrAfrica is a multi-stakeholder regional platform to support SLWM scale-up in Sub-Saharan Africa. Ghana is one of the countries on the Executive Committee.

² The NSBSAP was financed by the NSBCP and was prepared in a participatory way by the Ministry of Land, Forestry and Mines. Official adoption is pending.

Agriculture Sustainable Land Management Strategy and Action Plan (2009-2015), has been developed to operationalize portions of the National Land Policy that deal with agriculture land use and sustainable management of land and environment. The Strategy and action plan will support SLWM at all levels through focusing upon: (i) strengthening policies and regulations; (ii) building institutional capacity at all levels within the Food and Agriculture sector; (iii) promoting technologies for scaling-up of SLWM practices; (iv) building technical capacity at all levels; (v) generating and managing SLWM knowledge to support policy and investment decisions; and (vi) establishing an effective incentive system for SLWM. The Government of Ghana (GoG) is also finalizing the Ghana Strategic Investment Framework (GSIF) for SLWM which is a programmatic approach to address land degradation issues. The objective of the GSIF is to mainstream and scale-up SLWM in the development framework of Ghana at all levels to improve the governance of land management decisions, secure ecosystem services and improve rural livelihoods in the country.

13. In order to leverage the scope and impact of existing and planned SLWM interventions, the GoG established a multi-sector platform to improve investment programming. A National Sustainable Land Management Committee (NSLMC) was established in 2007 to promote the SLWM agenda at the policy and strategic level. The Committee is chaired by the Environment Protection Agency of the Ministry of Environment Science and Technology, and includes representation from the Ministry of Food & Agriculture, Forestry Commission, Water Resources Commission, Energy Commission, National Development Planning Commission, Ministry of Finance & Economic Planning, and Friends of the Earth, Ghana. It prepared the GSIF in line with the model of the TerrAfrica partnership, and has actively engaged with other regional partners.

2. Rationale for Bank and GEF involvement

14. Bank's comparative advantages. The rationale for the Bank's involvement is based on the fact that it: (i) is already engaged in a suite of activities related to sustainable land and water management, which this operation would strengthen, building towards a programmatic approach; and (ii) can draw upon regional and global experience in watershed management, scaling up of SLWM technologies and piloting payment for environmental services.

15. Bank Assistance Strategy. In 2007, donors signed the Ghana Joint Assistance Strategy (**G-JAS**) which emphasizes a range of rural interventions, including strengthening rural infrastructure, especially rural roads and irrigation, improving land tenure and management, promoting promising agricultural value chains, enhancing access to credit, and strengthening provision and targeting of agricultural research and extension. The Bank **CAS** (2008-11), drawing in part of the recommendations of the **Ghana Country Environmental Analysis** (CEA, 2007), highlights the importance of addressing environmental and land degradation because of its negative impact on economic growth.

16. Consistency with Programmatic Approach to SLWM in Ghana. The Bank is supporting the Government SLWM agenda through a range of instruments: **(1) the Natural Resource and Environmental Governance** (NREG) Development Policy Operation (DPO) addresses land degradation policy issues especially in the forestry and mining sectors; **(2) the Agriculture Development Policy Operation** (Ag DPO) supports sustainable development of the agricultural

sector, including the development of the Agriculture SLWM Strategy and Action Plan (a trigger for Ag DPO II); **(3) the Land Administration Project (LAP)** deals with land tenure and legislative aspects of land use and management; **(4) the Community-Based Rural Development Project (CBRDP)** and previous **Community-Based Natural Resources Management Project** have piloted community land use planning and natural resource management; **(5) the Social Opportunities Project (SOP)** (under preparation) will support labor-intensive small rural infrastructure, including for water resource management; **(6) a Global Facility for Disaster Reduction and Recovery (GFDRR)** grant is supporting development of a Integrated Water Resources and Flood Management Plan, in discussion with the National Disaster Management Organization (NADMO) and Water Resources Commission (WRC); **(7) Technical Assistance** provided through TerrAfrica Trust Fund is being used to strengthen the analytical underpinnings and coordination of SLWM activities, and the Bank is also supporting the government in the identification of opportunities to support Reduction of Emissions from Deforestation and Degradation (REDD) via the Forest Carbon Partnership Facility (FCPF) and Forest Investment Program; **(8) Water Resources ESW** a note on Water Resources Management in Ghana is being developed in anticipation of a broader sectoral engagement.

17. The proposed project will strategically complement and support this wider portfolio of activities by (a) providing technical and financial support for on-the-ground investments and demonstration of practical models and (b) piloting an innovative, market-oriented approach (based on rewarding generation of environmental services) that should provide a more efficient and sustainable mechanism for SLWM adoption.

18. Consistency with AAP, WDR 08, WDR 10 and Africa Regional Climate Change Strategy. The proposed operation is consistent with one of the objectives of the **Africa Action Plan (AAP)**, i.e. making agriculture more productive and sustainable to promote growth and poverty reduction. It also supports the implementation of some of the key messages of the **World Development Reports (WDR)** for 2008, i.e. agriculture is a major provider of environmental services and SLWM is a critical element for increasing agricultural productivity, and for 2010, which calls for urgent, novel and collaborative climate change action. Lastly, this operation is consistent with the **Africa Regional Climate Change Strategy** which recognizes the importance of land management for both adaptation and mitigation, and emphasizes the need to pursue a range of financing mechanisms.

19. Linkages to West Africa Biodiversity Program. The operation will support community-managed biodiversity corridors as part of an integrated landscape approach combining improved management of both agricultural lands and wild lands. The biodiversity activities have been developed as part of the GEF Biodiversity Program in West Africa, which aims to scale-up biodiversity conservation while capitalizing on sustainable use to support poverty alleviation and growth. The project will support globally important biodiversity conservation within the Gbele Resource Reserve and the surrounding corridors and will generate improved revenue streams for local populations. The savanna woodlands provides valuable environmental services, including a critical refuge for native biodiversity, protection of soil and water resources, and constitute a natural barrier to the desiccating Saharan winds, helping to maintain a favorable micro-climate for agricultural production.

20. The proposed operation is consistent with the approach advocated under the TerrAfrica Global Partnership Program, coordinated by NEPAD. This operation is under the regional

GEF Strategic Investment Program (SIP) for SLWM in SSA, and would contribute to the SIP's objectives through: (i) applying sustainable practices that increase land productivity while securing ecosystem services in selected priority areas; and (ii) mainstreaming SLWM by linking these to a major regional development planning initiative and developing efficient scale-up approaches.

21. GEF Rationale - The project is fully consistent with the GEF strategies of the Land Degradation and Biodiversity Focal areas and their strategic programs. It is in line with LD-SP1 (Supporting sustainable agriculture and rangeland management) and LD-SP2 (Investing in innovative approaches in SLWM) in that it seeks to support up-scaling of SLWM investments related to agriculture, rangeland and forest management. It is also in line with BD-SP3 (Strengthening Terrestrial PA networks). See Annex 15 for further details.

3. Higher level objectives to which the project contributes

22. The project also responds to key objectives within the Government's new medium term National Development Policy Framework (2010-2013). The project will significantly contribute to the national SLWM strategies discussed in paragraphs 11 & 12 above through building implementation capacity on the ground, especially amongst staff of participating districts, effecting improved land and watershed management in highly vulnerable areas within the north, and demonstrating new approaches to: (i) combining hard and soft, and large and small-scale investments; (ii) combining SLWM activities on agricultural lands and community-managed natural habitats; and (iii) developing new delivery and financing mechanisms. In addition, it will help to advance two emerging Government priorities: sustainable development of the north and national low carbon growth.

23. Direct contribution to the Sustainable Development Initiative for Northern Savannah (SDI, 2010-2030). In response to recent major floods, the SDI has been developed to specifically address the linked develop and environmental issues in the north. The strategy is based on the concept of a "Forested North" where "food crops and vegetables are inter-cropped with economic trees that are resilient to weather changes, sustain a stable environment, and creating a permanent stake in land for poor people". The goal is to double per capita incomes of northerners and reduce the incidence of poverty to 20 percent within 20 years by exploiting potentials for green growth and markets in neighboring countries. Economic growth and improved water resource management are considered to be mutually reinforcing by the SDI, which emphasizes flood mitigation and drought prevention in the White and Black Volta River sub-basins through: (i) catchment management including major efforts to grow economic trees and protect existing tree cover; (ii) identification and implementation of mid-catchment multipurpose flood protection and water storage infrastructure investments; and (iii) immediate floodplain management, and establishment of a flood early warning system. The SDI will be coordinated by a Savanna Accelerated Development Authority (SADA), and is expected to coordinate a major program of investment over coming years. The project will partner with SADA and directly contribute to realising the SDI through supporting integrated spatial analysis at the watershed level for planning of major multi-purpose water infrastructure developments, whilst demonstrating how a range of hard and soft community-level investments can complement these and contribute to the objective of more productive, sustainable and resilient rural livelihoods.

24. **The project is aligned with the Ministry of Environment, Science and Technology’s national Low Carbon Growth Plan (LCGP) for Ghana**, which will ensure that Ghana's development plans are climate resilient and low-carbon through integrating adaptation and mitigation measures into a comprehensive and coherent cross-sectoral plan. The project will pursue the climate double dividend of SLWM by increasing resiliency of natural and agricultural ecosystems, and enhancing carbon sequestration. The development of environmental service market approaches and efficient incentive regimes will also be highly beneficial in placing Ghana to exploit growing opportunities for land-use based carbon finance.

B. PROJECT DESCRIPTION

1. Lending instrument

25. The Ghana Sustainable Land and Water management 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. Government contribution to the project is estimated at US\$ 7.8 million.

2. Project development objective and key indicators

26. **Project Development Objective / Global Environment Objective:** 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.

27. 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).

3. Project Approach and Components

28. The Project 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. The project aims to support the Sustainable Development Initiative for the Northern Savanna to realize the vision of “a diversified and resilient economic zone in the north” with significant regional environmental benefits by: (i) piloting innovative models for grassroots watershed management; and (ii) 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 watershed management investments.

29. Project activities will focus on the sub-watersheds of two Volta tributaries flowing into the country from Burkina-Faso in order to concentrate impacts and effect outcomes at the sub-watershed level. The Kulpawn-Sisilli and the Red Volta sub-watersheds have been prioritized due to SLWM need, high poverty and priority for SOP investments, presence of biodiversity corridors and proposed CREMAs, and interest of SADA in future large-scale water storage investments in these areas. The Kulpawn-Sisilli sub-watershed links the Mole-Gbele-Nazinga protected area complex, and includes parts of Sisala West & East, Wa East, Builsa, Kassena Nankana, and West Maprusi Districts, including approximately 380 communities. The Red Volta sub-basin contains much of the eastern biodiversity corridor linking conservation areas in Burkina and Togo, and included parts of Talensi Nabdam and Bawku West Districts, and approximately 115 communities. The project aims to work within a total of around 100 communities. The final selection of micro-watersheds and communities will be determined with participating Districts on the basis of their willingness to use some SOP funds for complementary small-scale water and flood infrastructure, and insights on watershed priorities from early results of the spatial planning activities.

30. Most of the project area falls within the Guinea Savanna zone, characterized by a unimodal rainfall regime lasting from April to October, with a dry period between November and March, 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, and a 180-200 day long growing period. Most of the area consists of a gently rolling plain with average heights between 180 and 300 masl, and soils of moderate fertility but at serious risk form erosion. 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. The original savanna fauna is rich, but some vulnerable species are missing even from the reserves, and outside, the fauna is depleted further still by hunting and habitat degradation.

31. At the field level, a range of technologies exist that can enhance soil productivity, biodiversity and watershed services. Roll-out of these technologies remains limited, however, due to high transaction costs and a frequent focus on technical feasibility rather than socio-cultural acceptability. The project will seek to enhance efficiency and effectiveness through the following innovations:

- i. Using market-based instruments for effective incentives and efficient aggregation of diffuse investments:
 - Communities and individual farmers will be free to select from a menu SLWM technologies and support packages appropriate to local conditions.
 - Support will be tailored to address barriers for uptake of specific technologies, but favoring output-based incentives where feasible.
 - Portfolio of SLWM investments will be managed to maximize returns according to an index of environmental services associated with each SLWM technology.
- ii. Creation of marketable environmental services to support costs of (or at least significantly subsidize) sustainable land management.

- Exploring principles of payment for (biodiversity, watershed & carbon sequestration) environmental services, and linking to or establishing viable markets for the services by the close of the project. Links will be made to a range of potential buyers of services, as a single service alone may not provide sufficient revenue for rehabilitation.
- iii. A landscape management approach, integrating community protection of riparian wildlife corridors with sustainable land management in the surrounding watersheds, will offer investment synergies.
- Wildlife and water management are tightly linked in African savannas due both to wildlife need for water, and to historical development patterns that avoided riverine environments previously infested with onchocerciasis.
 - Mutually reinforcing activities – protection of natural riparian habitats will contribute greatly to watershed function, whilst investments in biodiversity corridors will be buffered by more sustainable management of surrounding lands.

32. The operation has three integrated components:

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

33. This component will provide integrated spatial planning tools (for mapping, analysis, monitoring and evaluation) to strengthen the capacity of SADA and relevant implementing agencies to guide and undertake decision-making for investment across the northern savanna region, taking into account watershed and ecological systems. The component will finance establishment of a small spatial planning unit within SADA, mapping and spatial planning exercises, and pre-feasibility studies of investments identified in the Integrated Water Resources and Flood Management Plan.

Component 2: Water & Land Management (\$6.45m from GEF):

34. This component support community flood and land management at the micro-watershed level, including both management of agricultural land and ecological infrastructure. It will also be associated with labor-intensive civil works investments in small-scale flood & water management infrastructure through SOP to provide for a comprehensive approach. The component will fund technical assistance, equipment, incremental operating costs, and incentives based on SLWM subproject agreements.

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

35. 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, which would identify watershed issues, needs for small-scale water and flood management infrastructure and potential for application of SLWM technologies.

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

36. This subcomponent will design systems and put in place local extension capacity to promote SLWM technologies on the ground, including the design of effective and flexible incentive systems:

- *Development of SLWM menu of options, manual & environmental index.* Annex 16 summarizes SLWM technology options considered most promising for the northern

savanna region. These are grouped into technology packages appropriate to different land types and agricultural systems, which will form the basis of a menu of SLWM technology options to be offered to local farmers. 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 in line with concepts of payment for environmental services (PES).

- *Develop district extension approaches and incentive structures for promoting SLWM.* Packages of incentives will be designed for farmer groups, based on the understanding of needs developed under subcomponent 2.1. Support would be conditioned on SLWM subproject agreements signed with farmer groups, and providing mutual accountability in terms of support to be provided in return for agreed land use changes. Support would be a mixture of up-front inputs (including training), and subsequent performance-based inputs for continuing implementation of the technology and linked livelihood activities. The project will experiment with different input packages in order to determine the most efficient incentive structures. Packages of support should be just enough to “tip the balance” of incentives in favor of widespread adoption of SLWM technologies, but should not exceed limits related to the level of environmental benefits expected from the new technology as measured by the environmental services index.
- *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 based on the final menu of SLWM technology packages. A capacity strengthening program will be then launched with extensionists to support implementation of the technologies.

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

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

38. *Develop, monitor & verify performance under SLWM subproject agreements.* Support will be provided for NGOs and District Agricultural Extension Agents to establish SLWM contracts with participating farmers, specifying the support to be received in return for implementing the technology in accordance with District-specific incentive packages as developed under subcomponent 2.2. District staff will also monitor contract performance on an annual basis, on which the provision of output based incentives will be conditioned. To estimate the contribution of the new SLWM technologies to rural livelihoods, overall agricultural productivity within participating communities will be monitored and compared to a control group. Annual feedback will also be collected at the same time as contractual performance is assessed to monitor farmer satisfaction.

39. To address risks of collusion, a 3rd party verification of SLWM contracts will be carried out, on a sample basis, to certify District monitoring.

40. *Support individual SLWM agreements.* This will finance support provided directly to farmers under subproject agreements, including demonstration and training, input subsidies and output incentives. Contracts will be formed with Farmer Groups, which individual land users may join of their own free choice, to introduce suitable SLWM technologies from the menu of options. Support would be conditioned on improvements in environmental services associated with

changes in land use, as measured by the environmental index. Contracts would be established around the end of year 1 of the project, and support would be provided annually over a maximum of 4 subsequent years based on observed changes in the land use system compared with the baseline situation on that particular farm. The contract period and amount of the support will be related to the economics (i.e. cost and time to break-even) of specific SLWM technologies as established under subcomponent 2.2.

41. *Linking soft and hard community SLWM investments.* GEF activities will complement associated small-scale infrastructure investments through the IDA Social Opportunities Project. The availability of hard investments through SOP, such as small-scale storage and irrigation structures, should help to respond to villagers' over-riding concerns of improving dry season water availability and minimizing wet season flood impact, whilst the GEF-funded activities will add value to the SOP investments through:

- i. Participatory identification of community investment needs through the micro-watershed planning processes under subcomponent 1.2.
- ii. Strengthening community capacity for sustainable management of infrastructure through water user groups and suitable regulations.
- iii. Provision of complementary soft SLWM investments (e.g. improved agricultural land management practices), which will increase the longevity of water infrastructure investments.

Subcomponent 2.4: Management of riparian biological corridors (\$1m GEF [Biodiversity window])

42. 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. The Project will integrate SLWM in predominantly agricultural watersheds with improved protection of the wildlife corridors at their core to capture synergies, and to develop local benefits from biodiversity-based livelihoods as a mechanism for sustaining an important element of watershed management.

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

43. The approaches taken in the corridors and wider watersheds will begin with a community-level planning exercise, in parallel to the broader community watershed planning approach, both, but more emphasis will be given to building of community institutions for the establishment of Community Resource Management Areas (CREMAs)³ in the corridors. Direct support will be provided to two sites based on their close proximity to existing protected areas endowed with globally significant wildlife populations, to encourage movement of wildlife into the corridor area. Specific activities to be financed will include (details in Technical Annex 1):

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).

³ A CREMA is a geographically defined area that includes one or more communities that have agreed to manage natural resources in a sustainable manner and was introduced and pilot-tested by Ghana's wildlife authorities under the Protected Areas Development Programme (PADP).

44. A management plan, draft tourism strategy and waterhole development plan have been developed for the GRR under the NSBCP through a participatory process. This subcomponent will implement selected activities within the Tourism and Waterhole development plans that support project objectives, including (details in Technical Annex 1):

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

Subcomponent 2.5: Monitoring SLWM & environmental services (\$0.5m GEF)

45. This component will finance monitoring and evaluation activities that will link local activities to national SLWM objectives, to strengthen their broader impact and replicability. This includes the monitoring of environmental services generated in the project area and two discrete national level activities to support the wider adoption of SLWM and impact of project activities:

- *National monitoring of SLWM policy & implementation.* This will develop simple monitoring systems of the implementation and effectiveness of Ghana's broad SLWM strategies. It will also help to identify specific policy constraints that act as barriers to uptake. In specific cases, such as harmonizing and enhancing the implementation of various regulations on riverine buffer zones, and analysis of specific policy gaps for PES systems to function, the project will develop policy recommendations.
- *Evaluation and strategy for PES.* This would also fund work to identify potential buyers of environmental services generated via the project and assess their willingness to pay relative to the cost of providing those services (as determined under component 2), to inform a strategy for continuation and scale-up of PES systems by the close of the project.

Component 3: Project management and coordination (\$0.7m from GEF [Land Degradation])

46. This component will support incremental project management and coordination activities. In addition to routine administration activities, i.e. budgeting & planning, procurement and financial management, the costs of annual audits, annual and quarterly progress reports, and reception of supervision missions as required by the GEF. The component will finance technical assistance, operating costs and where necessary equipment.

4. Lessons learned and reflected in the project design

47. The design of this operation reflects lessons learnt from (a) the implementation of projects in Ghana including the Agricultural DPO (Ag DPO I), the Natural Resources and Environmental Governance project (NREG DPO I), the Northern Savannah Biodiversity Conservation Project (NSBCP) and the Natural Resource Management Project, the Community-Based Rural Development and Community-Based Natural Resource Management Projects, and other countries in Africa including the PAGEN project in Burkina Faso, (b) international best practices for similar approach to the payment of environmental services including several projects in Latin America, and initial lessons on these approaches in Africa, and (c) a wealth of Bank experience in implementing watershed management projects across many countries.

48. **Community participation:** Approaches based on understanding community needs have proven to be a successful and sustainable delivery mechanism to reduce rural poverty, increase food security and rural economic diversification. Community-led strategies have proven critical

for SLWM and NRM to take root and replicate throughout Africa. Natural resource goals must be well integrated into the wider developmental needs of the community such as access to water, energy and food requirements. Community participation alone is not sufficient; care must be taken to ensure that activities implemented have a clear (typically economic) benefit to the local participants. Empowering producers and producer organizations to identify and contribute to the services they need, can also have a transformational effect on service supply. Where possible producer organizations will be engaged and strengthened to help promote sustainable land and water management.

49. Concept of Payment of Environmental Services (PES): Experience shows promising prospects for applying concepts of payment for environmental services to SLWM measures. Although there are upfront costs involved in supporting the initial costs of adoption, in the longer term, the practices have been found to be profitable. Hence PES, based on the substantial benefits of SLWM for biodiversity conservation, carbon sequestration, water services, etc., can be used to surmount initial investment barriers associated with the high discount rates of farmers, without requiring indefinite support. Given that land use and environmental service monitoring can be costly, it is useful to identify simple proxy indicators for services. However, experience in Central America, where some of the best established PES systems operate, has shown that it can have limitations, particularly where applied to poorer rural inhabitants. PES schemes have tended to favor larger landowners over smallholders, and amongst poorer farmers PES is best integrated into livelihoods as corollary benefits linked to receipt of technical expertise and expansion of livelihoods may be more important than cash payments.

50. Cross-sectoral coordination. Efforts to address land degradation and climate risk have greater impact by improving operational coordination across sectors, linking extension with investment and policy communities, strengthening local awareness and ownership, and involving communities in technology selection and monitoring. The level of engagement by Government and the Bank to continue support through sector wide approaches is critical. Vertical and horizontal coordination involves transaction costs, which can be onerous for a developing country with limited budget, but the benefits tend to outweigh costs.

5. Alternatives considered and reasons for rejection

51. The project design aims for maximum mainstreaming and leveraging opportunities. The following alternative design options were considered and rejected.

52. Providing support to SLWM only through the DPOs. One option was to provide support for SLWM only through the NREG and Agriculture DPOs, without a separate investment project. Whilst DPOs are effective instruments for policy objectives and for scale up of proven models, an investment operation gives scope to test and refine implementation models. This was still considered important in regard to tailoring SLWM technology options to specific areas, and development of more efficient and sustainable delivery mechanisms, including testing the potential role of market-based instruments in supporting scale up. It also provides scope to actively partner with SADA to exploit the opportunity to mainstream SLWM within SDI.

53. Separate agricultural land management and biodiversity projects. The biodiversity GEF funds could have been utilized through a separate MSP, rather than combined with land degradation funds into a single project. This would have forsaken the synergies from integrating

SLWM activities in agricultural land and in riparian biodiversity corridors within a landscape management approach. Community-based natural habitat conservation is a sustainable land management practice, and its inclusion within the broader project will also reinforce the link to biodiversity and nature-based livelihoods in the spatial planning under Component 1.

54. Cash-based PES approach. An earlier iteration of the design involved direct reliance on payment of cash incentives to farmers for uptake of improved land management practices. Whilst this approach has promise, its novelty within Ghana and the differences in the social context from other areas where predominantly cash-based incentive systems have been typically applied (i.e. small-holders operating in a largely subsistence-based system, rather than larger market-oriented farms), generated concerns with cash payments of: (i) use for immediate consumption rather than investment (as has been demonstrated for PES schemes working with poorer farmers in Mexico); (ii) mis-appropriation; and (iii) creation of perceptions that farmers should be paid for involvement in rural development projects. Hence the project design seeks to introduce and evaluate output-based rewards within a flexible incentive framework that gives scope for experimentation, whilst analyzing potential for development of a full PES system.

55. Broader geographical coverage. Working in several agro-ecological zones, not just the northern savanna, was also considered. Given limited project resources and the focus on reducing transaction costs, however, it was considered more prudent to focus on a single area. The north was chosen because of the severe vulnerability to land degradation, desertification and flood, and the opportunity to link to a much larger potential investment program through the SDI.

C. IMPLEMENTATION

1. Partnership arrangements

56. Through NEPAD's TerrAfrica Partnership, the World Bank and others are providing technical support to the Government of Ghana in strengthening programmatic investment in land use management via national coordination and multi-sector dialogue on investment priorities. Work to build institutional capacity to carry out this agenda is further supported under the project components. The GEF contribution to the Project falls under the umbrella of the multi-agency GEF-SIP, which was developed by the World Bank and NEPAD with TerrAfrica Partners (see www.terrafrica.org). Because the GEF resources are allocated under the SIP linkages will be made to other projects via the TerrAfrica platform to share knowledge and raise capacities of staff and stakeholders involved in the project.

57. Partnerships and synergies with other ongoing and pipeline projects is critical, as the GEF project aims to both influence a wider set of rural and watershed investments, and to benchmark its performance roll-out of SLWM technologies against others. As a result during implementation activities will be carried out in close collaboration with the Northern Rural Growth Programme (NRGP) program to leverage the maximum potential for sharing lessons, and for the project to add value to NRGP through strengthening SLWM aspects of their models.

2. Institutional and implementation arrangements

58. ***Project Management & Oversight*** Project management will be under the leadership of the Ministry of Environment, Science & Technology (MEST) with oversight and guidance provided by a small Project Steering Committee. A small secretariat to the Project Steering Committee will be appointed within MEST. Fiduciary management will be carried out within the Finance & Administration of MEST, and fiduciary capacity will be built to support the project, and to enhance the broader project management capacity of the Ministry. To ensure local ownership and coordination of activities between project Districts, a Local Steering Committee will be established, including Chief District Coordinators and representatives of Regional Coordinating Councils.

59. ***Implementation of Component Activities*** SADA will implement Component 1. Consultants will be recruited by MEST under terms of reference prepared / cleared and supervised by SADA.

60. The Environment Protection Agency (EPA) of MEST will provide technical input and support Districts in the coordination of cross-sectoral activities under this component. At the national level, as secretariat to the NSLMC, EPA will be responsible for development of the menu of SLWM, and defining the environmental services index and related incentive system. This will be done in consultation with MoFA, and involve convening an expert workshop. EPA will also take the lead in national policy monitoring & development of PES strategy. Within the project area, EPA (as the local representative of MEST) will provide coordination and technical support through a Technical Coordination Office (TCO) based at the Regional EPA office in Bolga. The TCO will: (i) act as secretariat to the LSC; (ii) coordinate micro-watershed planning under subcomponent 2.1; (iii) develop an MOU with each project district on SLMW activities and complementary investments; (iv) implement the SLWM performance verification mechanism under subcomponent 2.3; and (v) implement environmental service monitoring activities under Component 3. The TCO will: (i) include a Technical Advisor based in Bolga, at least during the first 2 years of the project; and (ii) may second a small number of (likely part-time) regional staff from other agencies. It will utilize and strengthen the existing GIS capacity in the EPA Bolga Office, to provide basic mapping services for the project.

61. Following the participatory micro-watershed planning, and agreement on the overall program of project activities within each District, MoFA will implement most SLWM activities in agricultural lands through District Agriculture Units and Extension Agents, including capacity strengthening under subcomponent 2.2, and contract development & monitoring and support for contracts under subcomponent 2.3. The Directorate of Crop Services will be provide oversight of these activities at the national level, including technical backstopping from the Environment, Land and Water Management Unit, as necessary.

62. Experienced local NGOs will be mobilized to support community engagement in both corridors and agricultural lands, providing extra capacity for community planning and institutional development exercises, including discussion and drafting of SLWM agreements with Farmer Groups, and complementing the technical expertise of District and Regional staff.

3. Monitoring and evaluation of outcomes/results

63. MEST will have overall responsibility for M&E, collating outputs and data from all implementing agencies for a consolidated M&E report as part of the annual progress reports.

Some M&E data (especially activities & outputs) will also be included in quarterly and bi-annual progress reports. Specific monitoring responsibilities will include the following:

- All implementing agencies will be required to keep detailed records of activities, outputs and expenditures against agreed work plans and following standard formats, including robust financial monitoring.
- District Agriculture Units will be responsible for collecting primary data on SLWM contracts signed, implementation of agricultural SLWM technologies on the ground, satisfaction with introduced SLWM technologies.
- A 3rd party verification system will be established by the TCO to cross-check recorded performance under SLWM contracts, based on a sampling approach.
- Specialized monitoring of vegetation cover and soil carbon in the project implementation areas will be outsourced under the supervision of EPA.
- Community Resource Management Committee members will be responsible for simple community wildlife and natural resource monitoring systems in CREMAs. The Wildlife Division will collate information and monitor management effectiveness via the METT tool.

64. In addition, the project will seek to encourage partners to engage in complementary monitoring activities. In particular: (i) other projects implementing SLWM technologies will be encouraged (and required in the case of those under MEST) to adopt compatible monitoring systems for comparison of approaches; (ii) institutional water users will be encouraged to conduct scientific water quality and flow monitoring to demonstrate impact of project activities on hydrological services and therefore the potential benefits of PES; and (iii) SADA is expected to conduct a rigorous impact evaluation for the project.

65. Results-based monitoring and learning systems will provide for adaptive management and to justify scaling up activities after project close.

4. Sustainability

66. **Sustainability of project investments.** Sustainability of specific investments made by the project is expected to be high:

- *Ecological.* In all cases the activities and investments introduced will be aimed at increasing environmental sustainability of rural activities. Natural resource management systems that may be developed by the project (e.g. in CREMAs) tend to involve a trade-off between sustainability and short-term return, and hence sustainability cannot be guaranteed, especially if appropriate monitoring activities are not pursued in the long run. Nevertheless, the impact of the project should still be to make these systems more sustainable than at present.
- *Social & financial.* The SLWM technologies to be promoted are selected to have significant benefits to the individuals and self-selected farmers voluntarily applying them. Hence long terms sustainability is expected to be high once initial barriers to adoption are overcome with the help of participatory planning, incentive systems designed around needs and social systems, and monitoring of participant satisfaction. Sustainability of community wildlife and habitat management activities within CREMAs is more challenging because the time taken to yield tangible benefits for the community is longer.

Management plans will establish road maps and milestones to profitable operation, but follow-up support after the close of the project is likely to be required.

- *Institutional.* Many of the SLWM activities will be individually based. For those that require group activity, community structures (i.e. Resource Management Committees, Water User Groups) will be established and strengthened as required. Sustainability of the CREMAs and Gbele Resource Reserve beyond the project is based on the institutional ownership of project activities by the Wildlife Division, which already sees the GEF support as part of a wider program, with contributions from NREG and other instruments.

67. **Replicability.** The project aims to influence a larger set of watershed management and rural development investments in northern Ghana beyond its own lifespan and scope:

- *Demonstration of value-added.* Watershed planning will identify the complementary roles of soft and hard land and watershed management investments. Many small dams previously built in northern Ghana have silted and fallen into disuse, and this project aims to demonstrably improve sustainability of SOP small water infrastructure investments by: (i) complementing the hard investments with soil protection measures; and (ii) improving the understanding and maintenance capacity of both communities and local government staff. Finally, the project will provide a quantitative assessment of the value of SLWM activities to environmental service markets, and of the cost-effectiveness of delivery mechanisms employed.
- *Institutions & policy.* Institutions are key to longer term impact. Activities will be implemented through existing agencies with statutory responsibilities for long term implementation. Policy barriers will be identified and addressed. Project support will strengthen the capacity of government at community, District, Regional and national levels to manage SLWM implementation and investment decisions.

5. Critical risks and possible controversial aspects

68. Key risks:

Risks	Risk Mitigation Measures	Risk Rating with Mitigation
Country level		
1. Weaknesses in the effective use of public funds, weak oversight regarding transparency and accountability. Poor linkages between strategic planning and long term budgeting at the sector levels.	Strengthening the role of the MMDAs in FM capacity building through ongoing reforms in the public financial management This has resulted to a set of new legislation to guide public financial management practices. Currently the GoG with the support of DP is developing an integrated FM systems	N
Sector level		

1. Institutional mandates are complex due to inter-sectoral nature of SLWM, and MEST structure is new, which can hamper effective implementation	Support is being provided through NREG for clearer definition of mandates in the environment and NRM sectors	M
To project development objective		
1. Low community demand to implement or sustain SLWM technologies	Attention to local benefits in selection of activities. Participatory watershed planning exercises will build local awareness and establish incentives required. Monitoring of satisfaction amongst participants, and flexibility to focus on smaller range of more readily accepted technologies, if necessary.	M
2. Lack of interest amongst authorities and potential environmental service buyers to support activities beyond project close.	Targeted engagement and dissemination of results to key decision-makers. Acceptance of environmental service markets is likely to increase over time.	M
To component results		
1. Institutional arrangements for SADA not fully established	Subcomponent 1.1 activities would be of interest to Regional Coordinating Committees and water sector agencies in the northern savanna region, regardless of institutional arrangements	M
2. District resistance to payment of cash incentives	District assemblies & staff will be educated as to why traditional extension approaches aren't always sufficient. Not all districts need to use cash incentives, and incentives of same value may be provided in other forms.	M
3. Traditional land use rights systems may not be conducive to the use of PES as a tool for the adoption of SLWM	The project will develop a range of incentive mechanisms, delivered through community structures and consistent with traditional land tenure systems.	M
4. Inadequate participation in CREMA management activities by community members	Project will conduct awareness and outreach activities, to promote understanding that management of CREMAs is for communities' own benefit, as distinct from government-led conservation.	M
5. Communities aren't able to effectively tackle external threats to CREMAs from e.g. itinerant pastoralists & charcoal trade	Communities will be supported by DAs through the recognition of community rules in the form of By Laws. Project would still establish the contribution that communities can make and extend sensitization and awareness activities to surrounding areas as necessary.	M
6. Financial management & procurement weaknesses	Capacity will be built within MEST for fiduciary management in line with national procurement law, external audit will be conducted, and combined IDA/GEF	S

	supervision will be provided throughout the life of the project.	
Overall risk rating		M

High Risk (H)—greater than 75 percent probability that the outcome/result will not be achieved.
Substantial Risk (S)—probability of 50 - 75 percent that the outcome/result will not be achieved.
Modest Risk (M)—probability of 25 - 50 percent that the outcome/result will not be achieved.
Low or Negligible Risk (N)—probability of less than 25 percent that the outcome/result will not be achieved.

69. **Reputational risk.** There is a potential reputational risk from an ongoing process to resettle the Gbele community out of the Gbele Reserve. Although GoG is dedicating considerable resources to the resettlement, it would not meet all the standards of OP 4.12. The project investments in Gbele will take place in a different area of the Reserve, and are neither directly related to nor dependent on the resettlement process (see Annex 17 for more details). Nevertheless, the Bank could be associated with the resettlement process because the project investments are contemporaneous and because the initial resettlement assessment was supported by the previous Northern Savanna Biodiversity Conservation Project. Should any controversy arise that affects implementation of the project or the Bank's reputation in the area, the project team will prepare a communications strategy to explain the Bank's role in the project and the fact that the issues in Gbele are not associated with the project.

6. Loan/credit conditions and covenants

Negotiations / Effectiveness condition:

70. There are no non-standard conditions of Negotiations or Effectiveness.

Covenants

71. Within 6 months of the date of Board approval:

- (a) The Recipient has adopted the base Project Implementation Manual document, including a detailed first year budget, as described in Annex 6; and
- (b) Core project staff and consultants have been selected, including for fiduciary management (procurement officer recruited and dedicated project accountant assigned).

D. APPRAISAL SUMMARY

1. Economic and financial analyses

72. The project takes a framework approach, with few specific investments identified up front, and a full economic analysis not available ex ante. However:

- international experience suggests that SLWM technologies bring substantial long-term productivity gains;
- the project is designed to quantify the environmental benefits that they provide, as well as the willingness to pay for these services;
- cost-effectiveness will be a major focus given the intention to generate marketable environmental services;
- investments in capacity building will be highly cost-effective, if the project succeeds in catalyzing a larger program of SLWM investments within northern Ghana.

73. Reliable figures are not available for the financial returns of the range of relevant SLWM technologies in northern Ghana. During preparation, estimates of the returns for a number of improved agricultural land management practices from 1991 farm models were updated with current prices. The results for the northern savanna suggested that internal rates of returns: (i) were mostly positive; (ii) varied widely between the practices; but (iii) in only a few cases (introduction of woody fallows, use of animal traction) were unequivocally large enough to exceed the high estimated discount rates of subsistence farmers (estimated at 20-30%). The rationale of the project is to provide incentives to farmers to overcome the barriers to introduction stemming from start up costs (or low returns) and high rates of discounting. It will also generate a more reliable understanding of the type and size of those incentives needed, and how they compare to the marginal social benefits derived from improved environmental services.

74. Previous studies suggest that CREMAs in the corridor areas would eventually be financially viable under a variety of small-scale, sustainable commercial hunting and fishing uses. Estimates of potential annual revenues for the 4 corridor areas north of Mole ranged from \$10,000 – 18,000 per village, compared to annual patrolling and management costs of around \$1,000 per village area. These are long term projections based on restoration of wildlife populations and establishment of well-managed sport hunting enterprises. These levels of income will not be achieved during the lifespan of the project, but milestones towards eventual full sustainability can still be set for the project itself.

2. Technical

75. The technical design is appropriate to the setting. PES approaches have been successful elsewhere, but here a conceptual framework based on PES is adapted to local conditions and combined with support to overcome capacity limitations of both farmers and government extension services. The capacity of the regional Forestry Commission and Wildlife Division offices is considered adequate to implement the biodiversity aspects of the project given previous experience under NSBCP. NGO involvement in community engagement under both aspects is likely to be beneficial, however. A small number of areas of the technical design require further refinement, which can be appropriately provided during early implementation stages, given the phased approach which involves participatory planning exercises with both communities and districts before full implementation of investments on the ground will commence. In general, more work is needed to define details of the approach to promotion of SLWM technologies in agricultural lands, rather than the activities in natural habitats, which have benefited from work earlier carried out by the NSBCP.

76. *SLWM technologies* to be employed are largely tested and well-understood in Ghana, and expert input will be used in the finalization of the menu of options. In general, the project design places more emphasis on innovation and experimentation in incentives and extension systems for supporting the implementation of the technologies.

77. *Incentive system* will require the finalization of the environmental services index, identification of specific barriers and contracting arrangements. The reliance on signed agreements and output-based for SLWM implementation is designed to be consistent with a PES concept, but also expected to have benefits in terms of transparency, ease of monitoring and reciprocal commitment.

3. Fiduciary

78. Ghana has been one of strongest investors in sub-Saharan Africa in modernizing its legal and regulatory framework for public financial management, and its public procurement law covers all public agencies. Specifically under this project, fiduciary aspects of project management will be handled by the MEST.

79. Procurement activities under the proposed project are mainly required within MEST. However, the assessment of the Ministry procurement unit showed that there is only one procurement officer handling all procurement activities with the support of two national service personnel in the Ministry and they experience in implementing Bank-financed projects. Strengthening of MEST's capacity to handle procurement according to Bank systems is required, via the recruitment of an experienced procurement officer for at least the first two years of the project.

80. MEST has a fully functioning accounts unit which is staffed with a mix of qualified and unqualified accountant with varying degrees of experience particularly in public sector accounting, but training will be needed to work with Bank specific systems. Overall financial management responsibility will be handled by the Director of Finance and Administration at MEST, who will ensure that there are adequate financial management systems in place which can report adequately on the use of project funds in compliance with financial covenants throughout implementation. He will also be responsible for maintaining and operating the project's designated account and make payments to contractors and service providers and verifying and authorizing payments for all contracts and activities under this project. The Director will assign a dedicated Principal Accountant / Project Accountant to be responsible for the operational and day to day transaction processing. A US\$ Project Account will be managed by MEST, with Ghana Cedi accounts for operational expenses and minor purchases by implementing agencies.

81. A review of the project's financial management arrangements indicates that they satisfy the Bank's minimum requirements under OP/BP10.02, but the overall fiduciary management risk is assessed as **Substantial**.

4. Social

82. Beneficiaries: The primary beneficiaries of the project are rural community groups exposed to the socio-economic and environmental impacts of land degradation. An estimated 8,000 farmers will potentially benefit from improved management of land and water resources, resulting in enhanced land productivity and income generation. Secondary beneficiaries include the wider local and international populations benefiting from improved environmental services.

83. Social Assessment: A baseline social assessment was conducted, which provided information on underlying causes of environmental degradation such as soil erosion, loss of soil fertility, overgrazing, and causes for water pollution. Adoption of SLWM practices would contribute to halting the environmental degradation caused by poor agricultural practices. A small sample of community members were asked about their knowledge of SLWM practices, determined the percentage of farmers willing to adopt SLWM techniques, and what barriers exist which may

prevent a farmer from adopting SLWM activities. Baseline data will be gathered specific for the impacted communities through the participatory micro-watershed planning exercise, and extension approaches and incentive packages will be developed, taking into account community conditions and traditional practices within each district.

84. Gender: In the project area, men and women are both engaged in agriculture and natural resource harvesting, but practice markedly different systems. Baseline data collection will be disaggregated by gender, and a determination will be made regarding what barriers may exist which are gender-specific, and how incentive packages need to respond to the different needs of women and men farmers.

85. OP 4.12: With the variety of SLWM options that will be available, communities may choose techniques which may impact individual(s) assets. Because it's unknown during project preparation where project activities will be implemented, or which SLWM techniques will be adopted, and resulting impact area, a Resettlement Process Framework (RPF) has been prepared. The Framework shows how local populations will be consulted and active participants in planning resource use within their area.

5. Environment

86. In accordance with the Bank environmental screening guidelines the project has been classified as Category B. In general, social and environmental impacts of activities are expected to be positive as the overall aim is to improve land, water and natural habitat management through small scale activities 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 be judged to have a clear (and potentially quantifiable) environmental benefit. No major adverse environmental or social impacts are expected.

87. An Environmental Analysis and Management Plan (EAMP) has been prepared to identify and mitigate remaining moderate environmental risks, such as:

- Carefully selection of any non-native species for SLWM technologies based on experience from other similar environments, to avoid introducing tree or shrub species that could become invasive or adversely impact soil water balance.
- Incorporating integrated fertility management and/or use of IPM alongside any improved farming systems that could encourage increased use of inorganic fertilizers and pesticides.
- Establishment of local regulations and enforcement by water users associations for any SLWM technologies linked to dry season irrigation that have the potential to increase water extraction. Irrigations systems will be improved for increased water use efficiency. The project will only support interventions that credibly improve overall hydrological services.
- Support for fire reduction and management to closer approximate natural fire ecologies, rather than outright fire suppression, which could damage natural systems and be counterproductive.
- Guidelines for location, design and construction of water points for wildlife, along with rules for contractors, including sourcing of construction material and provision of access to construction sites, to avoid impacting surrounding natural habitats or encouraging human-wildlife conflict.

- A negative list of activities that cannot be supported under the project to avoid unintended environmental impact.

6. Safeguard Policies

88. The following 5 safeguards policies were triggered by this Project for the GEF funded activities: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Pest Management (OP/BP 4.09), Forestry (OP/GP 4.36) and Involuntary Resettlement (OP/BP 4.12). The two safeguards instruments of EAMP and RPF were prepared and disclosed in-country and Bank's Info Shop on 29th April 2010. Most safeguards measures defined in these documents will be mainstreamed into standard procedures for participatory planning and implementation of SLWM technologies to be developed in the PIM.

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Natural Habitats (OP/BP 4.04)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pest Management (OP 4.09)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cultural Property (OPN 11.03 , being revised as OP 4.11)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Involuntary Resettlement (OP/BP 4.12)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Indigenous Peoples (OP/BP 4.10)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Forests (OP/BP 4.36)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Safety of Dams (OP/BP 4.37)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Projects in Disputed Areas (OP/BP 7.60)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Projects on International Waterways (OP/BP 7.50)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

7. Policy Exceptions and Readiness

89. There are no policy exceptions and the Project is ready for implementation provided standard conditions are met.

Annex 1: Program Background
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

A. Land Resources and Land degradation in Ghana – An Overview

1. Land Resources and Land Use Pattern

Land use in Ghana is classified as agricultural or nonagricultural. *Agricultural land use* includes cultivation of annual crops, tree crops, bush fallow and other uses, and unimproved pasture; agricultural land represents 52 percent of the total area of the country. *Nonagricultural land use* includes forest reserves, wildlife reserves, unreserved closed forests, unreserved savanna lands, lands for mining, settlements, and institutional uses; this land covers the remaining 48 percent of the country's surface (Quansah 2001). Of the agricultural land (World Bank 2005), i.e., land suitable for agricultural purposes, land under irrigation is only 0.5 percent of agricultural land (IFAD 2006), or 0.04 percent of all land (GoG 2003).

2. The importance of Land Resources in Ghana

Land is a key resource for Ghana's wealth. Land contributes to the provision, maintenance, and regulation of critical ecosystem functions. Land is the key environmental asset of the country and includes forests, wildlife, wetlands, and water resources. In addition, land provides habitats for biodiverse species; supports nutrient cycling; contributes to the provisioning of food, fresh water, and wood; and helps regulate the climate and floods. For instance, the forest, savanna, wetland, and coastal ecosystems provide habitats for at least 2,975 plant species, 728 birds, 225 mammals, and 221 reptiles. Ghana's forests provide a significant contribution to carbon sequestration (UNDP 2006).

Land resources are critical for Ghana's economic growth, and represent a critical asset for most part of the population:

- Most of the *natural capital* in Ghana (which represents about two thirds of the total wealth of the country) depends directly or indirectly on land resources (Where is the Wealth of Nations, 2006).
- The *agriculture sector*, which mainly depends on soil productivity, contributes 38% of the GDP, employs about 60% of the rural labor force, accounts for about 75% of the export earnings, and contributes to meet over 90% of the food needs of the country. *Forests and water resources* represent a key asset for Ghana's economy (CEA, 2007).
- Most of the rural households (63% of the total population) depend on land resources for their *livelihoods*. The poor are the most dependent on land resources (CEA, 2007).

3. The Problem of Land Degradation

Land degradation is however increasingly affecting the land resources in the country:

Agricultural lands - Current trends of increasing production through area expansion, unsustainable agricultural practices, rising competing demands for water are increasingly degrading land resources in agricultural lands.

Forests and other natural habitats - Illegal logging, bushfires, encroachment of reserves, poaching, and degradation of mining sites have greatly contributed to the degradation of forests and other natural habitats.

Water bodies - Depletion of forest and vegetative cover mainly due to improper land use management contributed to increased siltation, sedimentation, and eutrophication in water bodies (rivers, basins, lakes).

4. Major Forms of Land Degradation

Land degradation in Ghana can be attributed to physical (in the form of soil erosion, compaction, crusting, and iron-pan formation), chemical (depletion of nutrients, salinity, and acidification), and biological (loss of organic matter) processes. The major forms of land degradation include the following:

Soil Erosion

Soil erosion is the primary form of land degradation in Ghana. The main forms of soil erosion in Ghana are sheet erosion through surface runoff, rill erosion in permanent and shifting microchannels, and gully erosion in permanent channels (EPA 2002). Despite Ghana's topography does not present steep slopes, the intensity of rainfalls in all ecological zones¹²³ is generally high. Rains tend to be therefore highly erosive.

Depletion of soil nutrients

Organic matter content in soils is generally low (less than 2% in the topsoil) (MoFA 1998, in Oppong-Anane) as most of the soils are old and have been leached over a long period of time. The levels of organic carbon, nitrogen and available phosphorus are also generally low (FAO 2005). The annual burning, removal and grazing of crop residues prevent the build-up of new organic matter.

Reduction of vegetation Cover

Forest resources have been depleted at a rate of 1.7 percent per annum in the period 1990-2000 (WDI 2005), but, according to the National Action Program to combat Drought and Desertification, at a rate of 3 percent in the most desert-prone areas. The reduction of soil fertility and productivity has forced farmers to expand their cultivated lands and clear forest areas.

5. Main Causes of Land Degradation

Unsustainable agricultural practices

The traditional farming system (bush-fallow system), which involves slashing and burning of forests and grassland, and the rotation of cultivated fields (rather than crops) over years is proving to be unsustainable given the context of rapidly increasing human and animal population. Further in the absence of soil and water conservation measures and external nutrient replacement practices, unsustainable intensification leads to a progressive reduction of soil nutrients, organic matter, and other chemical processes, and to a consequent decline in productivity and crop yields.

Deforestation and overgrazing

Deforestation represents probably the most serious form of natural resource degradation in Ghana, and it is one of the main direct causes of land degradation in the country. In the presence of a rapid population growth, the demand for more land for agriculture, and for fuel wood and other wood products (e.g., charcoal), which the majority of rural people rely on for their livelihoods, has increased. The poor enforcement of regulations controlling access to and use of forestry products has favored unsustainable logging practices and indiscriminate fuel wood extraction. Overgrazing caused by the combination of rapid increase in the livestock population, sedentarization of pastoral populations, and the reliance of the livestock sector on extensive grazing on natural pastures and poor development of pasturelands has led to increasing pressures on land resources. Notably, the increase of livestock population is also directly linked to the physical compaction of the soil.

Urbanization and Increasing population

Rapid urbanization and increased population have increased the pressure on land, not only regarding farming to meet increased food requirements, but also for other competing uses, such as housing and infrastructure development. Ghana has experienced a rapid population growth in the last decades. Population almost tripled over the last 40 years, from 6.7 million in 1960 to 18.4 million in 2000

(Ghana Statistical Service 2000). Based on current population growth rates (2.7%), the World Bank estimated a population of 20.3 million in 2003 and 25.8 million in 2015 (World Bank 2006).

In the Upper East, Upper West, and Northern Regions, the regions most prone to land degradation, population density has increased between 1984 and 2000 from 87, 24, and 17 to 104, 31, and 21 persons/km², respectively, an increase of 20, 29, and 24 percent, respectively (Ghana Statistical Service 2000).

Mining activities

Mining, particularly illegal mining activities, is one of direct causes of land degradation most specific to the Ghanaian context (see Chapter 4 on Mining for more details). These activities are accompanied by deforestation and removal of the fertile topsoil of adjacent agricultural lands.

Climate conditions

Climate change is expected to further exacerbate the problem: increased rainfall variability and overall drop in rainfall and expected rising in temperatures would have negative impact on agricultural productivity, increase the chances of droughts and/or extreme climate events (e.g. floods), and exacerbate the problem of desertification (particularly in the Northern regions).

6. Impacts of Land Degradation: The impact of land degradation is significant:

From an economic point of view - Land degradation is reducing the growth potential of the country. The cost of soil erosion on agricultural lands and forest degradation is estimated to be about 7% of the national GDP⁴. The estimated cost of environmental degradation in the Lake Volta (i.e. water level fluctuation and hydropower generation, siltation, water quality) is about US\$ 16 million per year, one fifth of which for de-silting (ESW, 2005);

From an environmental point of view - Land degradation is compromising the capacity of ecosystems to provide, maintain, and regulate critical functions and services, including resilience to climate variability and natural hazards (e.g. regulating floods and preventing droughts). Upstream land degradation reduces in fact the capacity of ecosystems to retain water and regulate water flows, thus preventing excessive runoff during the rainy season. Downstream sedimentation and siltation reduces the water storage capacity of water bodies, thus reducing their capacity to retain excessive water flows during the rainy season (preventing flooding), and their capacity to store water for the dry season (allowing coping with possible droughts).

From a social point of view - The rural households, which constitute the most vulnerable part of the population and directly depend upon land resources for their livelihoods, are the most affected by land degradation (resulting in reduction of soil productivity and associated increased food insecurity). Consequences of land degradation, particularly in the Northern regions, include increased migration (from North to South and from rural areas to urban centers).

On Ecosystem Functions and services: Land degradation is considered one of the key factors of continuing imbalances in the ecosystems (including water resources) and worsening of wildlife habitats. See also Annex 16 on biodiversity profiles of the Gbele Resource Reserve and the Wildlife Corridors.

⁴ This is equivalent to about US\$ 530 million, i.e. more than one third of Ghana's US\$ 1.5 billion annual ODA.

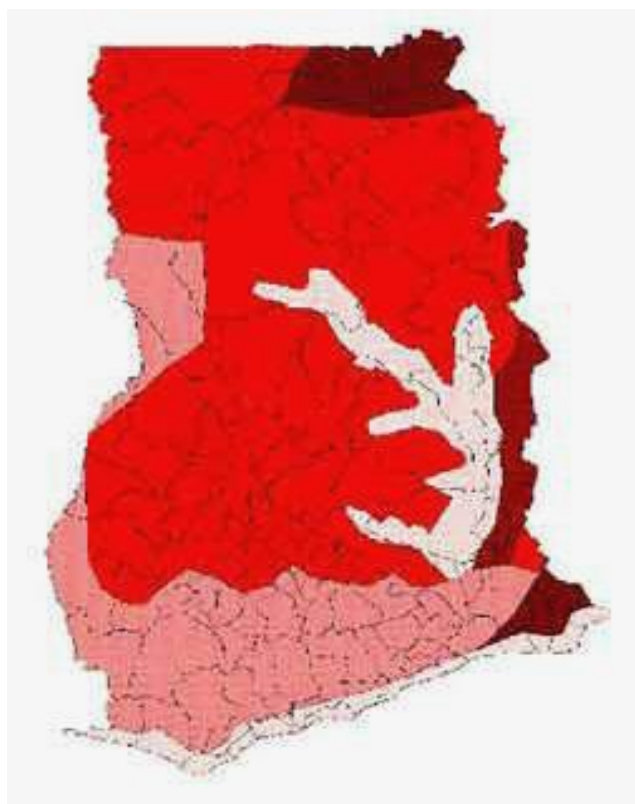
7. Land Degradation in Ghana: Scope and geographical distribution

It is estimated that about 69% of the total land surface is already prone to severe or very severe soil erosion. (This figure is well above the average for degraded land area in Sub-Saharan Africa, i.e. 43%) (FAO, 2000).

Land degradation is geographically widespread in all areas of the country. Soil erosion, in its various forms, is present in all agro-ecological zones and regions, although the most degraded areas in the country are the Upper East and Volta Regions. (Ref. Fig. 1 - Distribution of soil degradation in Ghana) (CEA, 2007).

Although other regions are also at risk of land degradation, the associated social vulnerability may well be most severe in the north of the country 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 rates are three times as high as the national average; (iii) as a result of the poverty, most people are restricted to low-input subsistence agriculture with very limited alternative livelihood opportunities or resources to invest in more resilient production systems; and (iv) the northern savanna is likely to be one of the regions most impacted by climate change.

Fig. 1 - Geographical distribution of soil degradation in Ghana



N.B: The darkest areas are the most degraded

Source: GoG baseline study of desertification risk (Osgood et al. 2001).

Comment [w1]: Probably need to take out map, as not official??

B. Sustainable land management (SLWM) as a means to address land degradation

1. Context of SLWM in Ghana

According to the Ghana- CEA, sustainable land management could offer a means to address land degradation and enhance rural land productivity on a long-term basis. Evidence suggests that sustainable options that can reduce soil erosion are currently adopted in Ghana. There are a number of technologies and conservation practices currently applied in Ghana that substantively reduce land degradation while enhancing productivity and preserving/restoring ecosystems' functions and services (SLWM). These include *agronomic measures*, such as intercropping and agro-forestry; *soil-management practices*, such as minimum or zero-tillage practices; and *physical soil and water conservation structures*, such as stone-bunding, flood control and drainage measures, water harvesting structures, etc. (A list of proven technologies, key benefits, agro-ecological zone suitability, and economic rate of return is reported in Annex 2). However, large-scale adoption of these practices continues to be limited.

2. Barriers to greater adoption of SLWM practices

Past efforts that aimed at addressing land degradation have primarily focused on the symptoms, rather than on the root causes of land degradation (TerrAfrica 2005). There are numerous barriers that have prevented a wider adoption of SLWM. Selected key barriers are shown in Table 1 below.

Barrier	Impact
<ul style="list-style-type: none"> • Weak cross-sectoral coordination • Single-sector/project-specific approach to the problem • Lack of or outdated policies and regulations • Weak institutional capacity 	<ul style="list-style-type: none"> • Policy and institutional environment non-conducive to SLWM scale-up
<ul style="list-style-type: none"> • Tenure insecurity 	<ul style="list-style-type: none"> • Farmers' incentive to long-term investments in land management is reduced.
<ul style="list-style-type: none"> • High upfront costs (and limited access to credit)/ economic returns deferred in the long-term 	<ul style="list-style-type: none"> • Farmers' financial capacity to bear the initial costs associated to land use change, or the capacity to cope with long periods without positive returns is limited.
<ul style="list-style-type: none"> • 'Public good' nature and 'off-site' benefits of sustainable land management 	<ul style="list-style-type: none"> • Private returns in investing in SLWM are usually lower than social returns and discourage private investments in land management.
<ul style="list-style-type: none"> • Limited access to market 	<ul style="list-style-type: none"> • The ability of farmers to benefit from potential improvements in land productivity is constricted, thus incentives to invest in land improvements are limited.

3. The Government' Key policies and priorities

Government's priorities. Addressing land degradation and promoting SLWM is indicated as a priority in key Government's policies, strategies and action plans, including:

- (1) *The Growth and Poverty Reduction Strategy (GPRS-II)*: Restoration and sustainable use of degraded land and water resources is one of the strategies to improve agricultural productivity and modernize the agricultural sector.
- (2) *The Food and Agricultural Sector Development Policy (FASDEP-2)*: Sustainable management of land and the environment as a means to sustain agricultural productivity is one of the key strategic policy objectives of FASDEP. Within FASDEP-2, *the Agricultural Sustainable Land*

Management Strategy provides the framework for implementing land management and environmental conservation activities within the agriculture sector⁵.

- (3) *The Sustainable Development Initiative for the Northern Ghana (SDI) - Strategy and Work Plan*: Sustainable land and water management is indicated as one of the key strategies to increase agricultural productivity and modernize agriculture, recognizing that promoting SLWM in the context of production enclaves provides economies of scale for the construction of physical soil and water conservation measures. The promotion of watershed protection and management using sustainable land management technologies (e.g. tree planting along the banks of the main drainage systems, promotion of water harvesting technologies, etc.) is one of the key measures proposed to improve land and water resource management and reduce the risks and the impact of natural hazards.
- (4) *The Comprehensive Africa Agriculture Development Program (CAADP)*: Extending the area under sustainable land management and reliable water control systems is one of the three pillars of the CAADP, which Ghana is implementing.
- (5) *The Soil Fertility Management Plan*—The Soil Fertility Management Plan (1998) encourages the sustainable use of lands, by, for instance, promoting crop rotations, agroforestry and soil and moisture conservation practices.
- (6) *The Ghana Environmental Policy*—The Ghana Environmental Policy (1991) aims at improving the living conditions and the quality of life of present and future Ghanaian generations. It seeks to ensure reconciliation between economic development and natural resource conservation, by promoting sound management of natural resources. Key issues in the policy include land, forestry, and water management. Specifically, the policy seeks to (1) maintain ecosystems and ecological processes essential for the functioning of the biosphere; (2) adequately protect humans, plants, and animals, and their biological communities and habitats against harmful impacts and destructive practice, and preserve biological diversity; (3) reduce and, as far as possible, eliminate pollution and nuisances; and (4) integrate environmental considerations in sectoral, structural, and socioeconomic planning at the national, regional, district, and grassroots levels. Among the various principles underlying the policy are (1) the use of the most cost effective means to achieve environmental objectives, (2) the use of incentives in addition to regulatory measures, (3) the delegation of decision making to the most appropriate level of government, and (4) public participation in environmental decision making. The Ghana Environmental Policy provides the broad framework for the implementation of the National Environmental Action Plan.
- (7) *The National Environmental Action Plan*—The National Environmental Action Plan (NEAP) (1991)—based on an extensive review of the key sectors/issues underpinning the country's economy and environmental sustainability (land management, forestry, wildlife, water management, marine and coastal ecosystems, mining, manufactory industries, hazardous chemicals and human settlements)—provides the basic policy framework for overall environmental and land management. At the core of the implementation strategy there are enhanced management practices.
- (8) *The Forest and Wildlife Policy*—The Forest and Wildlife Policy (1994) seeks to promote the conservation and sustainable use of the nation's forest and wildlife resources. The policy endeavors to bring the forest and wildlife sectors together for purposes of conservation through sustainable use. Its guiding principles include (1) the right of people to access natural resources for maintaining a basic standard of living, (2) the concomitant responsibility to ensure sustainable use of such resources, and (3) the wise use of these resources in view of their contribution to the

⁵ A number of policies and programmes have been formulated for the agricultural sector since the early 1990s. These included the Medium Term Agricultural Development Programme (MTADP) and the Accelerated Agricultural Growth and Development Strategy (AAGDS). In 2002, the first Food and Agricultural Sector Development Policy was formulated as a sector wide approach/programme and been revised based on changes in the structure of the sector, results of the studies on the pro-poor nature of current policies, focus on diversification of exports and private sector as a key actor in supporting agriculture led growth.

country's economy. The *Forest Development Master Plan* (2001-2010), which implements the Forest and Wildlife Policy, promotes sustainable forest and savanna woodland management, propagation of forest-based products, and conservation of protected areas.

- (9) The *National Wildfire Policy*—The National Wildfire Policy seeks to promote the effective management of wildfires to guarantee the sustainable management of natural resources and the restoration of environmental quality. More specifically, it seeks to (1) ensure the prevention and control of wildfires, (2) introduce alternative resource management systems that will minimize the incidence and effects of wildfires, (3) institute incentives and reward systems in wildfire management, and (4) promote user-focused research on wildfire management.
- (10) The *Northern Savannah Biodiversity Strategy and Action Plan (NSBSAP)*⁶ provides a framework for conservation of biodiversity in the Northern Savannah as a means of improving the context and policy frameworks within which biodiversity conservation nationally is managed. In particular there is emphasis on: (i) Maintaining ecosystem services; (ii) Undertake actions that improve species diversity; and (iii) Optimize the socio-economic benefits of biodiversity conservation and development to local people, for which recommended actions have been suggested.
- (11) The *Water Policy*—The Water Policy (under finalization) aims at ensuring effective development and management of the country's water resources. Based on the principle of Integrated Water Resource Management (IWRM), it will in particular encourage the sustainable exploitation, utilization, and management of water resources to ensure full socioeconomic benefits to present and future generations, while maintaining biodiversity and the quality of the environment. Among other measures, it will ensure the availability of water in sufficient quantity and quality for different purposes, including agricultural use to sustain food production and security. Finally, it will promote the development and use of appropriate technologies for sustainable water resources use.
- (12) The *Medium term National Development Policy Framework (2010-2013)*- The Government's new medium term National Development Policy Framework has seven pillars within the framework to focus on: (i) improvement and sustenance of macroeconomic stability; (ii) expanded development of production infrastructure; (iii) accelerated agriculture modernization and agro-based industrial development; (iv) sustainable partnerships between government and the private sector; (v) developing the human resources for national development; (vi) transparent and accountable governance; and (vii) reducing poverty and income inequalities.
- (13) The more recent effort of the Ministry of Environment, Science and Technology in developing a national *Low Carbon Growth Plan (LCGP)* for Ghana, which will ensure that Ghana's development plans are climate resilient and low-carbon through integrating adaptation and mitigation measures into a comprehensive and coherent cross-sectoral plan.

⁶ The NSBSAP was financed by the NSBCP and was prepared in a participatory way by the Ministry of Land, Forestry and Mines. Official adoption is pending.

Annex 2: Major Related Projects Financed by the Bank and/or other Agencies
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

Bank's portfolio. The Bank has a wide range of ongoing and planned instruments (lending and non-lending) as well as closed projects to support the Government's SLWM agenda:

(1) Ongoing Projects:

I. Lending (DPL, APL, SIL, LIL)		
Project	US\$ Amount	Year
<ul style="list-style-type: none"> • Natural Resources and Environmental Governance DPO (NREG DPO II): supports sectoral and cross-sectoral policy and institutional reforms that will contribute to address land degradation and promote sustainable use of land resources particularly in the NRM, forestry and mining sectors. 	US\$ 60 million (IDA)	2008-2010
<ul style="list-style-type: none"> • Agriculture DPO: supports policy and institutional reforms that will contribute to promote SLWM in agricultural lands. 	US\$ 55 million (IDA)	2008-2010
<ul style="list-style-type: none"> • Land Administration Project (LAP): supports establishment of efficient land titling/registration system and improvement of land administration system. 	US\$ 20.5 million (IDA)	2003-2010
<ul style="list-style-type: none"> • Community Based Rural Development Program (CBRDP): a specific component supports natural resource-based activities, including the adoption of soil and water conservation technologies. 	US\$ 60 million (IDA)	2005-2010
II. Non-lending (AAA)		
<ul style="list-style-type: none"> • TerrAfrica Technical Advisory Services: provides a flexible instrument to strengthen the analytical underpinnings and the capacity of various institutions to oversee SLWM activities. 	---	2007-2010
<ul style="list-style-type: none"> • Mapping and Valuing Water Services in Ghana: assesses the location, nature and value of water services in Ghana. It will provide details on degradation processes, causes, and impacts in a subset of critical watersheds. 	---	2007-09
<ul style="list-style-type: none"> • Global Facility for Disaster Reduction and Recovery proposal (GFDRR): supporting client countries to reduce vulnerability to natural hazards. This will provide linkages to developing a strategic planning and policy process to address the recent floods and future natural resources disasters in Ghana in line with the Sustainable Development Initiative. 	---	2009-2011

(2) Projects in Pipeline:

I. Lending (DPL, APL, SIL)		
Project	US\$ Amount	Year
<ul style="list-style-type: none"> • Social Opportunities project: Afforestation, small scale water harvesting structures, stone-bunds and other ‘labour-intensive’ physical and vegetative land-management technologies and practices (i.e. SLWM) will be used as a productive activity within a safety-net operation. SLWM activities can in fact generate quick income-generating opportunities for a large number of individuals; and adoption of SLWM can protect communities’ main asset (i.e. natural resources) and improve communities’ productive assets (i.e. land productivity). 	US\$ 50 million (IDA)	FY10
<ul style="list-style-type: none"> • Ghana Natural Resource and Environmental Governance – DPO (NREG III): The objectives of the three operations in this DPO series are to (a) ensure predictable and sustainable financing for the forest and wildlife sectors and effective law enforcement; (b) improve mining sector revenue collection, management, and transparency; (c) address social issues in forest and mining communities; and (d) mainstream environment into economic growth through Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), and development of a climate change strategy. 	US\$ 10 (IDA)	FY10
<ul style="list-style-type: none"> • Ghana Agriculture DPL 2 (AgDPO II): This operation is a key component of the Bank’s country program and continues to provide a foundation for policy dialogue on the agriculture sector at a critical time. 	US\$ 25 (IDA)	FY10
<ul style="list-style-type: none"> • Integrated Water Resources Development and Agricultural Competitiveness project: integrated land and water resource development and management to reduce the risks and the impact of natural hazards, and promotion of sustainable land management practices to improve soil productivity and allow intensification of production are key elements of the project. 	US\$ 50 million (IDA)	FY10
<ul style="list-style-type: none"> • Land Administration Project II (LAP-II): will support the next stage of reforms, including survey and maps, re-inventorying and re-evaluating state property, establishing land management information systems and supporting a more systematic registration of lands and deeds. 	---	FY11

(3) Closed Projects:

I. Lending (DPL, APL, SIL, LIL)			
Project	US\$ Amount	Closing Date	Outcome Rating
<ul style="list-style-type: none"> • Ghana Agriculture DPL (I, AgSSIP): In close coordination with other development partners, this project supported the implementation of Ghana’s Food 	US\$ 25 (IDA)	FY09	ICR in process

and Agriculture Sector Development Policy (FASDEP).			
<ul style="list-style-type: none"> • Natural Resources and Environmental Governance Project (NREG DPO1): supported reform efforts by GoG in three key natural resources and environment (NRE) sectors for sustainable growth and development- forestry and wildlife, mining, and environmental protection. 	US\$ 20 (IDA)	FY09	ICR in process
<ul style="list-style-type: none"> • GEF Northern Savannah Biodiversity Conservation project (NSBCP): supports the livelihoods of rural communities in the Northern Savannah by improving the conservation and management of natural resources. 	US\$ 7.6 million GEF	FY09	Satisfactory
<ul style="list-style-type: none"> • GEF Com Based Integrated NRM (FY04): This project enhanced biodiversity conservation and sustainable use of renewable natural resources in the Okyeman through community based integrated natural resource management approaches. 	US\$ 0.85 million GEF	FY08	
<ul style="list-style-type: none"> • Ghana GEF Forest Biodiversity SIL: The global environment objective was to increase the ecological security of globally significant biological resources, especially within threatened tropical moist forest ecosystems. 	US\$ 8.7 (GEF)	FY07	Satisfactory
<ul style="list-style-type: none"> • Natural Resource Management Project: The project aimed at assisting the Government of Ghana to implement its policy of protecting, rehabilitating and sustainably managing national land, forest and wildlife resources 	US\$ 9.3 (IDA) and US\$ 8.7 (GEF)	FY03	Satisfactory
II. Non-lending (AAA)			
ESW on NRM and Growth Sustainability: provided an estimate of the costs of environmental degradation in five natural assets that are critical to Ghana's economic growth, including land resources.	---	FY05	---
Country Environmental Analysis (CEA): assessed the scope, extent, and underlying causes of environmental degradation in four key assets/sub-sectors of Ghana's economy, including Land Management.	---	FY07	---
Country Assistance Strategy (CAS): highlights the need to address environmental degradation, including land degradation, because of its negative impact on economic growth.	---	FY07	---

Annex 3: Results Framework and Monitoring
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

PDO / GEO: 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.

PDO / GEO Outcomes	Project Outcome Indicators	Use of Project Outcome Information
<p>Demonstrated improved sustainable land and water management practices aimed at reducing land degradation and enhancing maintenance of biodiversity in selected micro-watersheds.</p> <p>Strengthened spatial planning for identification of linked watershed investments in the Northern Savanna region of Ghana.</p>	<ul style="list-style-type: none"> • 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). 	<p>Assess effectiveness of project approach to scaling up SLWM technologies</p> <p>Inform ongoing management needs in GRR and corridors</p> <p>Assess success in stimulating broader watershed investments</p>
Intermediate Outcomes	Intermediate Outcome Indicators	
<p>Component 1- Capacity building for integrated spatial planning</p> <p>Improved spatial planning to address land and water management needs</p>	<ul style="list-style-type: none"> • Integrated spatial master plan produced for Northern Savanna zone. • Integrated sub-basin plans developed (number). 	<p>Inform needs for large scale multipurpose waters storage infrastructure</p>

<p>Component2: Water & Land Management</p> <p>Improved local-level watershed management planning</p> <p>Increased extension capacity for SLWM technologies in selected districts</p> <p>Establish effective mechanism to support SLWM through individual land use agreements</p> <p>Improved management of Community Resource Management Areas</p> <p>Established feasibility of environmental service markets</p>	<ul style="list-style-type: none"> • Community Land Use Plans developed (number). • Demonstration plots established in the project area (number) • Farmers benefiting from improved land management in accordance with agreements [direct project beneficiaries] (number), of which female (percentage) • Targeted CREMA communities implementing management activities according to criteria defined in CREMA plans⁷(number) • Feasibility study on financial contribution of environmental service markets to implementation costs of SLWM conducted 	<p>Will be used to assess the capacity of districts to conduct micro-watershed land use planning</p> <p>Inform additional investment needed for comprehensive coverage</p> <p>Assess effectiveness of the extension & incentive models used [Core indicator]</p> <p>Assess demand for and functionality of the CREMA model</p> <p>Inform strategy for future SLWM scale up</p>
<p>Component 3: Project Management, Monitoring and Coordination</p>	<ul style="list-style-type: none"> • M&E system providing required reports and data in a timely manner 	<p>This will be used to assess the effectiveness of project management and M&E arrangements and whether a change is needed to ensure results.</p>

⁷ Likely to include NRM activities such as patrolling, establishment & monitoring of local resource use regulations, and fire management.

Arrangements for results monitoring

Outcome Indicators	Baseline	Target Values					Data Collection and Reporting		
		2011	2012	2013	2014	2015	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
PDO/GEO									
Area of land in selected micro-watersheds under new sustainable land and watershed management (SLWM) technologies (ha).	0	0	500 ha	1,000 ha	1,500 ha	2,000 ha	Annual	Records of fulfilled SLWM contracts	District extension services
Management effectiveness according to METT score in Gbele Resource Reserve and Wuru Kayero & Wahabu Wiasi corridor sites (score, disaggregated).	Gbele: 45 W-K: 28 W-W:34					Gbele: 55 W-K: 50 W-W: 50	End of project	Management Effectiveness Tracking Tool	Wildlife Division
Pre-feasibility studies conducted for new large-scale multipurpose water storage investments (number).	0	0	0	1	2	2	Annual	SADA progress reports	SADA
Results Indicators for Each Component									
Component 1- Capacity building for integrated spatial planning									
Integrated spatial master plan produced for Northern Savanna zone.	N/A	Initial mapping	Plan completed				Annual	SADA progress reports	SADA

Integrated sub-basin plans developed (number).	0	0	0	1	2	2	Annual	SADA progress reports	SADA
Component2: Flood & Land Management									
Community Land Use Plans developed (number).	0	40	80	80	80	80	Annual	District Agric. progress reports	MoFA
Demonstration plots established in the project area (number)	0	0	20	50	80	80	Annual	District Agric. progress reports	MoFA
Farmers benefiting from improved land management in accordance with agreements [direct project beneficiaries] (number), of which female (percentage)	0	0	2,000 40%	3,000 40%	4,000 40%	4,000 40%	Annual	Survey of participant satisfaction	District extension services
Targeted CREMA communities implementing management activities according to criteria defined in CREMA plans ⁸ (number)	0	0	0	10	15	20	Annual	Annual progress reports	Wildlife Division
Feasibility study on financial contribution of PES markets to implementation costs of SLWM conducted	N/A			Buyers identified		PES strategy completed	End of project	Annual progress reports	EPA
Component Three: Project Management and M&E									
M&E system providing required reports and data in a timely manner	N/A	Satisfactory annual report	Satisfactory annual report	Satisfactory annual report	Satisfactory annual report	Satisfactory annual report	Annually	Annual progress reports	MEST

⁸ Likely to include NRM activities such as patrolling, establishment & monitoring of local resource use regulations, and fire management.

MEST will have overall responsibility for M&E, collating activity, output and outcome data collected by all implementing agencies to a consolidated comprehensive monitoring and evaluation report as part of the annual progress reports. Key elements of the M&E data (especially activities & outputs) will also be included in quarterly and bi-annual progress reports produced by implementing agencies and collated by MEST. These will be submitted to the PSC and the Bank. Specific monitoring responsibilities will include the following:

- All implementing agencies will be required to keep detailed records of activities, outputs and expenditures against agreed work plans and following standard formats. Robust financial monitoring is particularly important, given that the project aims to develop reliable estimates of the fixed and variable costs involved in implementing SLM technologies following different implementation models. The Finance & Administration Division of MEST will oversee and provide quality control for financial monitoring systems.
- District extension staff will be responsible for collecting primary data on implementation of agricultural SLM technologies on the ground. They will assess the areas over which SLM technologies are applied via records of SLM contracts signed and fulfilled. Through contracts with participating communities (and simple survey instruments), they will also collect structured information on satisfaction with introduced SLM technologies, reports of changes in local stream flow patterns, use of agricultural chemicals, pest issues and agricultural output at the community level.
- An 3rd verification system will be established to cross-check recorded performance under SLM contracts, based on a sampling approach (further details in annex 4). This will be established and operated by the EPA, but work may be contracted to an NGO.
- Specialized monitoring of vegetation cover in the project implementation areas, using NDVI or similar remote-sensing based techniques, will be outsourced under the supervision of EPA. The TCO may also be directly involved if ground-truthing is required. Sampling of soils to monitor changes in organic (and therefore carbon) content will also be outsourced, potentially under the same contract.
- Community Resource Management Committee members will be responsible for simple community wildlife and natural resource monitoring systems in CREMAs. The information collected under these will be collated by the Wildlife Division, who will also be responsible for monitoring management effectiveness in Gbele and CREMAs via the METT tool, and for monitoring contractor compliance with safeguard measures for the construction of water points in Gbele..

In addition to the above responsibilities, which will be codified in the PIM, the project will seek to encourage partners to engage in complementary monitoring activities which will benefit the project. In particular: (i) other projects implementing SLM technologies will be encouraged to adopt compatible monitoring systems to allow comparison of the effectiveness of different approaches; (ii) institutional water users will be encouraged to conduct scientific water quality and flow monitoring to demonstrate the impact of project activities on hydrological services and therefore the benefits of PES; and (iii) SADA is expected to conduct a rigorous impact evaluation for the project.

A results-based monitoring and learning system will provide for adaptive management and demonstration of project performance as a basis of building support for scaling up activities after project close. GEF financing among other things will support a modest GIS capacity based within the project areas to support spatial aspects of monitoring.

Annex 4: Detailed Project Description
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

Project Development Objective / Global Environment Objective: 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.

Project approach

The Project 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.

Northern Ghana has fallen behind the rest of the country in terms of economic development and poverty reduction. As with many semi-arid areas, the north is at once challenged by too little water and too much. Only a single wet season crop cycle is supported under traditional rain-fed systems, and rainfall can be unreliable. Expansion of agricultural productivity requires provision of dry season irrigation, either for vegetable production, or for establishment of fruit trees (which require watering and protection during early years). Conversely, major flood events have occurred in recent years, which releases from upstream dams in Burkina Faso are believed to have exacerbated. One area in the east of the Northern Region is known as “Overseas” because overland access is severed by floodwaters on an annual basis.

Aside from water management, the north lacks other key infrastructure, particularly for transport of agricultural produce to markets. The savanna agro-ecological zone also has a high intrinsic vulnerability to land degradation, and the ever-increasing human pressure on land resources is believed to be leading not only to reduced soil productivity, but also to siltation and reduced dry season flow of the area’s rivers. This subcomponent will provide the basis for planning major investments in water management infrastructure in the north, and identifying complementary investments in other infrastructure and improved land management, to release the productive potential of its water resources for sustainable development.

Wildlife and water management are also intimately linked in northern Ghana. Due to wildlife requirements for water and to historical patterns of development that avoided river bank previously infested with onchocerciasis, natural habitat corridors centered along rivers form biodiversity corridors linking Mole National Park and Gbele Resource Reserve (GRR) with protected areas in Burkina Faso. Sustainable land management of the surrounding watersheds is key to supporting the continued survival of these riparian corridors, which in turn are critical to the hydrological services provided by the watershed as a whole, and form flood protection buffers along the main Volta tributaries flowing into Ghana from Burkina.

In the aftermath of devastating floods in 2007, 2008 and 2009, Parliament has approved the Sustainable Development Initiative for the Northern Savannah as an integrated approach to closing the economic growth gap between the north and the rest of Ghana, whilst increasing resilience to natural hazards and climate change. The Strategy is based on a win-win vision for the environment and regional economy, turning floodwaters into a productive asset through investing in flood control and irrigation whilst exploiting green drivers of growth compatible with improved watershed management. This would be supported with appropriate commercial and social infrastructure. Tree crops are identified as a key economic driver. Potentials for additional agricultural diversification and nature-based tourism are also recognized.

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: (i) piloting innovative models for

grassroots watershed management which combine flood, land & natural resource management; and (ii) 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 community-level watershed management activities will aim to solve typical transaction cost and sustainability issues by exploiting market based instruments and enhanced production opportunities. SLWM in predominantly agricultural watersheds will be integrated with improved protection of the wildlife corridors at their core to capture synergies, and to develop local benefits from biodiversity-based livelihoods as a mechanism for sustaining an important element of watershed management.

Selection of Project Areas

Selection of areas for project interventions is based on the following criteria:

- Selection of sub-watershed areas to allow sufficient concentration of activities to produce impacts.
- Severity of flood risk and land degradation issues.
- Included in the Social Opportunities Project (SOP), or other investment programs that can support similar small-scale water management infrastructure.
- Presence of biodiversity corridors and proposed CREMAs, to synergize SLWM activities in both agricultural land and natural habitats.
- Existing or high potential for future investment in complementary large-scale water and flood management infrastructure.
- Representation of each of the three northern regions.

Activities will therefore be focused on the sub-watersheds of major tributaries of the Volta flowing into the country from Burkina-Faso. SADA has a focus on future large-scale investments in these areas for floodwater management. In particular, the Kulpawn-Sisilli and the Red Volta sub-watersheds correspond with riparian biodiversity corridors, the former linking the Mole-Gbele-Nazinga protected area complex. Areas within these sub-watersheds suffer high flood and land degradation impacts, and associated poverty also makes them high priorities for SOP⁹.

The Kulpawn-Sisilli has two main branches. The Grogro arises in Sisala West, north of Gbele, flows southeast through the reserve, and then on to Mole through Wa East just below the Gbele-Mole Corridor. Within Mole, it turns northeast, becomes the Kulpawn, and exits into West Maprusi, where it reaches the White Volta. The Sisilli flows south out of Burkina Faso, at the core of the biodiversity corridor joining Nasinga with Mole-Gbele. It forms much of the boundary between Upper West Region (Sisala East) and Upper East (Kassena-Nankana & Builsa), before joining the Kulpawn in West Maprusi at the southeastern edge of the Mole-Gbele-Nasinga Corridor. The Red Volta flows out the Burkina Faso to the east, and runs south between Talensi Nabdum & Bawku West, at the core of the Eastern Biodiversity Corridor, before joining the White Volta. A smaller tributary, the Puruku flows thru Sisala East to the Sisilli.

The 8 Districts comprising these sub-watershed are listed in the table below. As SOP investments are selected and implemented by DAs, Districts' extent of participation in SLWM activities will be conditioned on their own willingness to use some of the available SOP funds for small-scale water and flood infrastructure, on the basis that GEF funds can then be used to support complementary soft investments. Detailed mapping of land degradation factors (including population density & vegetation cover) and micro-watershed boundaries, during early

⁹ SOP will include 40 districts under the Labor Intensive Public Works component, which are prioritized according to poverty indicators and receive allocations according to the size of the poor population. Of the 8 districts included within first priority watersheds, all but one are included as SOP districts, and 5 of these 7 are within in the top 10 SOP priority districts.

implementation of component 1 activities, will be used for precise targeting of communities.

Region	District	SOP # ⁹	Biodiversity areas	# communities in project area ¹⁰	Population within project area	Total population
Sisilli-Kulpawn						
Upper West	Sisala West	2	Gbele	51	35,000	39,265
	Sisala East	5	MGN corridor	58	38,000	52,760
	Wa East	3	MGN corridor	86	45,000	48,192
Northern	West Maprusi		MGN corridor	55	35,000	149,533
Upper East	Builsa	10	MGN corridor	75	45,000	104,503
	Kassena-Nankana	21	MGN corridor	55	44,000	87,244
Red Volta						
Upper East	Talensi Nabdam	7	Eastern corridor	40	25,000	70,945
	Bawku West	16	Eastern corridor	75	51,000	133,889

Project Components

The operation has three integrated components:

Component 1: Capacity building for integrated spatial planning (\$1.0m from GEF [Land Degradation])

This component will finance technical assistance, equipment and training to strengthen the capacity of local agencies to carry out spatial planning in a form that integrates watershed management concerns. It will provide integrated spatial planning tools (for mapping, analysis, monitoring and evaluation) 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 that this will 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.

The activities will be coordinated with a World Bank study to prepare a Basic Integrated Water Resources and Flood Management Plan (IWRFP) for the north through the Global Facility for Disaster Reduction and Recovery, and will draw upon additional work currently being conducted by the World Bank with WRC. The subcomponent will support SADA and local stakeholders to engage with the process of water resource and flood management planning, and carry that forward as part of an integrated spatial planning approach that identifies the potentials of large- and small-scale watershed management investments. Stages in the process would include:

- *Establish a small spatial planning unit within SADA.* Experienced spatial planning and GIS technical staff will be hired and provided with basic GIS tools.
- *Environmental & economic mapping of the north.* Mapping of the northern savanna region to identify areas with high agricultural and natural resource potentials (using land suitability mapping previously carried out by EPA, recent satellite imagery and land degradation diagnostics), ecologically sensitive

¹⁰ Numbers of communities and population within the project area are approximate, more detailed mapping of the extent of the target sub-watershed will be carried out early in implementation in order to prioritize communities for inclusion in project activities.

areas (including biodiversity reserves, potential and established corridors), and infrastructure (using regional infrastructure diagnostic tools, as applied in the Western Economic Corridor). These will be combined with water resource and flood risk mapping to be conducted under the World Bank and GFDRR studies.

- *Spatial development plans.* Convene local decision-makers around the results of the IWRFMP and regional mapping, and to begin to map out areas of focus for different development activities in the north, e.g. different agricultural products and processing facilities, natural resource management and tourism. A spatial masterplan for the whole Northern Savanna zone will be produced, and subsequently more detailed spatial plans for two sub-watershed, of which one is expected to be the Sisili.
- *Spatial monitoring & collaboration tool.* Develop a simple GIS-based monitoring tool to integrate data collected by various line agencies on an ongoing basis, and to support spatial data collection and monitoring under the project, including micro-watersheds mapping and monitoring in support of subcomponent 1.2. This would include capacity building for select regional and district agencies on spatial data collection to allow for routine integration of data on e.g. infrastructure construction & maintenance, land use and incidence of flood and droughts.
- *Identifying bankable investments.* Advancing the work started under the IWRFMP through conducting pre-feasibility studies for selected major multi-purpose water infrastructure investments indicated under the IWRFMP and incorporated into spatial plans. Pre-feasibility studies will include initial designs and operation plans, analysis of alternatives, field surveys, and initial social & environmental assessments and financial & economic assessments. This will identify an initial set of investments ready for detailed design and preparation work.

Component 2: Water & Land Management (\$6.45m from GEF [\$5.45m Land Degradation + \$1m Biodiversity]):

This component will provide technical assistance, equipment and incremental operating costs to support community flood and land management at the micro-watershed level, including management of agricultural land and ecological infrastructure. It will also be associated with labor-intensive civil works investments in small-scale flood & water management infrastructure through the Social Opportunities Project to exploit opportunities for a more comprehensive approach.

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

This subcomponent will provide technical assistance, training and incremental operating costs to (1) strengthen the capacity of district agencies in micro-watershed management techniques, and specifically 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, which would identify watershed issues, needs and suitable areas for application of water and flood management structures, as well as potential for application of sustainable land management technologies. The activity will utilize (and where necessary adapt) community land use planning approaches already developed for Ghana under the former Community-Based Natural Resource Management Project, the CBRDP and by FAO, and may be supported by an experienced field NGO.

A training program will be delivered to agriculture, water resources, forestry and planning staff in each of the pilot districts, along with material support needed to successfully work with communities to conduct participatory micro-watershed planning exercises within the implementation area. Typically a separate exercise will be conducted in each community, but neighboring communities may collaborate on a single plan if village areas share a single micro-watershed. Micro-watershed plans will not be detailed and prescriptive land use plans drawn up for the purpose of a legal definition of ownership or usage rights. Instead they will represent a broad-scale and informal consensus on the locations of major categories of land type and existing land use, mapping of water and flood management issues, identification of community-level water & flood infrastructure investments,

management needs for new and existing infrastructure, and suitability of different land zones for application of the various soft SLWM technology options. They will therefore pave the way for inclusion of small infrastructure investments in Area Council and District development plans, and for SLWM agreements with individual land users, but will not themselves form binding agreements. In addition, the community planning exercise will provide for:

- i. an entry point for general awareness-raising of SLWM approaches and technologies – the project rationale will be explained to communities in terms of short-term external assistance being provided for the adoption of improved SLWM technologies in line with the external benefits these provide, but emphasis will be given to the long-term benefits of these technologies to farmers and their families themselves, especially in the face of the likely impacts of climate change;
- ii. establishment of detailed baselines for each community of existing implementation of SLWM technologies and agricultural productivity, against which these will be monitored over the project lifespan;
- iii. forum for discussion of requirements and incentives for successful introduction of SLWM technologies; and
- iv. identification of any land use issues, uncertainties or disputes germane to the project, which may need the intervention or support of the District Assembly to resolve.

Specific outputs will include:

- Local land use and infrastructure maps, which can be digitized and potentially used for ongoing monitoring and to feed into macro-watershed analysis.
- List of potentially feasible small-scale flood & water infrastructure identified for incorporation into AC and DA development plans.
- Agreements with communities on types of improved SLWM technologies suitable for priority areas within micro-watersheds.
- Indication of farmers' interest in various SLWM technologies, and types of support needed to apply them.

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

This subcomponent would finance technical assistance, equipment, training and operating costs to design systems and put in place local extension capacity to promote SLWM technologies on the ground. The approach would involve the establishment of SLWM subproject agreements to provide mutual accountability between participating farmers and extension providers, and incentivize farmers to produce outputs, rather than just accepting inputs.

Development of SLWM menu of options, manual & incentive structures linked to an environmental index. Annex 16 summarizes SLWM technology options considered most promising for the northern savanna region, on the basis of permitting intensified rural production and soil rehabilitation without jeopardizing the resource base, and whilst contributing to the provision of broader environmental services and climate resilience. These are grouped into technology packages appropriate to different land types and agricultural systems, which will form the basis of a menu of SLWM technology options, and well-illustrated manuals, to be discussed during participatory micro-watershed planning exercises, and then offered to local farmers as agreed at that time.

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 scoring systems will be determined through an expert workshop during early Implementation, and then reviewed during the course of the project, as the monitoring of actual environmental services in the project area allows the efficacy of introduced SLWM technologies to be verified in the field. The index will provide a basis for eventually linking introduction of SLWM technologies to a PES-based framework. The level of support available for introduction of SLWM technologies will be linked to the environmental improvement of land use systems they imply, as measured according to this index.

Package of support will be designed for farmer groups to undertake improved land management practices that produce local or global environmental services (e.g. biodiversity conservation, improved carbon sequestration, reduced siltation, etc.), based on the understanding of needs developed under subcomponent 2.1. The difference from traditional extension approaches based solely on demonstration and input subsidy is that participants will be required to enter into subproject agreement specifying the support to be received in return for implementing the technology. This is designed to facilitate the eventual establishment of full PES markets, by providing a more transparent and bankable return for potential buyers of environmental services, but is also expected to have other key benefits, including:

- i. Attention will be focused on identifying and quantifying specific support and incentives required for successful implementation, directly acknowledging and confronting the possibility that the internal incentives from increased productivity may not be sufficient to cover the short term costs of labor or reduced initial production incurred in the implementation of a given SLWM technology. Where an additional external incentive is required, it may be justified by the public environmental benefits that the technology would generate. Support needs and the appropriate incentive mix will be discussed with farmers under community planning activities in subcomponent 1.2, and the ultimate test will be through the uptake and drop-out rates achieved.
- ii. Contracts should encourage more active involvement of farmers via (a) self-selection of the most committed individuals by acceptance of an obligation to implement; and (b) providing a basis for farmers to monitor the performance of the extension providers in delivering specified support.

Packages of support should be just enough to “tip the balance” of incentives in favor of widespread adoption of SLWM technologies, addressing financial and technical barriers associated with launching these technologies. Packages of support should not exceed limits related to the level of environmental benefits expected from the new technology as measured by the environmental services index. Annex 16 summarizes the types of support likely to be required under individual SLWM technology packages, but in general terms, these are will to consist of a mixture of inputs. Up-front support, such as extension, and provision of specialized inputs, e.g. new seed varieties, tree seedlings and small pieces of equipment, will be provided to allow farmers to begin to implement the technologies. Group extension activities will include establishment of community-level demonstration plots, and facilitation of broader learning and support networks including inter-community peer learning, use of regional media (especially existing agriculture-focused radio broadcasts) to share information, compare experiences, and showcase successes. Subsequent inputs will be performance-based according to implementation criteria included in subproject agreements. These will include necessary items to implement later stages of the SLWM technology, allow expansion of area under the technology, and/or consist of linked livelihood support inputs. Linked livelihood inputs could be regular inputs required by farmers (such as fertilizer or fertilizer subsidies) and/or small capital items that enhance livelihoods, such as equipment for processing agricultural products, carts, bicycles, beehives, small livestock, etc. The project will also investigate options for sharing costs of larger capital items (such as provision of solar or treadle pump small irrigation systems), as part of the incentive structure. Farmers would be provided with a menu of options from which output-based rewards can be selected, which could be based on a system of green rewards points earned according to the type and extent of the SLWM technology implemented. The negative list of items that cannot be provided would include items without productive value or excluded according to the negative list as in EAMP, i.e. pesticides, diesel pumps, potentially harmful species, firearms, chainsaws or hunting equipment. The project will involve experimentation with the packages of inputs provided (i.e. the degree to which these are (i) provided up-front vs performance-linked, and (ii) direct inputs to the SLWM technology in question vs linked livelihood inputs), in order to establish the most effective incentive structures.

Agricultural development projects in Ghana generally follow a value-chain approach, and if new crops are being introduced, assistance with identifying and linking to new markets may also be required. This particularly concerns the introduction of new dry season gardening systems, as opposed to incremental enhancements of

existing wet season farming systems, for which the degree of change is much more modest. Within the scope of the Project, however, there is limited potential for significant work on development of new product markets. Hence the SLWM technology packages will likely be restricted to those involving products for which existing local demand already exists, or for which new markets are already being developed under large rural development programs in the north, and to which project activities can readily link, such as the Northern Rural Growth Program (NRGP).

Build capacity of extension services to develop and support SLWM subproject agreements with local farmers. Extension services to support SLWM technologies will be mainly provided through District Agricultural Extension Agents, although local NGOs will be used to support the initial community planning and engagement activities, and involvement of NGOs or commercial organizations can be included if there are specific extension activities in which they have proven expertise. A SLWM training program and set of training materials for extension service providers will be developed based on the final menu of SLWM technology packages, and tailored to the agreed extension service arrangements. A capacity strengthening program will be then launched with extensionists to support implementation of the technologies, which will consist of training, and also supporting operational capacity of District staff through equipment and operating costs as necessary.

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

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 subproject agreements. Groups of farmers would enter into an agreement with the District Agricultural Unit to introduce the agreed SLWM technology to a plot of a specified size and location. Drawing up of agreements would include recording the GPS location and size of the plot (although not detailed mapping of plot boundaries), and endorsement at the community level. Contracts will specify standard indicators for successful implementation of the technology over the contract period, plus the extension support to which the farmer is entitled. The land tenure situation is very complex, and some benefit sharing arrangement may be needed to ensure both tenants farmers and traditional land owners (tindanas) agree to the implementation of the new technology. Incentives would be concentrated on the farmer implementing the new technology, but with some minor portion may be provided to the land owner (who would in any case benefit from the improvements to the land). Eligibility of SLWM technologies in any given area would be determined through the participatory sub-watershed planning exercise conducted under subcomponent 2.1. Additional eligibility criteria for farmers and sample agreements would be included within the Project Implementation Manual.

To estimate the contribution of the new SLWM technologies to rural livelihoods, overall agricultural productivity within participating communities will be monitored and compared to an equivalent control group of non-participating communities. This monitoring will build on existing routine district agricultural monitoring systems. The project will also employ an annual feedback instrument (applied at the same time as contractual performance and payment obligations are assessed) to monitor farmers' self-perceptions of performance and satisfaction under the introduced technologies.

To address risks of collusion, an independent verification of SLWM contracts will be carried out to certify provision of output based incentives. This will be based on (a) checks of the total volume of agreements for a community to ensure it does not exceed the amount of land available as adjusted for the local participation rate, (b) spot checks of individual contract plots (on a representative sample basis, 100% coverage would be prohibitively expensive), and (c) review of remote imagery to ensure broad correlation between recorded plot locations and evidence of changes in vegetation cover.

Support individual SLWM agreements. This will provide support directly to farmers under subproject

agreements, according to the incentive structures discussed above. Individual land users may of their own free choice enter into agreements to introduce suitable SLWM technologies from the menu of options. Support would be conditioned on improvements in environmental services associated with changes in land use, as measured by the environmental index. Extension activities in the north are general organized around Farmer Groups, consisting of around 15-20 individuals with interest in implementing particular activities, and these will form the basis for the SLWM contracts with the Districts. In most cases, Farmer Groups are ad hoc structures with limited institutional capacity, and therefore District staff would provide agreed output rewards to them directly in the form of the selected goods. The farmer group would then be responsible for the distribution of the inputs amongst its members. In a few locations within the project area, however, NGOs have worked to strengthen the capacity of these groups over some time, and there may be scope to provide them with output payments in the form of cash, against which they can organize their own purchase of reward items, as agreed with the project.

Agreements would be established around the end of year 1 of the project, and support could be provided annually over a maximum of 4 subsequent years based on observed changes in the land use system compared with the baseline situation on that particular farm. The agreement period and size of the rewards will be related to the economics (i.e. cost and time to break-even) of specific SLWM technologies. Rewards would be proportional to the total increment in environmental services as measured in relationship to the base line at contract signing. Provision of an up-front or joining bonus to reflect the existing land use status will be allowed if deemed necessary during consultation on detailed implementation arrangements. Indicatively, a strong-performing farmer could expect to get rewards equivalent to up to around \$60 per year per hectare over the course of the project.

A considerable number of locally based NGOs are active in the agricultural and NRM sectors in the north and often work in close cooperation with District staff. Although agreements will be signed with and most extension support provided by the Districts, NGOs may have a key role in assisting with the community engagement, and supporting the formation of agreements with farmer groups.

Linking soft and hard community SLWM investments. GEF activities will complement associated small-scale infrastructure investments to protect agricultural lands from localized floods and to harvest flood water to increase agricultural productivity, available through the IDA Social Opportunities Project. SOP investments focus on labor intensive works and may include construction or rehabilitation of community-managed:

- small-scale dams,
- water capture and storage structures, such as dugouts
- irrigation systems
- check dams and silt traps
- river bank protection structures
- physical and bio-physical soil and land conservation works, such as bunding, contour drains, grassing, etc, above and beyond those on individual plots to be supported under component 3
- hand-drilled wells and boreholes, and
- tree-planting.

GEF and SOP investments are expected to be highly synergistic. The availability of hard investments through SOP should help to respond to villagers' over-riding concerns of improving dry season water availability and minimizing wet season flood impact, whilst the GEF-funded activities will add value to the SOP investments through:

- i. Participatory identification of community investment needs through the micro-watershed planning processes under subcomponent 2.1. These would be incorporated into Area Council Action Plans and Medium-Term District Development Plans, and would then be eligible for selection by the DA for funding through SOP (following further feasibility study as necessary). As well as identifying potential water-related investments, participatory micro-watershed mapping will also be of value in siting other

- labor-intensive rural infrastructure, such as roads.
- ii. Strengthening community capacity for sustainable management of water infrastructure through the establishment of water user groups and suitable regulations. This process would start during the participatory micro-watershed planning, with follow-up built into the continuing engagement in project communities.
- iii. Provision of complementary soft SLWM investments (e.g. improved agricultural land management practices), which will increase the longevity of water infrastructure investments. In the case of tree-planting, where SOP might pay for labor and staffing, GEF funds could provide complementary inputs such as nurseries and incentive payments based on performance in maintaining trees.

SOP investments will be chosen by the Districts, so the proportion of labor-intensive public works that will be directed to water and flood infrastructure is not yet known, but indicatively, up to around \$9.5m may be available in target districts. The project will work with SOP to ensure that a suitable set of designs and guidelines for construction standards and quality control are used under SOP, including for promotion of agroforestry and other forms of community tree establishment.

The Project will also explore the potential for use of the rural infrastructure component of the IFAD / AfDB supported Northern Rural Growth Project to extend the funding available under this subcomponent.

Subcomponent 2.4: Management of riparian biological corridors (\$1m GEF [Biodiversity])

Overall this subcomponent will support activities for sustainable management of high-value natural habitats, to complement the broader approach to land and watershed management. This will include support to (1) the implementation of the Corridor Management Plan and (2) implementation of priority activities under the Tourism and Waterhole Development plan for the Gbele Resource Reserve which contribute to wider project watershed management objectives through the maintenance of ecological infrastructure. The biodiversity related Annex 17 provides further details on the nature of activities designed in this subcomponent.

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, in parallel to the broader community watershed planning approach, both, but more emphasis will be given to building of community institutions for the establishment of Collaborative Wildlife Management Areas (CWMAs)¹¹ and/or Community Resource Management Areas (CREMAs)¹² in the corridors. Land adjacent to the protected area network is usually seen as the highest priority for the establishment of CREMAs since they allow communities fringing the protected areas to manage and sustainably utilize the wildlife resources within a defined area.

As part of the Northern Savannah Biodiversity Conservation Project (NSBCP) financed by the GEF five potential CWMA sites were identified, mainly composed of community lands and a few forest reserves and community-owned areas of natural vegetation that could reinforce the Western and Eastern Corridors. These include: (i) Site 1- Wuru – Kayero Collaborative Wildlife Management Area; (ii) Site 2- Sumboru – Bechawsa Collaborative Wildlife Management Area; (iii) Site 3 – Wahabu –Wiasi Collaborative Wildlife Management Area; (iv) Site 4 - Gbele - Mole Collaborative Wildlife Management Area; and (v) Site 5 - Red Volta Collaborative Wildlife Management Area. Corridor management plans were developed for these sites. Similarly, management, tourism

¹¹ CWMA and CREMAs are used interchangeably. In some sites the entire CWMAs can be established as a CREMA which is managed by the communities, while in other sites where the CWMA includes forest reserves the CREMAs need to be established to exclude those areas.

¹² A CREMA is a geographically defined area that includes one or more communities that have agreed to manage natural resources in a sustainable manner and was introduced and pilot-tested by Ghana’s wildlife authorities under the Protected Areas Development Programme (PADP).

and waterhole development plans for the Gbele reserve were also prepared in close consultation with the park manager and staff and fringe communities.

The proposed project will provide direct support to only **Site 1** and **Site 3** given the limited availability of resources (see maps 2 and 3, Technical Annex 1) and based on their close proximity to existing National Parks which are endowed with globally significant wildlife populations, on the assumption that this would encourage free movement of wildlife into the corridor area. These initial interventions are expected to create the needed momentum for catalyzing other investments in developing the remaining sites in the Western and Eastern corridors.

Specific activities to be financed will include:

1. Creation of CREMAs

The project will support the creation of CREMAs within the CWMA which will include:

- (i) Sensitization and awareness creation on the CREMA concept within the community.
- (ii) Negotiations and agreements on CWMA boundaries including establishment of Community Resource Management Areas (CREMAs), and the governance structure.
- (iii) Baseline assessments for wildlife stocks, ecological studies for monitoring key fauna and flora species and opportunities for community based ecotourism using the FAO market analysis and development approach.
- (iv) Development of a CREMA Conservation Management Plan which will include strategies for fire management, wildlife surveillance and protection, water points development and opportunities for community based ecotourism activities.
- (v) Development of a system for community-led monitoring of wildlife stocks including patrol access tracks.
- (vi) Identification of sites for and establishing two or three waterholes (spillway dikes) for wildlife use given that wildlife and livestock drink from the major rivers and their tributaries.

2. Promoting Ecotourism

Productively managing wildlife corridor areas is key to ensuring the survival of their wildlife and plant resources. Also, it is clear that the only way that the surrounding communities will support the conservation of these areas is if they serve the interests of the communities in one or more tangible ways. This activity aims to provide the initial input towards both 'ecotourism development' including alternative livelihood opportunities (such as beekeeping, shea butter processing, dry season gardening, planting woodlots, improved charcoal burning and sustainable exploitation of firewood, domestic livestock rearing, wildlife rearing, specialized tours etc), and establishing wildlife "production" zones, meaning tourism (game viewing) and bushmeat industries, rather than a classical conservation approach. The project will support small community enterprises related to ecotourism development (wild art and craft making, production of natural honey and soap products) through financial support to training and start-up costs. Training will focus on bee keeping and honey extraction methods, management & exploitation of economically valuable trees. In addition it will also finance an ecotourism related study based on the market chain analysis and development approach to create opportunities through examining the potential for larger-scale nature-based businesses to support long-term operating costs

3. Training of Local Communities

Building capacities at the local community level is central to the maintenance of the assets created and for any intervention to be effective and sustainable. Trainings for the local village communities (40) within the two selected sites will focus on areas such as management of wildfires, simple ecological monitoring methods, management of bird hunting zones wildlife/wildstock conflicts, dry season gardening, tree planting. Trainings will be conducted through the government departments & agencies (such as the Wildlife division, Ghana National Fire service,) and the local level expertise available (such as local NGOs, National Disaster Management Organisation). Training material customized to the needs will be developed to support these

capacity building activities including posters, guidelines and general reference material.

4. Awareness Creation for WildFire Management

Annual burns and wild fires are a major cause of land degradation and vegetation loss which affects local communities by its effect on the local hydrology and loss of a range of non-timber forest products. The project will finance activities for awareness creation and sensitization of communities for fire control and prevention including development of guideline manuals, posters, publications, radio, and street plays etc

GEF funds will mainly provide for (a) Training and workshops (b) Consultancy (c) Equipment and supplies such as fire boots & gear, vehicle (1 pick-up truck or 2-3 motorbikes) for monitoring purposes (d) Infrastructure investment through creating water-points for wildlife, (e) Operational costs for conservation education and community outreach activities, travel, stationery etc.

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

A management plan, draft tourism strategy and waterhole development plan has been developed for the GRR under the NSBCP as a result of a participatory process that created a structure in which the communities share part of the management responsibilities. The implementation of the plans has not been initiated so far. This subcomponent will implement selected activities within the Tourism and Waterhole development plans aligned with broader project objectives. These activities should be seen as the initial steps towards catalyzing further investments in tourism in the GRR given the limited resources at this stage.

Specific activities to be financed will include:

1. Ecological Studies and Monitoring

The GRR is rich botanically in terms of its vegetation and is uniquely pristine with unmodified vegetative cover all over the reserve. However, there is not much data currently available. Ecological studies for major flora species in the reserve will be carried out through a floral survey to determine the floral composition in the reserve.

There is also a need for monitoring the wildlife species in the reserve for both tourism purposes and sustainable livelihoods. A system for monitoring of wildlife stocks will be put in place which will be adapted from the existing monitoring information system & tracking (MIST) of the Wildlife division used for surveillance of the wildlife stocks in the Mole National park.

2. Training and Capacity building in Fire Management

The Wildlife division within the forestry division and the Park management staff are the key players in the management of GRR. The project will create institutional capacity through supporting Forest Service Division and Park Management staff in fire management and in the system for monitoring. Trainings for the FSD and park management staff will be conducted through the Mole National park trained staff and possibly local level NGOs. Training material customized to the needs will be developed to support these capacity building activities including posters, guidelines and general reference material.

3. Establishing waterholes for wildlife use

The waterhole management plan emphasizes the need for provision of water for wildlife and livestock and has identified sites within the GRR for wildlife use. The wildlife drink from the Kulpawn river and its tributaries, which dries up during the dry season thus providing insufficient water through the year. Three to four waterholes (spillway dikes) will be created along the streams and tributaries to retain water for an additional few months in the dry season towards the southern tip of the park. Additionally small bird and game viewing platforms for tourist use will be installed in close proximity to the waterpoints. The design of the waterholes are based on the design already in use in the Nazinga National Park in neighboring Burkina Faso for drinking use for wildlife. These incorporate specially designed passages along the crest of the spillway thus allowing access most time of the year and can be created using labour-intensive methods and local available materials. These have not been established in Ghana so far.

GEF financing will support (a) Training on Fire control and prevention, monitoring of wildlife; (b) Equipment and supplies for ecological monitoring and fire control such as base radios, binoculars, boots, camera traps, 2 computers, one vehicle for monitoring etc, (c) Infrastructure investment through creating water-points for wildlife (d) Operational costs for monitoring activities, travel, office consumables etc.

Subcomponent 2.5: Monitoring SLWM & environmental services. (\$0.5m GEF)

This component will finance monitoring and evaluation activities that will link local activities to national SLWM objectives, to strengthen their broader impact and replicability. This includes the monitoring of environmental services generated in the project area and two discrete national level activities to support the wider adoption of SLWM and impact of project activities; development of monitoring systems for national SLWM policies, and the evaluation of the role of PES in promoting SLWM in northern Ghana.

National monitoring of SLWM policy & implementation. Ghana has developed a set of broad policies to support the implementation of SLWM and its mainstreaming in various sectors. Nevertheless, there remains a critical need to monitor the implementation of these strategies, and to identify specific sectoral policy constraints that act as barriers to broader uptake. Support will be provided to implement simple national monitoring systems of mainstreaming of SLWM in sectoral policies, and implementation and impacts of SLWM practices. This will help to identify specific policy constraints within key sectors that warrant further analysis, and potential project follow-up, such as harmonizing and enhancing the implementation of various regulations on riverine buffer zones, and analysis of specific policy gaps for PES systems to function.

Evaluating environmental service generation. A significant investment in monitoring systems will be required given the pilot nature of the program, which requires a clear and quantitative demonstration of concept to a variety of stakeholders, not least to convince potential future buyers of environmental services of the cost-effectiveness of the investment. Environmental services assumed under the land use index will be verified during the course of the project. Increases in terrestrial carbon stocks will be monitored through remote sensing (NDVI techniques) and/or FAO/UNEP LADA methods. Soil carbon may be monitored on the basis of early and end of project soil sample and/or through correlated with above ground carbon stocks. Simple, community-based observation methods will be used to assess changes in surface water flows, and fixed photo points will be used to assess effectiveness in prevention of bank and slope degradation. In addition, the Project will attempt to partner with major institutional water users and potential watershed service buyers, to encourage them to engage in more quantitative monitoring of water flows and quality.

Overall project M&E will have a strong focus on cost-effectiveness. Given the emphasis on piloting PES in part as a mechanism to increase the cost-efficiency of SLWM investments, considerable emphasis will be given to careful monitoring of financial data, including (a) the fixed and variable costs in achieving SLWM technology uptake and associated environmental services in different locations, and (b) the financial self-sufficiency and livelihood contributions of CREMAs. This will be built into the regular project progress reporting formats, as stipulated in the PIM, and will be used to funding choices during the course of implementation.

SADA is expected to contribute additional resources to provide for a rigorous impact evaluation of the project, although this cannot be confirmed until the Authority is fully established.

Evaluation and strategy for PES. This would identify potential buyers of environmental services generated via the project and assess their willingness to pay relative to the cost of providing those services, to inform a strategy for continuation and scale-up of PES systems by the close of the project. The development of the strategy would therefore draw heavily on results of project monitoring systems described under component 2 above. In the case of watershed services, where the ultimate buyers will be local, such as the Ghana Water Company, the Irrigation Development Authority and the Volta River Authority, awareness-raising is likely to be necessary to lay a foundation for dialogue, as the willingness-to-pay of these entities may not fully reflect the benefits they could

derive. Continuation of project activities need not be predicated entirely on traditional environmental service markets, however. State funding for climate adaptation or other non-marketable public services, and private financing to assist farmers in making long-term investments in their own productivity, could also contribute. Potential markets are illustrated in the table below. The expected outcome would be a timed action plan for continuation of at least a subset of PES activities, including specification of the locations, implementation arrangements, buyers and funding. Depending of the speed with which project M&E can produce clear evidence of effectiveness, the expansion of activities may commence before the close of the project.

Service	Buyers / partners	Approach
Water	Existing institutional users (e.g. Ghana Water Company, Volta River Authority)	Make first estimate of benefits and seek to engage as active partners (for e.g. water quality monitoring) during preparation. Establish willingness to pay based on demonstrated improvements and refined estimates of benefits by end of project.
	Future investments in local water infrastructure for irrigation / flood management	Liaise with developers (potentially via SADA) during implementation to present model for SLWM investment to complement hard water infrastructure.
Climate resilience	Adaptation funds	Integrate SLWM models into adaptation strategies. Assess post-COP15 sources of support during implementation.
Biodiversity	PA managers, tourists, sport hunters, professional nature-based enterprise operators	Engage PAs in coordinated management & eco-tourism development. Establish pilot nature-based activities within communities, & scale up via involvement of professional operators where markets are viable
Carbon sequestration	REDD++ instruments	Monitor carbon sequestration benefits. Assess viability of inclusion in post-COP15 REDD++ mechanisms (even if REDD operations not feasible in savanna areas, the demonstration of an efficient aggregation model would still position Ghana to capitalize on opportunities elsewhere)

Component 3: Project Management and Coordination (\$0.7m from GEF [Land Degradation])

This component will support the operating and where necessary equipment costs of incremental project management & coordination activities, primarily of MEST and EPA (TCO), in line with the implementation arrangements as detailed in Annex 6. In addition to routine administration activities, i.e. budgeting & planning, procurement and financial management, it will cover the costs of annual audits, annual and quarterly progress reports and reception of supervision missions as required by the GEF.

Annex 5: Project Costs
GHANA: Sustainable Land and Water Management Project

Project Cost By Component and/or Activity	Local US\$ million	Foreign US\$ million	Total US\$ million
Capacity building for integrated spatial planning	2.69	0.30	2.99
Water & Land Management	10.53	0.27	10.80
Project Management, Monitoring and Coordination	1.84	0.05	1.89
Total Baseline Cost	15.06	0.62	15.68
Physical Contingencies	0.18	0.02	0.20
Price Contingencies	0.06	0.01	0.27
Total Project Costs¹	15.29	0.65	15.95
Interest during construction			
Front-end Fee	n/a	n/a	n/a
Total Financing Required	7.47	0.68	8.15

Annex 6: Implementation Arrangements
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

National Institutional Framework

Sustainable land and watershed management are broad concerns that require the expertise and coordination of sectors, including agriculture, forestry and water resources. Implementation of such cross-sectoral projects is always a challenge, particularly in the case of small or pilot-level projects without resources to support extensive coordination structures. Several coordination structures relevant to project activities are new and/or still evolving. These include:

- i. **Local government.** Under the process of decentralization pursued in Ghana over the past several years, Districts have responsibility for all development activities in their districts, and therefore coordination and implementation at the local level. In addition to the District Assembly, each District has an Executive Committee, headed by the District Chief Executive, with a District Coordinating Director and 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. Regional Governments help to coordinate District plans, and at the sectoral level, provide technical back-stopping to District-based staff. MDAs which have not yet decentralized to the district level, including Forestry Commission (FC) and EPA, have field staff based at the Regional level.
- ii. The **Savannah Accelerated Development Authority (SADA)** is being established to coordinate the Sustainable Development Initiative for the Northern Savanna, an integrated strategy to close the development gap with the rest of the country that includes improved management of water resources and greening the north through promoting tree crops and other environmentally-sound livelihoods. The structure of the Authority, its mandate and working arrangements with other MDAs await full elucidation through an Act of Parliament, but SADA is expected to be overseen by a Board with a small secretariat, and have a mandate for development strategy and identification of transformative investments within the savannah ecological zone, including the three northern regions and areas of Barong-Ahafo Region.
- iii. The **National Sustainable Land Management Committee (NSLMC)** was established in 2007 to strengthen coordination of 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.
- iv. The **Ministry of Environment, Science & Technology (MEST)** aims to harmonize oversight and coordination of all environmental projects in Ghana, in part through establishment of a Ghana Environmental Conventions Coordinating Authority (GECCA) mandated with oversight of all international environmental conventions to which Ghana is party, including the United Nations Convention on Combating Desertification. A GECCA secretariat has been formed

currently as a small unit within MEST. Technical oversight will be provided by a Project Advisory Committee (PAC), including representatives of all key Ministries, and with recourse at the senior policy level to the Inter-Ministerial Policy Committee on environment, which convenes key ministers under the chairmanship of the Vice President. Under the CIDA-funded Ghana Environment Management Project (GEMP), MEST and the EPA are establishing a framework of Environmental Management Committees at the Regional, District and Community levels. A small project steering committee is being established for the GEMP, which is envisaged to lead to a National Desertification Committee, coordinating national activities to combat desertification.

Implementation Arrangement Principles

As the 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 are key. 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. Exploiting and strengthening existing coordination mechanisms will be favored over establishing new ones.
- Logistical costs should be minimized by placing support functions close to the implementers working on the ground.
- Competition 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 choice will be at the forefront. Environmental service markets are based on exploiting 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.

Project Management & Oversight

Project management will be under the leadership of the Ministry of Environment, Science & Technology (MEST). A small Project Steering Committee will have ultimate responsibility for oversight and policy guidance, chaired by Minister of MEST and including senior-level representatives (Chief Director or higher, although representatives may be sent to meetings on their authority) from MLNR, MLGRD, MoFA, MoFEP, MWWH, and SADA. The same PSC is expected to oversee both the SLWM Project and GEMP. The National Sustainable Land Management Committee (NSLMC) will act as a Technical Advisory Committee and provide access to international SLWM expertise and experience. NSLMC has very similar membership to PAC, and is expected to be formally linked or incorporated to that body in the future.

Within MEST, a Project Manager will be assigned to act as the Secretary to the PSC. With support of a small secretariat of assigned MEST staff including at least one technical / M&E officer & at least one administrative assistant, the Manager will conduct with project administration and monitoring activities, including: (i) coordinating, consolidating and reviewing implementation plans, budget & reports; (ii) M&E and appraising performance of implementing agencies; and (iii) ensuring the timely provision and quality of documentation provided to the Project Steering Committee and World Bank task manager. This secretariat is likely to sit within the GECCA office. Short term TA inputs will provide support as needed for specific activities (e.g. designing reporting formats).

The Directorate of Finance & Administration within MEST, will be responsible for fiduciary management of the project, including: (i) managing a US\$ project account and replenishments in compliance with World Bank Financial Management Guidelines, organizing transfers to Ghana Cedi operating accounts of implementing agencies based on agreed work plans, ensuring adequate accounting systems and annual project audit; (ii) ensuring procurement complies with national and IDA procurement guidelines, directly managing procurement of large items and overseeing procurement of small items for day-to-day activities by implementing agencies on the ground; and (iii) conducting an annual audit. An experienced procurement officer will be hired during the early stages of the project to oversee procurement and build capacity of regular staff. Existing MEST accountants will be provided with training on World Bank FM procedures.

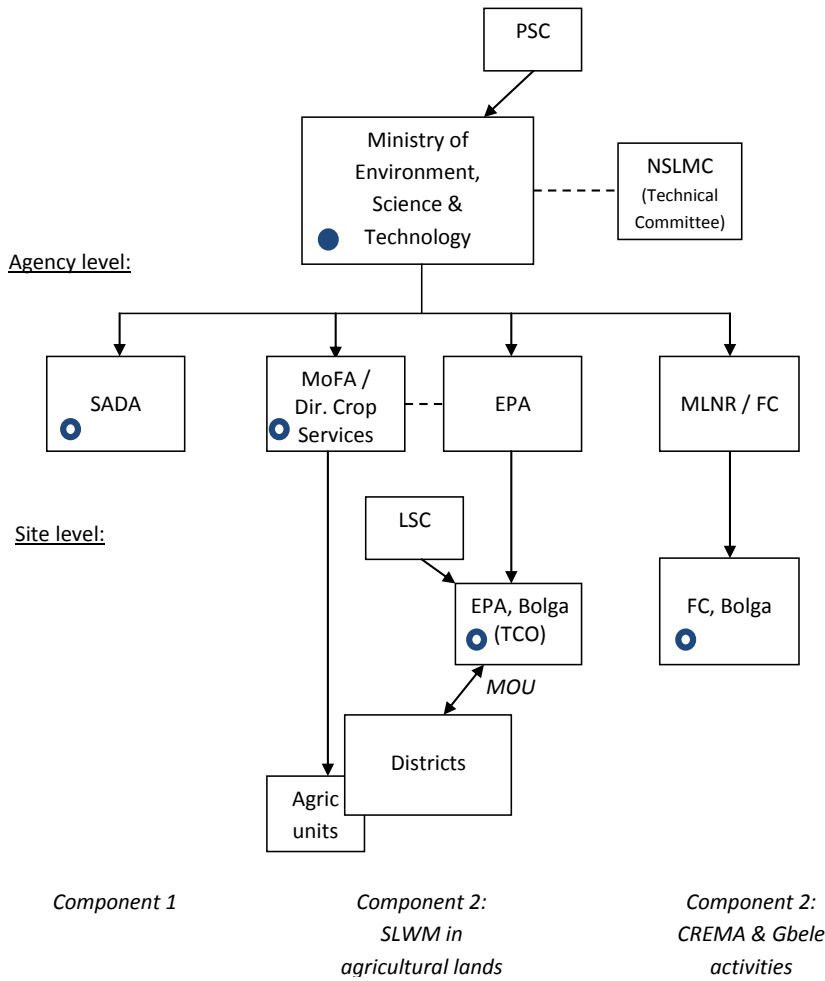
To coordinate activities and share lessons across Districts within the project area, a Local Steering Committee (LSC) will be established, composed of a Regional Coordinating Council representative (Economic Planning Officer) from each Region, the Head of the Regional Agriculture Office from each Region, and the District Coordinating Director from each District. The LSC will meet at least once annually, with meetings rotating through the 3 project Regions and the Planning Officer of the host region chairing. Meetings may be called at other times or decisions taken through non-objection to resolutions proposed through the current chair.

Implementation of Component Activities

Component 1:

SADA will implement activities under Component 1. Consultants will be recruited by MEST under terms of reference prepared / cleared and supervised by SADA. 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.

Overview of implementation responsibilities:



Flow of funds: ● US\$ account
○ Cedi accounts

PSC Project Steering Committee
 NSLMC National Sustainable Land Management Committee
 SADA Savanna Accelerated Development Authority
 MoFA Ministry of Food and Agriculture

EPA Environment Protection Agency
 FC Forestry Commission
 LSC Local Steering Committee
 TCO Technical Coordination Office

Component 2

The Environment Protection Agency (EPA) of MEST will provide technical input and support Districts in the coordination of cross-sectoral activities under this component. At the national level, as secretariat to the NSLMC, EPA will be responsible for development of the menu of SLWM, and defining the environmental services index and related incentive system. This will be done in consultation with MoFA, and involve convening an expert workshop. EPA will also take the lead in national policy monitoring & development of PES strategy.

Within the project area, EPA (as the local representative of MEST) will provide coordination and technical support through a Technical Coordination Office (TCO) based at the Regional EPA office in Bolga. The TCO will: (i) act as secretariat to the LSC; (ii) coordinate micro-watershed planning under subcomponent 2.1; (iii) develop an MOU with each project district on SLMW activities and complementary investments; (iv) implement the SLWM performance verification mechanism under subcomponent 2.3; and (v) implement environmental service monitoring activities under Component 3. The TCO will: (i) include a Technical Advisor based in Bolga, at least during the first 2 years of the project, who will mainly support local implementation but also give input to EPA activities at the national level; and (ii) may second a small number of (likely part-time) regional staff from other agencies. It will utilize and strengthen the existing GIS capacity in the EPA Bolga Office, to provide basic mapping services for the project.

Following the participatory micro-watershed planning, and agreement on the overall program of project activities within each District, MoFA will implement most SLWM activities in agricultural lands through District Agriculture Units and Extension Agents, including capacity strengthening under subcomponent 2.2, and contract development & monitoring and support for contracts under subcomponent 2.3. The Directorate of Crop Services will be provide oversight of these activities at the national level, including technical backstopping from the Environment, Land and Water Management Unit, as necessary.

Activities in reserves and Wildlife Corridors will be coordinated and managed by the Forestry Commission (FC) of the Ministry of Lands and Natural Resources. The FC will manage these project activities through its Regional Wildlife Division and Forest Services Division Managers at the Regional Office in Bolga. The office will have responsibility for producing operational plans, budgets and reports, and for conducting routine M&E for subcomponent 2.4. Via 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. 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.

The Forestry Commission's Wildlife Division 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). Although the reserve lies between three districts the reserve headquarters are located in Tumu (capital of Sissala East). Field staff are stationed in the two camps within the reserve and this project will likely work with the staff at the Wahabu camp.

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, whilst working with and strengthening existing structures such as Community Environment Management Committees and Water User Groups. The approach to supporting SLWM activities in agricultural lands will also build upon existing extension models based around Farmer Groups. SLWM agreements will be developed with these groups, who will in turn be responsible for coordinating the activities of their members and distributing incentives provided by the District Extension Staff. Farmer Groups in the north are typically ad hoc groupings of 15-20 farmers, formed around interest in specific extension capacity. The project will help to stabilize the groups by engaging them in long-term agreements, and in locations where they have capacity, they may take on a greater role in purchasing of inputs and output incentive items, potentially including cost-sharing in the purchase of larger capital investments.

The CREMAs established within the Western Corridor will be managed through a three layer governance structure (1) The CREMA Executive (Management Team), which will be the executive and operational part of the CREMA. It will be formed out of the Community Resource Management Committees (or CRMCs) with participation from the Wildlife Division, District Assembly, Traditional authorities and any relevant local organization, and its powers will be determined in the constitution, (2) The CRMC will be the local unit of organization and will be formed at the level of each community, based on existing community decision-making institutions. The composition and function of the CRMC will be outlined by the constitution. This committee advised by village leaders and with guidance from the Wildlife Division will establish management strategies for the CREMA of the village, (3) the individual farmers or land holders will constitute the membership of CREMA. They, through the CRMC, will determine the policies and activities of the CREMA and hold the Executive accountable through their own CRMC. Critical decisions will take place within the CREMA Management Committees, which identify, prepare, execute, supervise, operate and maintain their subprojects, assisted by the wildlife division.

Experienced local NGOs will be mobilized to support community engagement in both corridors and agricultural lands, providing extra capacity for community planning and institutional development exercises, including discussion and drafting of SLWM agreements with Farmer Groups, and complementing the technical expertise of District and Regional staff. NGOs and/or private sector organizations may also be used to support specific technical activities, such as the introduction of new livelihood or land management technologies, in cases where they have specific expertise and experience in those activities.

Incentives & Efficiency

The project aims to establish marketable environmental services, which requires close attention to efficiency and minimization of transaction costs. Efficiency will be promoted by including performance incentives not just for individual farmers through output-based payments, but also for contractors and implementing agencies where appropriate. Any staff hired or seconded under the project will be subject to performance agreements and annual reviews, with salary increments and/or non-monetary rewards related to performance where appropriate. Performance comparisons will be conducted between Districts and service providers, and used to inform the programming of funds during implementation. Local publicity materials, including extension-related radio broadcasts should recognize and congratulate best-performing micro-watershed areas, and farmers and other individuals who have achieved the most in implementation of SLWM technologies. Careful monitoring and reporting of unit costs will be included within the M&E framework.

For work in CREMAs, financial targets and tracking systems will be established to provide for a structured transition to independent operation. Targets to be met before the end of the project would be set to establish clear milestone in reaching financial viability, and project subsidies would likely be phased out according to a planned schedule.

Reporting, Annual Review and Mid-Term Review

Implementing agencies will prepare concise quarterly progress reports and budget updates for MEST, reporting in parallel to their line agencies as appropriate. MEST will prepare semi-annual implementation updates and a comprehensive annual report and Financial Monitoring Report with substantial input from all implementing agencies. The report should include updates on the monitoring and results framework. The TCO will organize an implementation workshop in the project area on or before October 31 every year. The workshop will be a forum for discussion of SLWM issues and PES with government agencies and development partners, and will immediately proceed the annual LSC meeting.

A Mid-Term Review (MTR) will be conducted jointly by the Borrower and the Bank not later than 31 October 2013 during which the project will be examined in depth with the view of improving implementation performance, including but not limited to physical and financial aspects, and in particular, its developmental impact. A SLWM technology uptake and impact assessment will be conducted prior to the MTR to guide discussions. MEST, with considerable input from implementing agencies, will prepare a comprehensive report covering the implementation period and will be delivered to IDA at least 30 days before commencement of the MTR.

Project Implementation Manual

A Project Implementation Manual will be prepared before Effectiveness, but will be a binder-based living document, to be augmented with additional sections during Implementation.

The base document, to be prepared for Effectiveness will cover:

- Details of implementation arrangements, including obligations of various parties
- Project budget
- Detailed work program and budget for first year (i.e. to end of 2011)

- FM & procurement regulations and procedures
- TORs for key positions, and staff performance systems
- TORs for initial consultant contracts – e.g. early aspects of Component 1, microwatershed planning
- Indicative working arrangements for activities at the field level, including review of NGO capacity and social issues
- Indicative list of SLWM options & incentive structures
- Template for District MoUs
- Environmental & social safeguards documentation & instruments
- Reporting & planning formats
- Outline M&E plan

The following sections will be added after Effectiveness:

- Participatory micro-watershed planning manual
- SLWM technologies manual, and environmental services index
- Community Wildlife Management Area implementation manual based on existing draft plans.
- Standard designs and template contracts for spillway dikes & any other small works to be funded by GEF
- Detailed arrangements for implementing activities in agricultural lands within each District, including template SLWM agreements
- Comprehensive project monitoring protocols

Annex 7: Financial Management and Disbursement Arrangements

GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

Introduction

1. In line with the guidelines as stated in the Financial Management Practices Manual issued by the Financial Management Sector Board on March 1, 2010, a financial management assessment was conducted on **Ministry of Environment Science & Technology (MEST)**. The objective of the assessment was to determine: (a) whether the agency has adequate financial management arrangements to ensure project funds will be used for purposes intended in an efficient and economical way; (b) the project's financial reports will be prepared in an accurate, reliable and timely manner; and (c) the entities' assets will be safeguarded. The conclusion of the assessment is that the MEST being a regular government ministry has in place adequate financial management systems which can effectively support the implementation.

2. Overall the residual FM risk of the Finance and Accounting unit of MEST is rated as moderate though it must be recognized that MEST itself even though it has a functional financial management unit has never been involved in IDA funded operations. However this lack of familiarity with IDA is more of an inherent project risk and is not likely to directly affect the fiduciary aspects of implementation.

Overview of Program and Institutional Arrangements

3. Project management will be under the leadership of the Ministry of Environment, Science & Technology (MEST) with oversight and guidance provided by a small Project Steering Committee. A small secretariat to the Project Steering Committee will be appointed within MEST. Fiduciary management will be carried out within the Finance & Administration of MEST, and fiduciary capacity will be built to support the project, and to enhance the broader project management capacity of the Ministry. To ensure local ownership and coordination of activities between project Districts, a Local Steering Committee will be established, including Chief District Coordinators and representatives of Regional Coordinating Councils.

4. The SLM seeks to pilot models for sustainable flood and land management to increase small-scale agricultural productivity in northern Ghana; and (b) strengthen the capacity of selected institutions in integrating watershed management into spatial planning and development. The Project 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.

5. The Project seeks to support realization of the Government's vision of "a diversified and resilient economic zone in the north" with significant regional environmental benefits by: (i) piloting innovative models for grassroots watershed management which combine flood, land & natural resource management; and (ii) 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 community-level watershed management activities will aim to solve typical transaction cost and sustainability issues by exploiting market based instruments and enhanced production opportunities. Sustainable Development Initiative for the Northern

Savannah as an integrated approach to closing the economic growth gap between the north and the rest of Ghana, whilst increasing resilience to natural hazards and climate change

Country Issues

6. Ghana's fiduciary environment for utilizing both budgetary funds and donor funds is considered adequate. The June 2009, ERPFM noted that the government continues to make encouraging progress in implementing its wide ranging program of strengthening public financial management (PFM) through adoption of the Short-Term and Medium-Term Action Plan (ST/MT AP). Budget formulation has been improved by revising the budget timetable to enable earlier tabling of the Estimates and thus the passage of the Appropriations Bill prior to the start of the new financial year, with a view of allowing a more orderly implementation of spending plans. There is now increased consultation with stakeholders in budget formulation, more comprehensive information in budget documents, and encouragement of Ministries, Departments and Agencies (MDAs) to undertake procurement planning for use as basis for financial planning and budgeting.

7. Recent PFM reviews notes the government's continuing efforts to improve the commitment control system, to strengthen cash management, and to facilitate payments through decentralized treasuries. These actions aim at leading eventually to a Treasury Single Account (TSA), and to the further implementation of the Budget and Public Expenditure Management System (BPEMS). Key challenges do remain in the predictability of flows to Metropolitan, Municipal, and District Assemblies (MMDAs) and releases by the CAGD and these impacts on the pace of budget execution. Financial statements of the Consolidated Fund and of MDAs are current and audited, but delays continue with regard to public enterprises and other statutory bodies, as well as that of other statutory funds. The Internal Audit Agency (IAA) was established by the Internal Audit Agency Act, 2003 with the objective to co-ordinate facilitate and provide quality assurance for internal audit activities within MDAs and MMDAs.

8. Concerning external audit, the Ghana Audit Service (GAS) continues to show progress in clearing the backlog of audits and submitting the audited annual accounts prior to the statutory deadline of 30 June, with the final 2006 Consolidated Fund accounts completed on time.

9. In sum, as part of the overall public sector reforms, the Government of Ghana (GOG) aims at strengthen central government structures and institution by introducing programs to make them more efficient, effective through legislation and other reforms. Recent PFM laws including Financial Administration Act of 2003, the Internal Audit Agency Act of 2003 and the Public Procurement Act of 2003 have been enacted and enforce to help regulate the use of public funds. GOG has also demonstrated its commitment to continue its PFM reforms by developing more efficient public financial management systems and ensuring transparency by strengthening state oversight institutions including the Public Accounts Committee of Parliament which has recently been holding public hearings on instances of financial irregularities and allegations of fraud and corruption.

Project Financial Management

10. This section presents an assessment of MEST and in addition proposes action plans needed to strengthen its financial management arrangements. Even though the MEST has never been involved in managing an IDA project, however as an established government agency it has fully functional financial management systems and internal control processes in place which can be relied upon during implementation.

11. The overall financial management responsibility will be handled by the Director of Finance and Administration (Dir, F&A) at the MEST. The responsibility of the Director is to ensure that throughout implementation there are adequate financial management systems in place which can report adequately on the use

of project funds. The Director, F&A, will also be responsible for maintaining and operating the project's designated account and make payments to contractors and service providers and verifying and authorizing payments for all contracts and activities under this project, including,. The Director, F&A will assign a dedicated Principal Project Accountant who will be responsible for the operational and day to day transaction processing, whilst maintaining oversight responsibilities with regards to ensuring compliance with financial covenants such as submitting Interim Unaudited Financial Reports (IFRs), maintaining internal controls over project expenditure and engaging external auditors.

Project Risk Assessment and Mitigation

12. This section presents the results of the risk assessment and identifies the key risks project management may face in achieving project objectives together with risk mitigating recommendations on how the project management intends to address these risks.

Table 1: Risk Rating Summary Table

Risk	Risk Rating	Risk Mitigating Measures/Remarks	Conditions for Effectiveness/ Negotiations	Residual Risk Rating
Inherent Risk				
Country Level Weaknesses in the effective use of public funds, weak oversight regarding transparency and accountability. Poor linkages between strategic planning and long term budgeting at the sector levels.	M	Strengthening the role of the MMDAs in FM capacity building through ongoing reforms in the public financial management This has resulted to a set of new legislation to guide public financial management practices. Currently the GoG with the support of DP is developing an integrated FM systems	No	L
Entity Level Legal and institutional framework exist but there are challenges in ensuring compliance to PFM requirements regarding accounting, financial reporting and auditing.	S	PFM Systems at the MMDA levels are being reviewed and improved through reforms.	No	M
Project Level The split of the fiduciary functions managed by Dir. F&A and the technical aspect managed elsewhere in MEST could affect effective coordination of project activities.	S	Ensure there is close coordination between Dir F&A and Project Manager within MEST.	No	S
Overall Inherent Risk	S			S
Control Risk				
Budgeting Challenge of translating the corporate plan into realistic time bound budgets with specific activities and outputs. Risk of cost overruns and adverse variations in expenditure due to poor budgeting techniques and slow implementation.	S	The project is being funded by DPs and there is the risk that it budgeting may be done outside the general budget environment of MEST. There is the need for collaboration between the Director F & A of MEST and Project Manager.	No	S
Accounting Accounting and reporting difficulties due to the MEST handling multiple projects	S	The MEST has not been involved in the managing of any IDA project and as such will require training. The MEST	No	M

Risk	Risk Rating	Risk Mitigating Measures/Remarks	Conditions for Effectiveness/ Negotiations	Residual Risk Rating
funded by DPs in addition to managing its own GoG allocations. Lack of familiarity with IDA funded policies and procedures		will appoint a dedicated experienced Accountant to support implementation who will be given training on IDA policies and procedures. It is expected that this should be done prior to effectiveness.		
Internal Controls Risk of non compliance to internal control processes. Possibility of weaknesses in GAC (transparency in processes) particularly in procurement and contract awarding/execution.	S	The MEST has a functioning Internal Audit Unit to help minimize risk. The GoG financial regulations and manuals are adequate for operational control. These manuals document clearly the approval and authorization hierarchies applicable for processing financial transactions. Regular IDA supervision missions and reviews will help ascertain level of compliance.	No	M
Funds Flow Delays in processing withdrawal applications due to the lack of familiarity with IDA processes.	S	Staff members to be trained on IDA policies and procedures.	No	M
Financial Reporting Delays in processing and submitting IFRs and other progress reports.	M	Staff members to be trained on IDA policies and procedures. The funds flow and banking arrangements will be centralized and this should facilitate timely reporting.	No	L
Auditing The risk that audits will not be submitted on time to ensure compliance with covenants. MEST is audited by the GAS and their scope of work and timing may be different.	S	To mitigate this, the project will be audited separately by private audit firms and the TOR for engagement will be reviewed and cleared by the fiduciary team of the Bank to guarantee that the scope of works is satisfactory. Continuous engagement by the FMS to follow through audit program.	No	M
Overall Risk Rating	S			M

H – High S – Substantial M – Moderate L – Low

Strengths and weaknesses of the Financial Management System

13. MEST being a governmental entity has a fully functioning accounts unit which is staffed with a mix of qualified and unqualified accountant with varying degrees of experience particularly in public sector accounting. The presences of an existing accounting unit with established processes and procedures as complemented by adequate staffing is the key advantage of relying on the Finance and Accounting Unit of MEST for implementation. However MEST has not been involved in managing any IDA funded project and are not familiar and experienced with IDA financial managed and procurement policies and guidelines. This weakness will pose a challenge during the initial years of implementation but would be addressed through regular training and capacity building.

Time Bound Action Plan

14. The action plan below indicates the actions to be taken for the project to address the weaknesses that have been identified to ensure the FM system are adequate. Some of these activities and actions are to be completed during project appraisal and prior to credit effectiveness and these will be monitored during implementation.

Table 2: Action Plan

	Action	Date due by	Responsible
i.	MEST to assign a dedicated Project Accountant responsible for supporting implementation	Prior to Effectiveness	Dir F&A
ii.	Prepare a comprehensive budget on the use of funds	Prior to Effectiveness	MEST / Dir F&A
iii.	Conduct financial management and procurement training	At the start of the project	IDA

Summary Financial Management Assessment

15. A summary of the key finding of the financial management arrangements as assessed at the MEST is presented as follows:

Budgeting Arrangements

16. The MEST follows the budget preparation guidelines as per the Financial Administration Act (2003), the Financial Administration Regulation (2004) and also the annual budget guidelines issued by the Ministry of Finance. Specifically for this project, the budget will be derived from the allocations agreed between the government and donor partners. The current budgetary control processes used mostly for the government's discretionary budget are capable of monitoring commitments and outstanding balances and this helps to reduce risk of multiple payments. The assessment indicates that budgeting processes are satisfactory and can be relied upon to reflect the various components to be implemented. There is the need for close coordination between the Project Manager and secretariat and the Finance Department to ensure effective monitoring and budgetary controls.

Accounting Arrangements

17. The Director, Finance & Administration (Director F&A) at the MEST will be responsible for overall fiduciary aspects of the Project. Specific accounting issues such as recording and processing of payment voucher will be handled by the Accounts Unit which is under the Finance and Administration Directorate. The accounting unit is staffed with an adequate number of staff with various levels of skills and competences. Specifically for this project, the daily transactional issues will be handled by the Principal Accountant, with the requisite skills and experience. Our assessments notes that the staff at the Accounts Unit do not have any experience in managing IDA funded projects and will require training in Bank processes. The technical capacity of accounting staff will be regularly assessed during project implementation and if necessary they will be provided with training to update their skills and mitigate any potential risk.

18. The assessment of the Finance and Accounting Department indicated that currently accounting and financial reporting is done using a combination of manual processing and spreadsheets. This may pose a challenge during implementation since the accounting and information systems should be robust enough to report on the different sources of funding, and different components. To address this weakness the GECCA should consider the possibility of funding the purchase of automated accounting software.

Internal Control and Internal Auditing

19. The projects internal controls will to a large extent rely on the government established accounting and internal control guidelines as documented in the Financial Administration Act (2003), the Financial Administration Regulation (2004), Public Procurement Act (Act 663) and in line with the internal audit manual of the Ministry of Finance & Economic Planning. In addition the internal audit functions of all MDA are informed by the Internal Audit Agency Act (2003). The credibility of the project's internal controls and general control environment including processes for recording and safe guarding of assets will be in line with the GoG guidelines. The MEST has a functioning internal audit unit which helps to ensure a sound control environment for transaction processing. Our assessment indicated that the internal audit and control environment is adequate for project implementation; the role of the internal audit will be regularly assessed during supervision missions by reviewing their reports and management responsiveness to their findings. This is to ensure that the role is not limited to transactional reviews (pre-auditing) but adds value to the overall control environment through risk assessment.

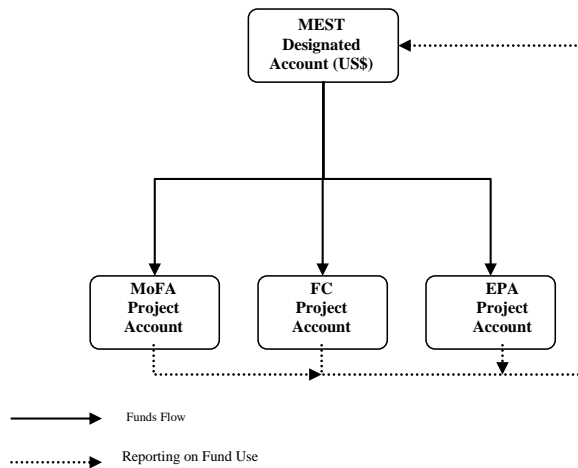
Funds Flow and Disbursement Arrangements

20. This operation is GEF Grant of US\$8.15 million. Proceeds of the grant will be used by the MEST/GECCA for eligible expenditures as defined in the grant agreement and further detailed in the respective annual work plans and budgets. The initial disbursement and ceiling will be based on the expenditure forecast for the first six months (**but not to exceed US\$500,000**).

21. The proposed arrangement is to use a single Designated Account (DA) (denominated in US dollars) under the direct responsibility of the National Project Coordinator but managed and operated by Director, F & A. This arrangement to use a central account is important to ensure that the MEST has oversight responsibilities over all the transfers and payments related to the implementation of programme activities. As part of fund flow design it has been agreed that in order to facilitate payment of some minor local expenditure the three key beneficiary agencies, namely (EPA, MoFA and FC) will operate Project Accounts on an imprest system. The ceiling for the imprest will be stated in the PIM and the use of these funds will be monitored through the imprest and reported upon by the Project Accountant. The types of expenditure envisaged to be funded under the imprest include stationery, local travel and other operational cost. All significant capital expenditure including consultancy cost will be processed centrally at MEST on behalf of the beneficiary agencies. The assessment of the financial management arrangement at these three agencies concludes that they have adequate internal control systems in place to effectively manage and report on these funds.

Diagrammatically the fund flow arrangement is as below:

- i. There will be only one designated account opened and maintained by the MEST on behalf of the P
- ii. Funds will be transferred to three other sub Project Accounts; at MoFA, FC and EPA for payment of incremental operating cost and to support District Assemblies activities.
- iii. Transfers to these sub accounts will be based on an imprest system and based on the activities outlined in their approved annual work plans
- iv. All significant capital expenditure and consultancy will be centrally (MEST) processed for payments



22. **Disbursement arrangements and use of funds.** Proceeds of the financing will follow the standard Bank procedures for Investment Lending, for use by the Borrower for eligible expenditures as defined in project financing agreements. Disbursement arrangements have been designed in consultation with the Borrower after taking into consideration the assessments of Borrower’s financial management and procurement arrangements, the procurement plan, cash flow needs of the operation and the Borrower’s prior disbursement experience. Additional instructions for disbursements will be provided in a disbursement letter issued for this project.

23. Based on the assessment of financial management, the proceeds of the grant will be administered using **transaction based disbursement (Statement of Expenditure (SOE))** returns for reporting on the uses of project funds and also for requesting for subsequent funds. Subsequent replenishments and withdrawals will be made on submission of satisfactory returns. Additional instructions for disbursements will be provided in a disbursement letter issued for this project.

24. Supporting documentation will be requested along with withdrawal applications as specified in the disbursement letter. This will comprise summary reports (Statement of Expenditure) for payments made by the Borrower from the DA and requests for reimbursements for eligible expenditure. Copies of original documents or records shall be requested only for certain categories of expenditures above financial thresholds specified in the disbursement letter.

Financial Reporting Arrangements

25. The MEST will be required to prepare and submit separate quarterly IFRs to account for activities funded under this grant. The Director, F & A, is responsible for generating acceptable quarterly Interim Unaudited Financial Reports (IFRs). Financial reporting under the program will be transactions based and it is expected that the unit will maintain adequate filing and archival system of all relevant supporting documents for review by the Bank’s FM team during supervision mission and also for audit purposes. IFRs for the project are expected to be submitted not later than 45 days after the end of each quarter. The financial reports will be designed to provide

relevant and timely information to the project management, implementing agencies, and various stakeholders monitoring the project's performance. The formats, content and frequency of reporting will be agreed prior to negotiations.

Auditing

26. The Auditor General (Ghana Audit Services) is solely responsible for the auditing of all government ministries, agencies and departments and historically has been undertaking the audit of MEST. Our review indicates that usually the audit report delays and this may affect the submission dates as required under IDA. As is the practice, due to capacity constraints it is usual for the auditor general to subcontract the audit of donor funded project to private firms. This arrangement will be followed subject to the Bank's necessary procurement and technical clearance of the terms of reference (TOR) for the engagement of the audit firm. This is to ensure that there are no delays in meeting the financial covenants for submission. External auditors must be recruited not later than six months after project effectiveness.

Conclusion of the Assessment

27. A description of the project's financial management arrangements at MEST as documented in the preceding paragraphs indicates that they satisfy the Bank's minimum requirements under OP/BP10.02. MEST has a fully functioning finance unit, and as such the overall financial management residual risk for the project is rated as **modest**.

Supervision Plan

28. Based on the risk rating of the project and the current FM arrangement it is expected that in the first year of implementation there will be two onsite visits to ascertain adequacy of systems supplemented by desk reviews of IFR and audit reports. The FM supervision mission's objectives will include ensuring that strong financial management systems are maintained for the project throughout project tenure. In adopting a risk based approach to FM supervision, the key risk areas of focus will include assessing the accuracy and reasonableness of budgets, their predictability and budget execution, compliance with payment and fund disbursement arrangements and the ability of the systems to generate reliable financial reports.

Annex 8: Procurement Arrangements
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

A. General

1. Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004, revised October 2006; and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, revised October 2006, and the provisions stipulated in the Legal Agreement or any other method accepted by the Bank. The various items under different expenditure categories are described in detail below. For each contract to be financed by the Loan/Credit, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

2. Procurement would be carried out using the Bank's Standard Bidding Documents (SBD) for all International Competitive Bidding (ICB) for goods and works and for Standard Request for Proposal (RFP) for the selection of consultants through competitive procedures. For National Competitive Bidding (NCB) for goods and works and the selection of consultants through methods other than Quality and Cost-Based Selection (QCBS), national procedures that are governed by the Ghana Public Procurement Act 663 of 2003 may be followed, with the exceptions that are specified below.

3. **Procurement of Works:** Works contract expected to be procured under this project will be minimal and will consist mainly of construction of spillway dykes, at an estimated total cost of US\$ 347,000. No ICB works contracts are anticipated. Contracts estimated to cost above US\$ 100,000 equivalent may be procured through NCB. Contracts estimated to cost less than US\$100,000 equivalent per contract may be procured using shopping procedures in accordance with Para. 3.5 of the Procurement Guidelines¹³ and based on a model request for quotations satisfactory to the Bank. Direct contracting may be used in exceptional circumstances with the prior approval of the Bank, in accordance with paragraphs 3.6 and 3.7 of the Procurement Guidelines. Apart from contracts agreed between the Borrowers and the Bank as indicated in the Procurement Plan, all other contracts are subject to post review.

4. The Borrower may follow its own national procedures that are governed by the Ghana Public Procurement Act 663 of 2003, with the following exceptions: (a) foreign bidders shall be allowed to participate in National Competitive Bidding procedures; (b) bidders shall be given at least one month to submit bids from the date of the invitation to bid or the date of availability of bidding documents, whichever is later; (c) no domestic preference shall be given for domestic bidders and for works; and (d) in accordance with paragraph 1.14(e) of the Procurement Guidelines, each bidding document and contract financed out of the proceeds of the Credit shall provide that: (i) the bidders, suppliers,

¹³ Shopping consists of the comparison of at least three price quotations in response to a written request. Additional information on how to do prudent shopping is contained in the *Guidance on Shopping* available at the Bank's external web site for procurement under Procurement Policies and Procedures.

contractors and subcontractors shall permit the Association, at its request, to inspect their accounts and records relating to the bid submission and performance of the contract, and to have said accounts and records audited by auditors appointed by the Association; and (ii) the deliberate and material violation by the bidder, supplier, contractor or subcontractor of such provision may amount to an obstructive practice as defined in paragraph 1.14(a)(v) of the Procurement Guidelines. Contracts estimated to cost less than US\$100,000 equivalent per contract would be procured using shopping procedures based on a model request for quotations satisfactory to the Bank. Direct contracting may be used where necessary, but it will be subject to Bank's no objection.

5. Procurement of Goods: Goods procured under the project would include office equipments and vehicles, at an estimated total cost of about US\$ 990,000. Contracts for goods estimated to cost US\$500,000 equivalent or more per contract shall be procured through ICB. Goods orders shall be grouped into larger contracts wherever possible to achieve greater economy. Contracts estimated to cost less than US\$500,000 but equal to or above US\$50,000 equivalent per contract may be procured through NCB. However, relevant NCB goods contracts, which are deemed complex and/or have significant risk levels, will be prior-reviewed. Such contracts will be identified in the tables and also in the procurement plans. Again, under the NCB, the project must ensure that: (i) foreign bidders shall be allowed to participate in the NCB procedures; (ii) bidders shall be given at least one month to submit bids from the date of the invitation to bid, or the date of availability of bidding documents, whichever is later; (iii) no domestic preference shall be given for domestic bidders and for domestically manufactured goods; and (iv) in accordance with paragraph 1.14(e) of the Procurement Guidelines, each bidding document and contract financed out of the proceeds of the Financing shall provide that: (1) the bidders, suppliers, contractors and subcontractors shall permit the Association, at its request, to inspect their accounts and records relating to the bid submission and performance of the contract, and to have said accounts and records audited by auditors appointed by the Association; and (2) the deliberate and material violation by the bidder, supplier, contractor or subcontractor of such provision may amount to an obstructive practice as defined in paragraph 1.14(a)(v) of the Procurement Guidelines. Contracts estimated to cost less than US\$50,000 equivalent per contract may be procured using shopping procedures in accordance with Para. 3.5 of the Procurement Guidelines. Direct contracting may be used in exceptional circumstances with the prior approval of the Bank, in accordance with para. 3.6 and 3.7 of the Procurement Guidelines. Contracts for goods estimated to cost US\$500,000 equivalent or more and any other contract below this threshold but agreed between the Borrowers and the Bank as indicated in the Procurement Plan are subject to prior review by the Bank. All other contracts are subject to post review.

6. Procurement of non-consulting services: Procurement of non-consulting services will follow procurement procedures similar to those stipulated for the procurement of goods, depending on their nature. The applicable methods shall include NCB and shopping. The SBD to use for bidding is "Procurement of Non-Consulting Services & User Guide, December 2002 revised April 2007".

7. Selection of Consultants: Consultancy services valued at about US\$ 900,000 would be provided under the project and includes the following categories: financial, technical and procurement audits, economic and technical feasibility and design studies, supervision of construction works, institutional studies, monitoring and evaluation studies and technical assistance to the implementing ministries. Contracts for consulting services, each estimated to cost US\$100,000 equivalent or more, will be

awarded following the procedure of Quality and Cost-Based Selection (QCBS). Consulting services estimated to cost less than US\$100,000 per contract under the project would be procured following the procedures of Selection Based on Consultants' Qualifications (QBS). Selections under Fixed Budget Selection (FBS) and Least Cost Selection (LCS) methods will be applied in the circumstances as respectively described under paragraphs 3.5 and 3.6 of the Consultants Guidelines. For all contracts to be awarded following QCBS, LCS and FBS the Bank's Standard Request for Proposals will be used. Procedures of Selection of Individual Consultants (IC) would be followed for assignments that meet the requirements of paragraph 5.1 and 5.3 of the Consultant Guidelines. LCS procedures would be used for assignments for selecting the auditors. Single-Source Selection (SSS) procedures would be followed for assignments that meet the requirements of paragraphs 3.10-3.12 of the Consultant Guidelines and will always require the Bank's prior review regardless of the amount.

8. Assignments estimated to cost the equivalent of US\$200,000 or more would be advertised for expressions of interest (EOI) in Development Business (UNDB), in DgMarket and in at least one newspaper of wide national circulation. In addition, EOI for specialized assignments may be advertised in an international newspaper or magazine. In the case of assignments estimated to cost less than US\$200,000, but more than US\$100,000 the assignment would be advertised nationally. The shortlist of firms for assignments estimated to cost less than US\$200,000 may be made up entirely of national consultants, if at least three qualified firms are available at competitive costs in Ghana. However, foreign consultants who wish to participate should not be excluded from consideration. Consultancy services estimated to cost above US\$200,000 per contract for firms, and contracts for individuals for assignments estimated to cost above US\$100,000 and single source selection of consultants (firms and individuals) will be subject to prior review by the Bank.

9. **Capacity Building and Training Programs, Conferences, Workshops, etc.** A total amount of US\$ 1.56 million would be provided for these activities, which will be geared towards building capacity and improving management and staff skills within the implementing agencies All training and workshops will be carried out on the basis of the project's Annual Work Plans and Budget which will have been approved by the Bank on a yearly basis, and which will *inter alia*, identify: (i) the envisaged training and workshops; (ii) the personnel to be trained; (iii) the institutions which will conduct the training; and (iv) duration of the proposed training.

10. **Operating Costs:** Operating Costs financed by the project are incremental expenses related to the implementation of the project, including office supplies, operation and maintenance of vehicles, maintenance of equipment, communication, rental, utilities, consumables, transport and accommodation, and travel costs and per diem. The procedures for managing these expenditures will be governed by the Borrower's own administrative procedures, acceptable to the Bank.

B. Assessment of the agency's capacity to implement procurement

11. The Ministry of Environment, Science and Technology (MEST) intends to assign a Project Coordination Unit (PCU) to coordinate, manage and monitor the implementation of the project. Among its functions will include coordinating, consolidating and reviewing implementation plans, budget & reports; managing a project account in compliance with World Bank Financial Management Guidelines; and ensuring procurement complies with national and IDA procurement guidelines; and (iv) monitoring and evaluation and appraising performance of implementing agencies. Membership of the PCU who will be assigned within the Ministry will include a Project Manager, an Accountant, a Procurement

Specialist, and an M & E Specialist, and supported by a small secretariat of assigned MEST staff.

12. The major procurement activities under the project, which will be mainly through National Competitive Bidding procedures and a few International Selection of Individual Consultants, will be carried out by the Project Coordination Unit of the Ministry of Environment, Science and Technology. The other implementing agencies like Regional Office of Forestry Commission (FC) in Bolgatanga, participating District Offices of Ministry of Food and Agriculture, and SADA will not directly handle any procurement apart from purchasing very small items like pens and fuel for their operations. The implementing agencies will however provide inputs for procurement and selection of contracts under their components.

13. An assessment of the capacity of MEST to implement procurement actions for the project was carried out by the Bank's Procurement Specialist in February 2010. The assessment reviewed the organizational structure for implementing the project and the interaction between the implementing agencies and their staff responsible for procurement. The observation on the assessment to manage procurement for the project under the Bank's guidelines and procedures is given below.

14. The assessment showed that MEST and its Agencies and Departments are subject to national laws and its procurement rules responds to the Ghana Public Procurement Act, 2003, which provides a good legal framework for the conduct of transparent and comprehensive procurement. The Act has features of good public procurement practice including effective and wide advertising of upcoming procurement opportunities; public opening of bids; pre-disclosure of all relevant information including transparent and clear bid evaluation and contract award procedures; clear accountabilities for decision making with segregation of executive and oversight responsibilities; and an enforceable right of review for bidders when public entities breach the rules.

15. Procurement carried by MEST and its Agencies and Departments each year are derived from their annual work plan and budget, thus, linking closely procurement planning to multiyear plans from which annual operating plans are derived and based on which annual procurement plans and estimation of associated cost, cumulating in annual budgets are formulated.

16. Furthermore, in response to the Ghana PPA 663, MEST as a procurement entity, has in place the required structures made up of entity tender and tender review committees that are required by law for reviewing and approving the overall annual procurement plans and the various procurement decisions associated with contracting process.

17. The Ministry has adopted and uses the comprehensive procurement procedure manual that details out all procurement and supply management functions of the Ministry's procurement unit prepared by the Public Procurement Authority to complement the Public Procurement Act document. The manual lays out the legal framework for undertaking procurement; processes and procedures of procurement cycle management; technical and administrative for reviews for quality control; approval processes, authority and thresholds; appeal mechanisms; warehousing and stores management; and contract management responsibilities.

18. The Ministry has developed policies and internal audit arrangements to guide its internal audit processes. All procurement processes are checked by internal auditors to ensure efficient and effective

use of resources as required by the Internal Audit Act of Ghana. The internal audit department is headed by a qualified accountant with considerable experience. The Ministry is also bound by the Financial Administration Act, Act 654, to ensure accountability and transparency of its financial management functions. External procurement audits are carried out by the Auditor General at the end of each financial year.

19. The assessment found that the Ministry procurement unit has only one procurement officer handling all procurement activities with the support of two national service personnel. The Ministry, it was found out, is newly established and though the Procurement Unit has previous experience in procurement using Shopping, National Competitive Bidding and other procurement procedures under the Public Procurement Act, it does not have any history of implementing Bank-financed projects and therefore the experiences of the staff in comprehensive use of the World Bank guidelines for procurement of goods, works and services are very limited.

20. The assessment concludes that though the Ministry is in compliance with the national procurement law, having a procurement unit in the permanent organization, having adequate internal technical and administrative controls and anti-corruption measures, and satisfactory appeal mechanisms for bidders, it lacked adequate staffing and capacity to support its normal activities, let alone the activities under the project, and will need to recruit an experienced procurement specialist to support the procurement unit to implement the proposed project.

Action Plan

21. **The assessment shows an overall high risk for procurement:** The key risks for procurement include: (i) the lack proficient skill and experience to undertake and manage complex procurement; (ii) the lack of in-house experience and familiarity with World Bank procurement guidelines and procedures; and (iii) lack of adequate procurement staffing.

22. **The key risk areas** and proposed mitigation measures and/or actions are identified in the Table below:

1.

No	Key risks	Mitigation Actions	By Whom	By When
1	Lack of capacity to implement procurement actions	Appointment of a qualified high level procurement consultant to be present throughout the life of the project	MEST	Prior to project effectiveness
2	Lack of in-house experience and familiarity with World Bank procurement guidelines and procedures	<p>Focused capacity building for existing staff specific to the areas of weakness, i.e. capacity building program to be developed to respond to specific gaps identified.</p> <p>The PCU should also prepare a Project Implementation Manual which should have a section on procurement detailing out instructions for handling procurement. This should be disseminated to all staff involved in the project implementation at project launch.</p>	Procurement consultant	Throughout project life

No	Key risks	Mitigation Actions	By Whom	By When
3	Delays in Evaluation of bids and Technical Proposals.	Close monitoring of procurement plans on a monthly basis and closely monitor and exercise quality control on all aspects of the procurement process, including evaluation, selection and award.	Procurement Consultant	Throughout project life
4	Fraud and Corruption (Kick-backs)	For NCB procurement, a list of exceptions to the PPA enumerated in paragraphs 4 and 5 must be incorporated to take account of the Bank's Fraud and anti-corruption.	PCU	Throughout project life

C. Procurement Plan

23. The Borrower, at appraisal will develop a Procurement Plan for project implementation which will provide basis for the procurement method and time frame of implementation. This plan will be agreed between the Borrower and the Bank at negotiation and shall be published on the Bank's external website and also available in the Project's database. The Procurement Plan will be updated in agreement with the implementing institutions annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

Thresholds for Procurement Methods and Prior Review

No	Expenditure Category	Contract Value Threshold* (US\$)	Procurement Method	Contracts Subject to Prior Review (US\$)
1	Works	C >= 5,000,000	ICB	All Contracts.
		100,000 = < C <= 5,000,000	NCB	Specified contracts as would be indicated in the Procurement Plans.
		C < 100,000	Shopping	None.
		All values	Direct Contracting	All Contracts.
2	Goods and Services (other than Consulting Services)	C >= 500,000	ICB	All Contracts.
		50,000 = < C < 500,000 C <= 200,000	NCB	Specified contracts as would be indicated in the Procurement Plans.
		C < 50,000	Shopping	None.
		All values	Direct Contracting	All Contracts.
3	Consulting Services	C >= 200,000 firms	QCBS (International)	All Contracts.
		100,000 = < C < 200,000 firms	QCBS (National)	All Contracts.
		C < 100,000	CQS	Only TORs.
		C >= 50,000 individuals	IC	All contracts.
		C < 50,000 individuals	IC	TORs.
		All Values	Single Source	All Contracts.

			Selection.	
4	Training, Workshops, Study Tours	All Values	To be based on Annual Work Plan and Budgets	

*These thresholds are for the purposes of the initial Procurement Plan. The thresholds will be revised periodically based on reassessment of the project procurement risks.

D. Frequency of Procurement Supervision

24. In addition to the prior review supervision which will be carried out by the Bank, the procurement capacity assessment recommends two supervision missions each year to visit the field to carry out post-review of procurement actions and technical review. The procurement post-reviews and technical reviews should cover at least 20 percent of contracts subject to post-review.

25. **Contract management and Expenditure Reports.** As part of Procurement Management Report (PMR), MEST will submit contract management and expenditure information in quarterly reports to IDA. The procurement management report will consist of information on procurement of goods, works and consultants' services and compliance with agreed procurement methods. The report will compare procurement performance against the plan agreed at negotiation and as appropriately update at the end of each quarter. The report will also provide information on complaints by bidders, unsatisfactory performance by contractors and suppliers, and any information on contractual disputes.

26. **Publications of Awards and Debriefing.** Publication of contract awards of the bidding process and debriefing for all ICB procurements, and also for all consultants' contract for hiring firms, will be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004 and revised in October 2006; the "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004 and revised in October 2006. Publication of results of other procurement activities, including debriefing shall be subject to the stipulations in the Ghana Public Procurement Law of 2003, Act 663.

27. **Fraud and Corruption.** All procurement entities as well as bidders and service providers, i.e. suppliers, contractors, and consultants shall observe the highest standard of ethics during the procurement and execution of contracts financed under the project in accordance with paragraphs 1.14 of the Procurement Guidelines and paragraph 1.22 of the Consultants Guidelines, in addition to the relevant Articles of the Ghana Public Procurement Act which refers to corrupt practices.

E. Details of the Procurement Arrangements Involving International Competition

(1) Goods, Works, and Non-Consulting Services

28. List of contract packages to be procured following ICB and direct contracting:

Table 1: Works

1	2	3	4	5	6	7	8
No.	Contract (Description)	Estimated Cost (US\$ million)	Procurement Method	P-Q	Domestic Preference (Yes/No)	Review by Bank (Prior/Post)	Expected Bid Opening Date
	Construction of Waterholes	306,000	NCB	No	No	Post	March, 2012
	Establishment of small bird and game viewing platforms	55,000	Shopping	No	No	Post	November 2011

29. ICB contracts estimated to cost above US\$5.0 million per contract and all direct contracting will be subject to prior review by the Bank.

Table 2: Goods

1	2	3	4	5	6	7	8
No.	Contract (Description)	Estimated Cost (US\$ million)	Procurement Method	P-Q	Domestic Preference (Yes/No)	Review by Bank (Prior/Post)	Expected Bid Opening Date
	Procurement of Vehicles	390,000	NCB	No	No	Prior	Feb. 2011
	Procurement of 55 Motorbikes	295,000	NCB	No	No	Prior	June, 2011
	Procurement of 100 No. Bicycles	22,000	NCB	No	No	Post	June, 2011
	Procurement of 13 No. Desktop Computers and accessories, 7 No. Laptops, 11 No. Printers, 2 No. Digital Printers, and 8 No. UPSs	40,000	NCB	No	No	Post	Nov. 2011
	Procurement of and 3 No. LCD Projectors, 8 No. Digital Camera, 3 No. Camcorders, and 20 No. GPS	15,000	Shopping	No	No	Post	Feb. 2011
	GIS Software	50,000	Shopping	No	No	Post	Jan., 2011
	Satellite Imagery	60,000	NCB	No	No	Post	Jan., 2011
	Various Field equipments for Wildlife and Agric.	66,000	NCB	No	No	Post	Feb. 2011

30. ICB contracts estimated to cost above US\$500,000 for goods per contract and all direct contracting will be subject to prior review by the Bank.

(2) Consulting Services

31. List of consulting assignments with short-list of international firms.

Table 3: Consulting Services

1	2	3	4	5	6
No.	Description of Services	Estimated Cost (US\$ million)	Selection Method	Review by Bank (Prior/Post)	Expected Proposals Submission Date
1	PES Strategy	50,000	IC	Prior	March, 2011
2	External Audit for 3 years	45,000	LC	Post	December 2011
3	Impact Evaluation over 5 years	75,000	IC?	Prior	Dec. 2011
4	GIS Specialist	100,000	IC	Prior	October, 2010
	Spatial Planning Specialist	90,000	IC	Post	October, 2010
	Prefeasibility studies for multi-purpose infrastructure	60,000	QCBS	Post	March, 2011
	Experienced Procurement Consultant to provide support to the Finance Administration Directorate's procurement	60,000	IC	Post	October, 2010
	Development of Environmental & Economic Mapping Tools	145,000	QCBS	Prior	June 2011
	Consulting services to provide training to the NSLMC	20,000	CQ	Post	August 2011
	Ponctual TA to PMU to provide inputs for specific activities (e.g. designing reporting formats)	40,000	IC	Post	October 2010
	Establishment of detailed baselines micro-watershed and land use	50,000	CQ	Post	April, 2011
	Consultant to Develop Spatial monitoring & collaboration tool	30,000	IC	Post	July 2011
	TA /NGO support to microwatershed planning	55,000	CQ	Post	august 2011
	Vegetation monitoring	50,000	IC	Prior	January 2012
	Soil carbon monitoring	40,000	IC	Post	January 2012
	Consulting service to develop environmental index to promote SLWM	111,660	QCBS	Prior	June 2011
	Ecotourism market chain analysis and development	54,000	CQ	Post	July 2011
	Flora Survey under Ecological Studies & Monitoring	34,000		Post	March, 2011
	Wildlife Survey	38,000	CQ	Post	April 2012
	Development of Wildlife Monitoring system under Ecological Studies & Monitoring	34,000	CQ	Post	July, 2012
	Design & supervision of waterhole construction	48,000	IC	Post	June 2012

32. Consulting services estimated to cost US\$100,000 equivalent or more per contract and single source selection of consultants will be subject to prior review by the Bank.

33. Short lists of consultants for services estimated to cost less than US\$200,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

Annex 9: Economic and Financial Analysis
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

Economic analysis

The Sustainable Land and Water Management Project takes a framework, rather than a blue print project approach, with few specific investments identified up front. Given the demand-driven nature of the investments, and difficulty of quantifying key marginal benefits in the form of watershed services, biodiversity conservation and capacity building, a full economic analysis not available ex ante. International experience, however, suggests that SLWM technologies bring substantial long-term productivity gains, and the project is designed to quantify the environmental benefits that they provide, as well as the willingness to pay for the services generated.

The benefits from capacity building investments will very much depend on the degree to which that capacity is utilized subsequent to the project. Hence the emphasis in project design on catalyzing a much larger program of land and watershed management investments.

Program cost-effectiveness

The project is focused on maximizing the efficiency of environmental service delivery, and improving understanding of the economics and potential market values of those services. As a pilot project, there will be a significant investment in experimentation and monitoring, which will add to project costs, but also provide a basis for evaluating future investments:

- Project monitoring systems will include measurement of environmental services generated and fixed and variable transaction costs in implementation.
- Values of incentive packages that need to be provided for widespread uptake of SLWM technologies will be established through discussion with communities and implementation in multiple locations.
- Willingness to pay for environmental services for a range of potential buyers will be assessed under the PES strategy.
- If sufficient data exists for parameterization, hydrological models under the macro-watershed analysis and planning subcomponent will include improved SLWM technologies in order to estimate their impact on hydrological flows and values in terms of water supply, maintenance of water infrastructure, etc.

Summary of benefits of project activities:

Activity	Expected Benefits	Remarks
Component I:		
Integrated spatial planning	<ul style="list-style-type: none"> - Provide analytical basis for major physical investments to reduce flood risk and enhance economic value of water resources - Identify synergies between hard investments in large & small-scale water infrastructure and soft investments in improved SLWM practices and ecological infrastructure - Identify efficient pattern of land uses at 	<ul style="list-style-type: none"> - NDI provides opportunity & framework for much larger investments - Land and watershed projects often focus on one type of investment and fail to exploit

	landscape scale - Accelerate early implementation of NDI program	synergies - District level development planning may fail to capture landscape-level efficiencies
Component 2:		
Participatory micro-watershed planning	- Enhance shared understanding of watershed management issues and planning capacity between communities and Districts - Identify community level hard and soft water & land investments - Identify efficient pattern of land uses at community scale	- Need to identify key grassroots concerns and empower communities to begin to address them
Development of menu of options & incentive system	- Provide for sustainable up-scaling of soft investments in watershed management - Increase efficiency of environmental service provision - Provide model for exploiting environmental service markets more widely	- Need to scale up numerous small scale SLWM activities - Need to efficiently aggregate diffuse investments to access environmental services markets
Implementation of SLWM technologies	- Increase medium & long-term agricultural productivity - Increase effective lifespan of hard water infrastructure investments - Contribute to improvements in stabilizing water flows for downstream users - Increase resilience of agricultural systems to climate change - Increase carbon sequestration	- Many SLWM technologies have been demonstrated to be beneficial to farmers and environment in medium/long term, but several short term barriers to uptake need to be overcome
Riparian natural habitat conservation	- Maintain regional biodiversity - Maintain ecological infrastructure for flood protection and stabilization of hydrological flows - Secure long-term access to key natural resources - Increase economic opportunities from ecotourism and other environmentally friendly livelihoods	- CREMAs have functioned successfully in many areas in Africa - Ecological infrastructure is often cheaper and more resilient - Nature conservation and ecotourism need to be integrated into landscape level approach to be sustainable

Financial analysis

The project is designed as a modest pilot aimed at leveraging much more substantial programs of investment in northern Ghana. As such, Government contributions are not expected to have any significant impact on state finances.

Reliable recent figures are not available for the financial returns of relevant SLWM technologies in northern Ghana. However, during preparation, estimates of the returns for a number of improved agricultural land management practices from farm models constructed for different agro-ecological zones in 1991¹⁴ were updated with current prices. The results for the northern savanna suggested that internal rates of returns: (i) were mostly positive; (ii) varied widely between the practices (and depending on whether individual or social labor opportunity costs were used); but (iii) in only a few cases (e.g. introduction of woody fallows) were unequivocally large enough to exceed the high estimated discount rates of subsistence farmers (estimated at 20-30%). The table below provides some indicative figures of private net returns based on these updated farm models for a number of conservation agriculture options in the savanna region. These should be treated cautiously and don't cover a full range of SLWM options, however. During finalization of the menu of SLWM to be included in the project, more recent experience with introducing SLWM in the north will be reviewed, even if quantitative estimates of returns are not available. The rationale of the project is to provide incentives to farmers to overcome the barriers to introduction stemming from start up costs (or low returns) and high rates of discounting. It will also generate a more reliable understanding of the type and size of those incentives needed, and how they compare to the marginal social benefits derived from improved environmental services.

Option	Annual net return over 1 st 20 years (GH cedis per ha)																				IRR
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Woody Fallow	-145	3	3	3	246	26	30	30	30	273	29	29	29	29	272	28	28	28	28	271	31.5
Fodder Bank	-213	-40	-40	70	72	73	74	75	76	77	74	76	78	80	81	83	85	97	89	90	18.3
Stone Lines	-189	-1	0	1	3	4	5	7	8	9	10	11	12	13	15	16	17	18	19	20	-0.1
Vetiver Bunding	-39	-43	-4	3	6	8	9	10	11	13	14	15	16	17	19	20	21	22	23	25	9.9

Studies under NSBCP suggested that CREMAs in the corridor areas would eventually be financially viable under a variety of small-scale, sustainable commercial hunting and fishing uses. Evidence from Nazinga and elsewhere suggests that under an appropriate rental/management contract with the community, sustainable professional management, cropping according to ecological parameters at potential wildlife densities, the annual benefits for every 100 sq km could be about \$20,000 for the local communities; \$20,000 for the State, and about \$85,000 for local businessmen supplying the sites and retailing the meat and fish products (gross sales). This is in addition to potential benefits from specialized bird-hunting schemes, as operate in Burkina Faso, and organization of non timber forest product (NTFP) production chains. Estimate of potential annual revenues for the 4 corridor areas north of Mole ranged from \$10,000 – 18,000 per village (see table below), compared to annual patrolling and management costs of around \$1,000 per village area. These are long term projections based on restoration of wildlife populations and establishment of well-managed sport hunting enterprises, which

¹⁴ FAO / World Bank (1991): Ghana Land Resource Management Study: Identification Mission. Report N° 103/91 CP-GHA 28: Vol. II. FAO Investment Centre. FAO, Rome.

require long-term support. These levels of income will not be achieved during the lifespan of the project, but milestones towards eventual full sustainability can still be set for the project itself. Indicative incomes from CREMA management in the wildlife corridors¹⁵.

Item	SITE 1 Wuru- Kayoro	SITE 2 Sumboru- Bechawsa	SITE 3 Walembele- Wiasi	SITE 4 Gbele-Mole	SITE 5 Red Volta	Total 5 Sites
Site Specific Information:						
Approximate length of the perimeter (km)	102	228	242	293	302	1 167
Approximate Surface Area (sq km)	554	1 184	1 422	1 626	900	5 686
Approximate Area HDZ (sq km)	339	430	400	197	100	1 466
Approximate Area LDZ/ZICOM (sq km)	215	754	1 022	1 429	800	4 220
% HDZ to total	61%	36%	28%	12%	11%	25,8%
Annual Buffalo Quota	14	20	20	14	7	76
Number Bird-hunting Camps recommended	2	2	4	3	4	15
Probable length of contract for commercial viability :	15 years	15 years	20 yeagr	20-25 years	25-30 years	-
Actual + Potential Waterways:						
- Major river (number km in the site)	30	30	14	69	114	257
- Main Tributaries with wide sections (number km)		80	50	35		165
Water Development Sites Proposed Years 1 - 5**						
- Major river (Number spillway dikes)	5	4	2	2	4	17
- Main Tributaries with wide sections (number sites)		6	4	4		14
Potential Annual Fish Production (kg)*	24 000	88 000	51 200	83 200	91 200	337 600
Order of Annual Socio-Economic Benefits (Year 15) \$US:						
- Community						
- Professional Management of CWMA	110 800	236 800	284 400	162 600	90 000	884 600
- NTFP production chains	?	?	?	?	?	?
- Bird-hunting	24 600	24 600	49 200	36 900	49 200	184 500
- Fishing (if potentials developed)**	28 800	105 600	61 440	99 840	109 440	405 120
Total for the Community	164 200	367 000	395 040	299 340	248 640	1 474 220
- State (direct and indirect receipts)						
	110 800	236 800	284 400	162 600	90 000	884 600
- Private Sector (Gross Sales)						
	465 360	994 560	1 194 480	682 920	378 000	3 715 320
Total (in GHANA)	740 360	1 598 360	1 873 920	1 144 860	716 640	6 074 140
Number of Villages	9	27	31	31	87	171
Approximate Annual Benefits/Village \$US	18 244	13 593	12 743	9 656	2 858	8 621
Cost of Proposed Action Plan \$US	1 565 000	2 660 000	2 843 000	2 558 000	2 672 000	12 298 000
Approx Cost/Village \$US	173 889	98 519	91 710	82 516	30 713	71 918
Number years of full production to "reimburse" costs:	9,5	7,2	7,2	8,5	11	8

* based on Nazinga average annual captures per km of waterway (800 kg/km waterway), usually pays back cost of construction of spillway dikes within 15 years

** spillway dikes to raise the water level at the end of the last flows of the rainy season by about 2-3 m

*** based on selling fish at an average price of \$US 1.20 per kg

¹⁵ NBSCP (2008) Summary of the Wildlife Corridor Program in Northern Ghana. Prepared by Wildlife Production Development Center & IUCN, Ouagadougou.

Annex 10: Safeguard Policy Issues
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

Safeguards category and instruments

In accordance with the Bank environmental screening guidelines the project has been classified as Category B. The project is intended to benefit participants and their environment, and no major negative environmental or adverse social impacts are expected. All sustainable land management investments will involve small-scale activities, mainly at the scale of individual small-holder plots and designed to provide demonstrable environmental benefits. In order to address potential social and environmental impacts from the remaining activities directly supported by GEF, additional safeguards instruments have been developed for the Project to ensure that:

- project investments are designed to be beneficial to the environment and local communities;
- any negative effects are identified and appropriate mitigation measures are developed and implemented;

Two related and complementary safeguards instruments have been developed by the Government of Ghana:

1. an Environmental Analysis and Management Plan (EAMP), which will ensure that the requirement for environmental assessment according to World Bank policy (World Bank OP 4.01 Environmental Assessment) is met, and in so doing ensure consistency with other World Bank environmental safeguard policies (i.e. World Bank OP 4.04 Natural Habitats; World Bank OP 4.36 Forestry; World Bank; OP4.09 Integrated Pest Management), and
2. a Resettlement Policy Framework (RPF), which ensures that the requirements of the World Bank OP/BP 4.12 Involuntary Resettlement are met.

Both safeguards instruments are also consistent with national regulations. The EPA, which led most of the project preparation work, also oversees national environmental safeguards policies.

Most safeguards measures defined in these documents will be mainstreamed into standard procedures for participatory planning and implementation of SLWM technologies to be developed in the PIM. Specific safeguards screening or assessment processes will only be required during implementation if:

1. an additional SLWM technology is proposed to be added to the standard menu of options, or
2. an instance occurs where tenant farmers are required to desist cultivation of land that communities or tendanas have designated for protective use, in which case a RAP would be developed according to the process laid out in the.

Summary Environment Benefits, Impacts, Risks and Mitigation Measures

In general, social and environmental impacts of activities are expected to 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 be 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. In addition, the EAMP defines a specific negative list of activities that cannot be supported under the project to avoid unintended environmental impact.

There is potential for certain adverse environmental impacts to arise, however:

- Some tree or shrub species used in SLWM technologies could become invasive or adversely impact soil water balance if care in selection is not taken. Species will be carefully selected for on farm integration based on experience from other similar environments.
- Introduction of improved farming systems could encourage increased use of inorganic fertilizers and pesticides as farmers strive to increase agricultural production. Where appropriate, SLWM technologies will therefore incorporate integrated fertility management and/or use of IPM to combat any pest incidences.
- SLWM technologies linked to dry season irrigation have the potential to increase water extraction, thus affecting downstream activities. The project will support establishment of local regulations and enforcement by water users associations. Irrigations systems will be improved for increased water use efficiency. The project will only support interventions that credibly improve overall hydrological services.
- Fire control can damage natural systems and be counterproductive if applied overly rigidly. The project will therefore support fire reduction and management to more closely approximate natural fires ecologies, rather than outright fire suppression.
- The construction of water points for wildlife could potentially impact surrounding natural habitats and if unwisely situated encourage human-wildlife conflict. Guidelines are therefore provided for their location and design, along with rules for contractors, including sourcing of construction material and provision of access to construction sites
- Although, unlikely there is some potential for physical cultural resources to be discovered and potentially harmed in the course of small works or agricultural activities. Chance finds procedures will therefore be put in place.

Social issues and approaches

A baseline social assessment was conducted, which provided information on underlying causes of environmental degradation such as soil erosion, loss of soil fertility, overgrazing, and causes for water pollution. Adoption of SLWM practices would contribute to halting the environmental degradation caused by poor agricultural practices. A small sample of community members were asked about their knowledge of SLWM practices, determined the percentage of farmers willing to adopt SLWM techniques, and what barriers exist which may prevent a farmer from adopting SLWM activities.

The project will provide a variety of SLWM techniques from which participants can choose to incorporate based on their needs. Once target areas are identified, baseline data will be gathered specific for the impacted communities through the participatory micro-watershed planning exercise, and extension approaches and incentive packages will be developed, taking into account community conditions and traditional practices within each district.

Barriers: According to respondents, inadequate access to land and lack of money to purchase inputs were the two most common constraints to adopting SLWM. Lack of knowledge about SLWM techniques and not having access to materials were also significant barriers SLWM participation. Other barriers listed by farmers included: labor constraints, concerns about demand on time, and community/social influences such as religion or traditional practices.

Gender: In the project area, men and women are both engaged in agriculture and natural resource harvesting, but practice markedly different systems. Once project districts have been identified, baseline

data, disaggregated by gender, will be collected, and a determination will be made regarding what barriers may exist which are gender-specific, and how incentive packages need to respond to the different needs of women and men farmers. Included would be an examination in access to land, inheritance practices, and ability to engage with extension service providers. If it is determined that barriers exist which are unique to women, these will be addressed in order to ensure equal access to project benefits.

The project will establish community resource management committees and (where necessary) water user groups. In order to ensure appropriate representation, it will be required that at least (30-40 %) of committee members are women. All community capacity training opportunities will include women participants. In order to ensure women's participation in training opportunities, it will be determined if there are unique factors which would prevent women from participating. These factors will be addressed in order to assist women to fully participate in capacity building initiatives.

Community Participation: The project has been set up such that activities will involve community based planning exercises, both for micro-watershed management and the establishment of Community Resource Management Areas (CREMAs). The CREMA would belong to the community and organized in such a way as to be sustainable and profitable for the community involved. The objective would be to optimize socio-economic benefits for local communities while securing biodiversity conservation and sustainable management of natural resources, including wildlife resources. CREMAs would be based on discussions with surrounding communities to determine their willingness to create a management area and establish boundaries for CREMA.

Adoption of SLWM techniques will also focus on community, as well as individual, involvement. The participatory micro-watershed management exercise would identify SLWM interventions that are both appropriate and acceptable to the community at large, but most SLWM activities on agricultural land will only be initiated once individuals request to participate in the SLWM opportunities chosen based on their individual needs.

Based on initial baseline data and SLWM implementation contracts, the project can track inputs and benefits received by individuals. An evaluation can be made as to the impact of the input and determine positive outcomes as well as identify unforeseen negative experiences which could then be resolved so that stakeholders have a positive final outcome.

OP 4.12: The Project has triggered World Bank social safeguard policy OP 4.12 on Involuntary Resettlement as a precautionary measure. Although no involuntary land-taking is envisaged, there are potentials for individual access to resources to be restricted as the result of community-level choices to engage in certain NRM and SLWM 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. Such instances are expected to be dealt with through community action to make available other suitable land to the affected farmers, but nevertheless, the potential for these instances to occur necessitates the preparation of a Resettlement Policy Framework, which will address two issues:

1) Resource access restriction from community NRM decisions

A process framework has been established for dealing with issues arising from communal resource management decisions, such as establishment of natural resource (e.g. firewood, NTFPs, wildlife) management regulations, or fire management systems, particularly expected under the development of Community Resource Management Areas (CREMAs). As such systems are expected to be to the long-term benefit of all community members, the framework is not expected to provide for compensation, per se, but should include provision for ensuring equitable representation and decision-making in deciding on communal resource management systems.

It is often the case that the poorest and most vulnerable sectors of rural populations are the most dependent on the natural resources. They are also the most likely to bear the direct and indirect costs of living in and/or near conservation areas due to the loss of access to resources as well as damages that may be caused by wildlife on crops, livestock, or even human life. In order to promote stakeholder participation, CREMAs will be established in areas where the project will be initiating activities. A CREMA is a geographically defined area that includes one or more communities that have agreed to manage natural resources in a sustainable manner. The CREMA serves as a community-based organization built on existing community decision making structures including an executive body and a constitution that guides the activities and regulations of the CREMA. A district Assembly bylaw gives legal recognition and backing to the constitution. The community benefits as the CREMA provides a structure which enables collective decision making for these shared resources while also enabling the community to make collective rules and establish a means by which to enforce these rules. The CREMA also provides a forum whereby external entities are able to access communities.

The CREMA operates at three levels:

- CREMA Executive – this is the executive and operational part of the CREMA. It is formed primarily out of community committees and its powers are determined in the CREMA constitution.
- Community Resource Management Committee (CRMC) is formed at the level of each individual community. Ideally it is based on existing community governance structures. The composition and function of the CRMC is outlined by the constitution.
- Individual farmers or land holders are the membership of the CREMA or in corporate terms the shareholders of this structure. They through the CRMC determine the policies and activities of the CREMA and hold the Executive accountable through their own structures at the community level. They are responsible for constructing and amending the constitution to ensure the effective operation of the CREMA.

The CREMA approach is not the first attempt in Ghana to involve communities in natural resource management and conservation but it is the first to use a devolution of management authority to a community based organisation. The CREMA approach is established by a set of guiding principles detailed in a policy for *“Collaborative Community Based Wildlife Management and the Establishment of Community Resource Management Areas”* prepared by the Wildlife Division in September 2000.

This policy defines the following concepts:

1. Effective management of wildlife is best achieved by giving it focussed value for those who live with it.
2. Those who live with and bear the cost of wildlife must be the primary beneficiaries of its management.

3. The control of access and benefit from wildlife whether by the individual or collectively must be determined by those who live with the resource.
4. Wildlife should be recognized in its own right as an integral and viable component of national land use policy.
5. Wildlife is a unique natural resource offering various opportunities for sustainable rural development and economic utilization. To achieve this, the protected areas of Ghana serve as a valuable reserve of wildlife resources for neighboring communities.
6. To create the incentive for sustainable wildlife management at community level the authority to manage and benefit from wildlife must be devolved to an appropriate representative community institution.
7. The role of traditional authorities, traditional knowledge and other cultural aspects in wildlife management is recognized and encouraged. Such appropriate traditional institutions, knowledge and forms of management should be enhanced and incorporated into national strategies and wildlife management techniques.
8. The role of women is central to achieving sustainable wildlife use, women must be integrated into the development and implementation of wildlife management programs at all levels.
9. The role of the Wildlife Division as the national authority for wildlife is recognized and it is accepted and that it may in cases control levels or modes of use even where authority is devolved if it is in the national interest to do so.

The CREMA approach has both financial incentives and increased feelings of ownership/ responsibility through control of access to the area by outsiders. But participation mechanisms need to be designed and followed that ensure equitable representation of different voices within a community, and particularly of vulnerable individuals. These inclusion and safeguard systems are laid out in the framework.

Loss of use rights for agricultural land

No forced relocation will be allowed by the project. However, certain SLWM activities or the development and demarcation of CREMAs as part of wildlife corridors may require acquisition of land currently being used by individuals, also impacting livelihood due to loss of cultivated area. Any acquisition of land would be based on voluntary decisions by the community and traditional landowners, once it is confirmed no form of coercion influenced the decision making process.

These cases, if they occur, are expected to be dealt with through provision of access to alternative suitable land by the community, and a Resettlement Policy Framework was prepared which establishes the procedures and standards by which it would occur. The Framework will include: (a) eligibility criteria and cut-off dates, including the unit on which compensation is paid (e.g. individual or household); (b) methods for valuing affected assets including input from the Affected Persons in the process; (c) entitlement matrix specifying the type of compensation for each potential category of Affected Person; (d) organizational arrangements and procedures, describing the responsibilities and roles in the approval processes for the various stages of the compensation work (including final provision of compensation) and which actors will be involved; (e) methods of consultation and participation of affected people; and (f) template for design of a Resettlement Action Plan based on the details of the RPF and informed by World Bank framework for RAPs.

Institutional Responsibilities

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. GECCA, 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. Districts and 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 Technical Support Unit 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.

Consultation and Participation: During the preparation of the Project meetings were organized with project Districts and several communities, including a 2-day consultation event held in the project area on 5th and 6th May 2010, minutes of which are appended to the safeguards documents. During the consultations all applicable Project procedures have been presented and discussed extensively, including the applicable safeguard policies and review procedures.

Community activities will be developed and approved through consultative processes for both micro-watershed and CREMA planning. The project will not fund any investment that is not acceptable to the majority of villagers involved, and all of the villagers directly affected. Decisions on the use of funds are made by community members themselves, through a negotiation process, and with information provided by project facilitators and technicians.

Disclosure: Safeguard documents prepared for the Project were publicly disclosed on 29th April 2010 at the InfoShop in Washington and in the Library of the World Bank Accra Office. The documents are also publically available from MEST in Ghana, and will be posted on the Ministry website once that is revamped.

Annex 11: Project Preparation and Supervision
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

	Planned	Actual
PCN review	12/19/2005	12/19/2005
Initial PID to PIC	07/20/2006	07/20/2006
Initial ISDS to PIC	07/20/2006	07/20/2006
Appraisal	06/26/2010	
Negotiations	07/15/2010	
Board/RVP approval	August 2010	
Planned date of effectiveness	October 2010	
Planned date of mid-term review		
Planned closing date		

Key institutions responsible for preparation of the project:

- **National Sustainable Land Management Committee (NSLMC)**
- **Ministry of Environment, Science & Technology (MEST)**
(including Environment Protection Agency (EPA))
- **Ministry of Land & Natural Resources (MLNR)**
- **Savanna Accelerated Development Authority**
- **Ministry of Finance & Economic Management (MoFEM)**

Bank staff and consultants who worked on the project included:

Name	Title	Unit
Stephen Ling	Task Team Leader	AFTEN
Paola Agostini	Senior Economist	AFTEN
Kristine Schwebach	Sr. Social Development Specialist	AFTCS
Peter Kristensen	Sector Leader	AFTEN
Gayatri Kanungo	Biodiversity & GEF Technical Specialist	AFTEN
Kadir Osman Gyasi	Agricultural Economist	AFTAR
Beatrix Allah-Mensah	Social Development Specialist	AFTCS
Paula Lytle	Senior Social Development Specialist	AFTCS
George Ledec	Lead Ecologist	AFTEN
Matte Marchiso	NRM Specialist	AFTEN
Robert W. DeGraft-Hanson	Financial Management Specialist	AFTFM
Adu-Gyamfi Abunyewa	Procurement Specialist	AFTPC
Salimata D. Follea	Operations Analyst	AFTEN
Jayne Angela Kwengwere	Program Assistant	AFTEN
Clement Okia	Agro Forestry Specialist, Consultant	AFCW1
Salimatou Drame-Bah	Program Assistant	
Ricardo Hernandez	Senior Environmental Specialist, Peer Reviewer	LCSSEN
Jonathan Agwe	Operations Officer Peer Reviewer	ARD
Huong-Giang Lucie Tran	Operations Officer Peer Reviewer	MNSAR

Bank funds expended to date on project preparation:¹⁶

1. Bank resources:
2. Trust funds:
3. Total:

Estimated Approval and Supervision costs:

1. Remaining costs to approval:
2. Estimated annual supervision cost:

¹⁶ Preparation and supervision costs to be finalized at Appraisal.

Annex 12: Documents in the Project File

GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

GHANA: SUSTAINABLE LAND AND WATER MANAGEMENT PROJECT

1. Ghana Country SLM Investment Framework (March 2009)
2. Agriculture SLM Strategy (June 2008)
3. Project Concept Note and PPG Request (October 2008)
4. Land Degradation Assessment in all Ecological Zones of Ghana (April 2009)
5. Baseline Study – Inception Report (April 2009)
6. Natural Resources, Management and Growth Sustainability: Policy Note. Executive Summary (June 2008)
7. Ghana Country Environmental Analysis (November 2007)
8. Project Concept Note (PCN) Review Minutes (January 2006)
9. Project Concept Note (PCN) Reviewers Comments (December 2005)
10. Project Concept Note Package (December 2005)
11. Project Information Documents Concept Stage (July 2007)
12. Integrated Safeguards Data Sheet (Concept Stage) (July 2007)
13. Disbursement Guidelines (May 2006)
14. GEF Project Identification Form (PIF- SLM) (January 2008)
15. GEF Project Identification Form (PIF- BD) (December 2008)

Annex 13: Statement of Loans and Credits
GHANA: Sustainable Land and Water Management Project

Project ID	FY	Purpose	Original Amount in US\$ Millions					Difference between expected and actual disbursements		
			IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig.	Frm. Rev'd
P113301	2009	GH-EGPRC (fast-track)	0.00	300.00	0.00	0.00	0.00	150.52	-151.03	0.00
P102000	2009	GH-Transport Project SIL (FY09)	0.00	225.00	0.00	0.00	0.00	229.83	9.47	0.00
P074191	2008	GH-Energy Dev & Access SIL (FY08)	0.00	90.00	0.00	0.00	0.00	67.97	-4.12	0.00
P105092	2008	GH-Nut. & Malaria Ctrl Child Surv (FY08)	0.00	25.00	0.00	0.00	0.00	18.07	4.75	0.00
P101852	2008	GH-Health Insurance Project (FY08)	0.00	15.00	0.00	0.00	0.00	12.81	11.18	0.00
P093610	2007	YGH-eGhana SIL (FY07)	0.00	40.00	0.00	0.00	0.00	32.30	17.51	0.00
P100619	2007	GH-Urban Transport Project SIL (FY07)	0.00	45.00	0.00	0.00	0.00	40.18	9.32	0.00
P092986	2006	GH-Economic Management CB	0.00	35.00	0.00	0.00	0.00	15.16	-2.23	7.61
P088797	2006	GH-Multi-Sect HIV/AIDS - M-SHAP (FY06)	0.00	20.00	0.00	0.00	0.00	10.17	6.72	6.03
P085006	2006	MSME Initiative	0.00	45.00	0.00	0.00	0.00	39.70	25.94	0.00
P081482	2005	GH-Com Based Rural Dev (FY05)	0.00	82.00	0.00	0.00	0.00	12.66	-10.43	6.91
P084015	2005	GH-Small Towns Water Sply & Sanit (FY05)	0.00	51.00	0.00	0.00	0.00	16.14	-11.08	5.62
P056256	2005	GH-Urban Water SIL (FY05)	0.00	206.00	0.00	0.00	0.00	65.83	52.59	0.00
P071157	2004	GH Land Administration (FY04)	0.00	20.50	0.00	0.00	0.00	4.31	2.00	0.00
P082373	2004	GH-Urban Env Sanitation 2 (FY04)	0.00	62.00	0.00	0.00	0.00	36.65	26.40	0.00
P050620	2004	GH-Edu Sec SIL (FY04)	0.00	78.00	0.00	0.00	0.00	30.39	27.80	0.00
Total:			0.00	1,339.50	0.00	0.00	0.00	782.69	14.79	26.17

GHANA
STATEMENT OF IFC's
Held and Disbursed Portfolio
In Millions of US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic.	Loan	Equity	Quasi	Partic.
1990	AAIL	0.00	2.55	0.00	0.00	0.00	2.55	0.00	0.00
1998	AEF NCS	0.00	0.00	0.53	0.00	0.00	0.00	0.53	0.00
1997	AEF PTS	0.00	0.00	0.31	0.00	0.00	0.00	0.31	0.00
1994	AEF Shangri-la	0.93	0.00	0.00	0.00	0.93	0.00	0.00	0.00
1996	AEF Tacks Farms	0.43	0.00	0.00	0.00	0.37	0.00	0.00	0.00
2006	Barclays Bnk GHA	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1989	CAL Bank Ltd	0.00	0.87	0.00	0.00	0.00	0.87	0.00	0.00
2001	Diamond Cement	2.50	0.00	0.00	0.00	2.50	0.00	0.00	0.00
2000	ELAC	0.00	0.10	0.00	0.00	0.00	0.10	0.00	0.00
1991	GHANAL	0.00	0.22	0.00	0.00	0.00	0.22	0.00	0.00
2006	Newmont Ghana	75.00	0.00	0.00	50.00	0.00	0.00	0.00	0.00

2005	Scancom	40.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
2005	School Fin Facil	1.03	0.00	0.00	0.00	0.25	0.00	0.00	0.00
Total portfolio:		149.89	3.74	0.84	50.00	24.05	3.74	0.84	0.00

Approvals Pending Commitment					
FY Approval	Company	Loan	Equity	Quasi	Partic.
2005	Scancom	0.00	0.00	0.00	0.00
2004	Takoradi II	0.06	0.00	0.00	0.00
Total pending commitment:		0.06	0.00	0.00	0.00

Annex 14: Country at a Glance

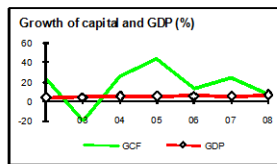
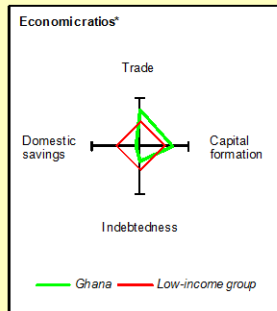
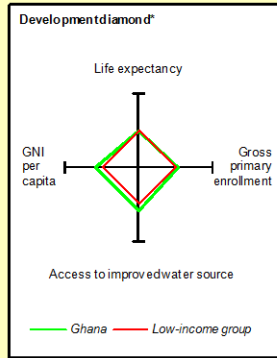
GHANA: ProjectName

Ghana at a glance

12/9/09

POVERTY and SOCIAL	Ghana	Sub-Saharan Africa	Low-income	
2008				
Population, mid-year (millions)	23.4	818	973	
GNI per capita (Atlas method, US\$)	630	1082	524	
GNI (Atlas method, US\$ billions)	14.7	885	510	
Average annual growth, 2002-08				
Population (%)	2.2	2.5	2.1	
Labor force (%)	2.4	2.8	2.7	
Most recent estimate (latest year available, 2002-08)				
Poverty (% of population below national poverty line)	29	-	-	
Urban population (% of total population)	48	36	29	
Life expectancy at birth (years)	57	52	59	
Infant mortality (per 1000 live births)	51	89	78	
Child malnutrition (% of children under 5)	14	27	28	
Access to an improved water source (% of population)	80	58	67	
Literacy (% of population age 15+)	65	62	64	
Gross primary enrollment (% of school-age population)	102	98	98	
Male	102	103	102	
Female	101	93	95	
KEY ECONOMIC RATIOS and LONG-TERM TRENDS				
	1988	1998	2007	2008
GDP (US\$ billions)	5.2	7.5	14.9	16.7
Gross capital formation/GDP	11.3	23.1	33.8	35.9
Exports of goods and services/GDP	16.2	33.9	40.0	42.5
Gross domestic savings/GDP	5.4	10.3	6.8	2.9
Gross national savings/GDP	6.2	16.1	21.1	9.8
Current account balance/GDP	-5.1	-5.0	-9.1	-17.2
Interest payments/GDP	2.4	2.0	0.5	0.9
Total debt/GDP	58.8	84.4	29.9	29.8
Total debt service/exports	57.1	18.4	3.5	3.4
Present value of debt/GDP	-	-	19.1	17.4
Present value of debt/exports	-	-	54.8	41.6
	1988-98	1998-08	2007	2008
(average annual growth)				
GDP	4.3	5.2	5.7	7.3
GDP per capita	14	2.9	3.5	5.1
Exports of goods and services	9.8	5.1	14	2.0
17.5				

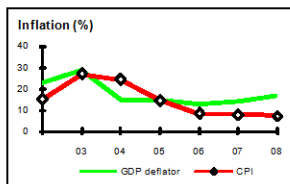
STRUCTURE of the ECONOMY	1988	1998	2007	2008
(% of GDP)				
Agriculture	49.6	36.0	33.9	33.5
Industry	16.6	25.3	25.3	25.3
Manufacturing	9.6	9.0	7.1	6.3
Services	33.8	38.7	40.8	41.2
Household final consumption expenditure	84.9	79.4	74.6	76.7
General gov't final consumption expenditure	9.7	10.3	18.6	20.4
Imports of goods and services	24.1	46.7	67.0	75.5
(average annual growth)				
Agriculture	2.7	3.4	2.4	5.1
Industry	2.2	7.0	5.1	8.1
Manufacturing	-5.3	-	-	-
Services	6.6	6.2	8.3	8.6
Household final consumption expenditure	4.3	3.3	0.1	9.9
General gov't final consumption expenditure	4.9	-3.6	10.1	7.9
Gross capital formation	2.8	22.4	24.5	8.6
Imports of goods and services	10.0	5.5	16.6	13.3



Note: 2008 data are preliminary estimates.
 This table was produced from the Development Economics LDB database.
 *The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

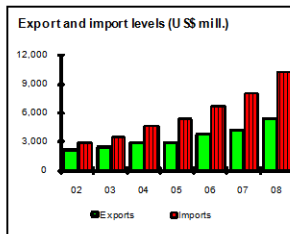
PRICES and GOVERNMENT FINANCE

	1988	1998	2007	2008
Domestic prices				
<i>(%change)</i>				
Consumer prices	314	19.3	7.7	7.3
Implicit GDP deflator	33.4	17.0	18.8	16.9
Government finance				
<i>(%of GDP, includes current grants)</i>				
Current revenue	..	..	33.6	25.2
Current budget balance	..	..	9.9	-11
Overall surplus/deficit	..	..	-4.5	-16.8



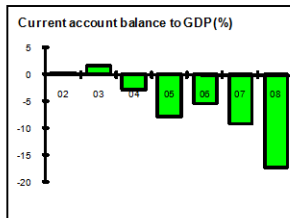
TRADE

	1988	1998	2007	2008
<i>(US\$ millions)</i>				
Total exports (fo b)	881	2,091	4,172	5,270
Cocoa	462	621	1,000	999
Timber	106	171	255	274
Manufactures	81	151	405	379
Total imports (cif)	1,089	3,207	8,066	10,269
Food	163	481	663	691
Fuel and energy	157	236	902	938
Capital goods	489	1,665	1,648	1,791
Export price index(2000=100)	68	82	104	105
Import price index(2000=100)	93	118	125	126
Terms of trade (2000=100)	73	52	84	84



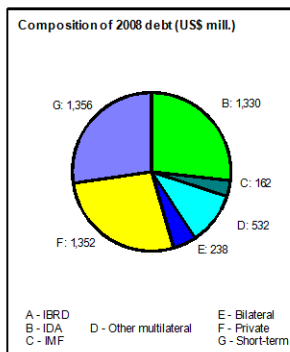
BALANCE of PAYMENTS

	1988	1998	2007	2008
<i>(US\$ millions)</i>				
Exports of goods and services	944	2,559	6,004	7,071
Imports of goods and services	1,250	3,519	10,065	12,569
Resource balance	-305	-960	-4,061	-5,498
Net income	-131	-62	-139	-259
Net current transfers	172	742	2,833	2,900
Current account balance	-264	-370	-1,366	-2,856
Financing items (net)	389	470	1,671	3,273
Changes in net reserves	-125	-10	-305	-416
Memo:				
Reserves including gold (US\$ millions)	..	0	2,396	2,753
Conversion rate (DEC, local/US\$)	2.02E-2	0.2	0.9	11



EXTERNAL DEBT and RESOURCE FLOWS

	1988	1998	2007	2008
<i>(US\$ millions)</i>				
Total debt outstanding and disbursed	3,056	6,311	4,463	4,970
IBRD	128	27	0	0
IDA	876	2,962	1,087	1,330
Total debt service	543	478	180	235
IBRD	24	6	0	0
IDA	8	36	8	10
Composition of net resource flows				
Official grants	171	240	742	764
Official creditors	254	321	255	367
Private creditors	-17	35	798	68
Foreign direct investment (net inflows)	5	167	855	2,112
Portfolio equity (net inflows)	0	0	0	0
World Bank program				
Commitments	270	417	355	257
Disbursements	205	261	231	257
Principal repayments	2	21	1	1
Net flows	192	241	230	256
Interest payments	20	21	8	9
Net transfers	173	219	223	247



Note: This table was produced from the Development Economics LDB database.

2/9/09

Annex 15: Incremental Cost Analysis
GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

A. Background Context

Land degradation is increasingly affecting land resources in Ghana including agricultural lands, forests and natural habitats and waterbodies. Some 69% of the total land surface is considered prone to severe or very severe soil erosion, the main feature of land degradation in Ghana. According to the government's National Action Programme to combat Drought and Desertification, the land area prone to desertification has almost doubled in the last decades. Land degradation is economically significant. A recent study (Ghana Country Environmental Analysis) estimated soil erosion to cost around 2% and forest degradation to cost about 5% of the national GDP. Unsustainable farming practices (particularly the traditional bush-fallow system) and removal of vegetation cover (mainly through deforestation, overgrazing and bush burning) are the main proximate causes of land degradation in Ghana.

Further, in Ghana there is a visible developmental gap across the North and South of the country where the southern coastal and forest zones (both urban and rural) have been the epicenter of rapid poverty reduction, in contrast to the north which remains under-developed. The Northern region is landlocked and in comparison with the South, its geographic locale brings less rainfall, greater land and soil degradation, and a pre-disposition to droughts and floods. This forces agricultural households to adopt low-risk and low-input strategies, creating a virtual cycle of poverty. Despite the attempts the decline in poverty has, however, not still been equally spread geographically and the poor in Ghana therefore, continue to be concentrated in the Northern Savannah Ecological belt. Bridging this developmental gap has been a long-stated goal of most post-independence Governments of Ghana.

Therefore a win-win vision for the environment and regional economy is to turn floodwaters into a productive asset through investing in flood control whilst exploiting green drivers of growth compatible with improved watershed management. This would need to be supported with appropriate commercial and social infrastructure. Tree crops are identified as a key economic driver, and thus the potentials for additional agricultural diversification and nature-based tourism need to be recognized for better land management. In addition, land provides habitats for biodiverse species. Due to wildlife requirements for water and to historical patterns of development that avoided river bank previously infested with onchocerciasis, natural habitat corridors centered along rivers form biodiversity corridors linking Mole National Park and Gbele Resource Reserve (GRR) with protected areas in Burkina Faso. Sustainable land management of the surrounding watersheds is thus key to supporting the continued survival of these riparian corridors, which in turn are critical to the hydrological services provided by the watershed as a whole, and form flood protection buffers along the main Volta tributaries flowing into Ghana from Burkina.

Evidence in Ghana suggests that several factors (including policy, institutional, knowledge and incentive barriers) prevent a wider adoption of sustainable land management practices that would help to alleviate land degradation impacts. These include, among others a weak policy, legislative & incentive framework coupled with gaps in resource knowledge and inadequate access of land users to quality advisory and extension services for land use practices and techniques; a complex institutional framework and fragmented institutional coordination; weak institutional capacity; a limited body of knowledge and systematic information on SLWM, and the lack of financial incentives.

B. Fit with GEF Strategic Priorities and SIP

Eligibility for GEF co-financing: Ghana is a member of many International Conventions. It ratified the UNCCD on December 27, 1996, the Convention on Biological Diversity in August 29, 1994 and the Ramsar Convention

on June 22, 1988.

Relevance to GEF Strategic Priorities:

Land Degradation: This operation is part of the GEF Strategic Investment Program for SLWM in Sub-Saharan Africa (SIP) and would contribute to the SIP's Program Goal (i.e. improving natural resource-based livelihoods in Sub-Saharan Africa by reducing land degradation) by specifically contributing to reduce land degradation in Ghana.

This operation would in addition contribute to the GEF SIP's Program Development Objective (to support Sub-Saharan countries in designing and managing programs and activities to advance SLWM mainstreaming, governance and investments), as it would on the one hand support Ghana in designing, implementing and managing suitable SLWM policies, strategies, and on-the-ground-investments; and on the other hand support Ghana's efforts to pursue a programmatic approach to SLWM scale-up. More specifically, the set of actions proposed directly contribute to the Intermediate Results 1, 2, and 3 of the SIP. The operation exceeds the 1:4 financial leveraging ratio for SIP operations (GEF: non-GEF).

As part of the GEF-SIP, this operation will directly contribute to the implementation of the GEF Land Degradation Focal Area Strategy, i.e. Strategic Objectives 1 (creating an enabling environment for SLWM) and 2 (generating benefits for the global environment through the upscaling of SLWM investments). More specifically, this operation will support the objective of LD-Strategic Program 1 (support sustainable agriculture and rangeland management), and LD-Strategic Program 2 (support sustainable forest management in production landscapes). Finally, this operation is consistent and would support the implementation of TerrAfrica Business Planning Framework (particularly Activity Line 3, Objectives 6 and 7).

Biodiversity: By supporting the implementation of management plans in protected areas and wildlife corridors, the project will address the *Strategic Objective 1 (SO-1): Catalyze Sustainability of Protected Areas* that has the key objective of conserving biodiversity through the expansion, consolidation, and rationalization of national protected area (PA) systems. Within the SO-1, the project will particularly respond to the *Strategic Program 3 (SP-3): Strengthening Terrestrial Protected Area Networks* enhancing connectivity between wildlife corridors and protected areas. Involving local communities in the areas' management will raise their interest in protecting them and thus will contribute to their sustainability. The SO-1 includes the integration of protected area management within the management of the broader landscape and seascape which this project, being integrated with the SLWM project, will attain.

C. Project approach

Baseline or Business as Usual Scenario

In the business as usual scenario the Government will continue to fund and support its regular activities including the following specific initiatives and programs which are considered the baseline for the proposed project:

The Social Opportunities Project (SOP): This IDA funded project aims to improve targeting in social protection spending, increase access to conditional cash transfers nationwide, increase access to employment and cash-earning opportunities for rural poor during agricultural off-season, and improve economic infrastructure in target districts. The project estimated at US\$ 90 million will increase opportunities for the poor to help themselves by: (i) financing public works using labor intensive construction methods that create employment, with priority given to the poorest districts of the country, predominately located in the three northern regions; (ii) providing incremental support to scale up the conditional cash transfer program, whereby the poorest households are paid to participate in education and health services; (iii) improving links between disaster response planning and the utilization of social safety nets; and (iv) developing the government's capacity to implement safety net programs

both at the central level and through decentralized structures (i.e., primarily District Assemblies). In addition, the rehabilitation and/or development of small-scale productive infrastructure in target districts are/is expected to create secondary employment and income-generation effects.

Natural Resources and Environmental Governance Development Policy Loan (NREG DPL II): As part of the second tranche (US\$10 Million) of a programmatic development policy operation, this DPL will continue to address governance issues in the forestry and mining sectors and improve environmental management. Currently forestry, wildlife and mining are key to Ghana's economy and share common challenges. The NREG will include policy actions needed to improve environmental assessment and governance across sectors, mainstream climate change adaptation into development and in strengthening the link between the funding needs and allocations, and clarifying institutional roles at the national and local levels and the. One of the key focuses will be on improving forest governance in line with the 1994 Forest and Wildlife Policy, as a result of which the GOG launched a Forestry Development Master Plan in 1996 to guide the execution of the Policy to 2020. Key elements under the Master Plan will be supported under the NREG DPL through policy actions which will lead to: (i) improved law enforcement in the forestry sector; (ii) improved forest health; (iii) predictable and diversified sources of funding for Forestry Commission; (iv) a private sector investment framework in forest and wildlife sector and; (v) active participation of communities in decision-making regarding resource management.

Agricultural Development Policy Loan (AgDPO II): This policy operation is the second tranche (US\$25 million) of a programmatic DPL and aims to increase the contribution of agriculture to growth and poverty reduction while improving the management of soil and water resources. It will build on the measures supported under the first operation in support of agricultural modernization and aims to create enabling conditions for increasing total factor productivity growth and the diversification into high-value crops especially for export. A key policy action supported under the AgDPO aims at deepening the impact of the strategy to diversify exports and increase private sector participation. Attracted by available land and favorable global food prices, although a number of private investors are seeking investment opportunities for large-scale commercial agriculture in Ghana, only a few ventures have been realized. Moreover, the current system of reacting to unsolicited proposals on a case-by-case basis prohibits optimal land use decisions and competition between potential investors. The Government is keen to attract additional investment by improving the existing land bank to act as a clearing house for land held by traditional authorities and interested investors and as a result reforms are underway to improve the institutional framework through the DPL. Additionally AgDPO also includes policy actions to support Sustainable Management of Land and Environment, including the completion of the sustainable agricultural land management strategy and the integration of SLWM monitoring into established agriculture performance reviews, as a mechanism for shifting attention to implementation of said strategy. International best practice now positions SLWM within the context of climate change (both as a cause of climate change and as an essential adaptive technology to changing agro-climatic conditions). Moreover, natural disasters in Ghana are primarily weather related (floods and draughts) and therefore SLWM also contributes to disaster risk management which itself is inextricably linked to climate change. Adoption of SLWM techniques are, therefore, a determinant of and response to the current challenges.

Northern Rural Growth programme (NRGP): The NRGD jointly being implemented by MoFA, IFAD and AfDB has an overall goal to achieve sustainable agricultural and rural livelihoods and food security for the rural poor in northern Ghana. With a funding envelope of US\$104 million the program specifically focuses on developing profitable and inclusive agricultural commodity chains. It is being implemented in the three northern regions (UWR, UER, NR) and in five districts in the Brong-Ahfo region. The program has four essential components including: (i) commodity chain development; (ii) Rural infrastructure; (iii) access to rural finance; and (iv) programme management and coordination. The program has cross cutting implications due to the gender inclusiveness, environmental consciousness, pro-poor economic development, equitable distribution of income from value-added and value created opportunities. Component 1 on the commodity chain development focuses on strengthening producer organizations, preparing and implementing results-based commodity business plans and establishment and operationalization of commodity development funds. These will lay emphasis on four

opportunity windows in industrial crops (soya, sorghum maize), higher value fruits and vegetables (onions, chilli, okra), women's crops (shea, moringa and sesame) and the animal. Component 2 on rural infrastructure focuses on small scale irrigation development, transport infrastructure and market infrastructure. These two components within the NREG provide a strong complimentary baseline of activities which will be incrementally supported through the intervention defined in the proposed project.

In this business as usual scenario the development priority is to increase the income of rural land users by delivering demand-driven resources for livelihood activities, mostly agricultural, and by empowering local community groups to better access extension support and advisory services aimed to increase rural productivity. Focus of investments would lie on income-generation and livelihood improvements, social capital development, physical infrastructure development for productive use, food security, and related transfer and adoption of technological know-how. As a result environmental sustainability dimension of increased rural productivity would be limited.

Without GEF support approaches to address land degradation will include ad-hoc/project specific interventions often focusing on the symptoms of the problem rather than on root causes/barriers and limited attention to the factors that enable the adoption and replication of SLWM. The government will continue to fund its programs including largely the salaries of the project personnel with minimal funding for activities within the watersheds and the parks. This would result in continuing degradation of productive and non-productive land-use systems with consequent loss of ecosystem function, and thus loss in global biodiversity benefits, increase in carbon releases from vegetation loss, and deterioration of soil quality and hydrological regimes. Continued land degradation would therefore lead to further reductions in farm yields, making agriculture unattractive, especially for the youth which could increase rural-urban migration. With no incentive to integrate trees into farming systems or manage existing natural vegetation, households would experience increasing difficulty in obtaining fuelwood and other tree products. From a biodiversity perspective the management plans for the Gbele Resource Reserve and the forest wildlife corridors will remain paper documents, not being implemented. This will result in continuing deforestation in the corridors, wildlife being poached in the Gbele Reserve and elephant movement through the corridor being greatly restricted and in communities not being really involved with the management of the park or of the corridors. Thus, there will be limited awareness on SLWM as a solution to land degradation and climate risks.

Finally the baseline programs as designed do not particularly focus on removing key barriers limiting the current enabling environment for SLWM, and SLWM investments can take more than two growing seasons to realize return on investment – which undermines incentives for adoption by poor smallholder farmers. The GEF support will therefore play a critical role in awareness building, knowledge sharing, building a network of community practitioners that can serve as agents of change and foster increased interest in viable SLWM activities, improve land quality monitoring at the local and national levels, and enhance institutional capacities to carry out multi-sector investment programming.

C. GEF Alternative

The GEF Alternative is strategically designed towards maximum mainstreaming and leveraging impact related to the investments in the baseline projects (SOP, NREG, AGDPO, NREGP). As elaborated in the baseline scenario the SOP provides opportunities to combine community-based GEF activities with small-scale water and flood management infrastructure. NREG and the AgDPO represent effective instruments for engaging the Government on broader policy issues and institutional reforms across a variety of sectors, including local government, forest management and agriculture. The NREGP provides a strong complimentary baseline of activities to support both infrastructure investments and strengthening producer organizations.

The proposed GEF operation, funded out of the SIP umbrella, supports the development of a country's emerging investment platform on SLWM, anchored in the emerging Ghanaian strategic investment framework for SLWM. Given that SLWM is a key element for the connectivity of the different fragmented habitats in Ghana, a mosaic

approach to ecosystem management has been taken for the provision of essential ecosystem services. The proposed project as designed 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. It is specifically designed to focus on watershed rehabilitation through multi-sectoral SLWM technologies, focused on cost-efficient delivery of a suite of environmental services (related to hydrology, terrestrial carbon sequestration, & biodiversity), with the aim of linking these eventually to local & global environmental service markets. This approach also involves protection of the key biodiversity in the Gbele Resource Reserve and Wildlife Corridors, which will lead to success in SLWM in the adjacent agricultural land.

Global Environmental Objective (GEO): 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.

Scope of Analysis:

There are 33 Districts in the three Regions of northern Ghana (plus one Metropolitan area and four Municipalities). Project activities will focus on the sub-watersheds of major tributaries of the Volta flowing into the country from Burkina-Faso. SADA has a focus on future large-scale water storage investments in these areas to combat impacts of both flood and drought. In particular, the Kulpawn-Sisilli and the Red Volta sub-watersheds correspond with biodiversity corridors, the former linking the Mole-Gbele-Nazinga protected area complex. Areas within these sub-watersheds suffer high flood and land degradation impacts, and associated poverty also makes them high priorities for SOP. Priority 8 districts have been identified and these include Sisala West, Sissala East, Wa East, West Mamprusi, Builsa, Kassena Nankana, Talensi Nabdam and Bawku West. As SOP investments are led by DAs, Districts' extent of participation in SLWM activities will be conditioned on their own willingness in using some of the available SOP funds for small-scale water and flood infrastructure, on the basis that GEF funds can then be used to support complementary soft investments. Detailed mapping of land degradation factors (including population density & vegetation cover) and micro-watershed boundaries, during early implementation of component 1 activities, will be used for precise targeting of communities (see also Annex 4).

Under subcomponent 2.4, activities will be supported in two selected sites within the Western corridor (where CREMAs are to be established) and the Gbele Resource Reserve. Within the Western corridor, the first site Wuru – Kayero Collaborative Wildlife Management Area is situated between two districts Kassena-Nankana West District in upper East Region and Sissala East District in the Upper West Region. The second site, Wahabu – Wiasi Collaborative Wildlife Management Area is situated between four districts including West Mamprusi, Builsa, Wa East and Sissala East. The GRR lies between three districts the Sissala East, Sissala West and Nadowli. Activities in the reserve will primarily focus on institutional strengthening and ecological monitoring. In addition it will support development of waterholes for wildlife use in the southern part of the reserve area.

GEF Incremental Activities

Incremental project activities of this operation respond directly to the barriers identified and will assist the Government in improving the enabling environment for SLWM investments and habitat management through enhancing capacities and knowledge to promote greater adoption of SLWM practices.

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

GEF funds will mainly support (a) establishing a small spatial planning unit in SADA, (b) mapping exercise for the northern savanna region to identify areas with high agricultural and natural resource potentials, ecologically sensitive areas (including biodiversity reserves, potential and established corridors), and high risk flood-prone areas, (c) preparation of spatial development masterplan for the Northern Savannah zone, (d) development of

GIS-based monitoring tools, and (e) prefeasibility studies for selected major multi-purpose water infrastructure investments.

Component 2: Water & Land Management (\$5.45 m from GEF Land Degradation + \$1m from GEF [Biodiversity]):

This component will support flood and land management at the micro-watershed level. It will include significant innovation by integrating watershed and natural habitat management, and evaluating alternate incentive packages.

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

GEF funds will finance (a) training of district teams, especially extension service providers on micro-watershed and land use planning (b) Micro-watershed and land use planning exercises leading to local land use and infrastructure maps, (c) At least five micro-watershed and land use plans developed for incorporation into Area councils and District Assembly development plans (d) Agreements with communities on types of improved SLWM technologies suitable for priority areas within micro-watersheds.

Subcomponent 2.2: Systems & capacity to promote SLWM (\$1.2m GEF)

This subcomponent would finance technical assistance, training and incremental operating costs to design systems and put in place local extension capacity to promote SLWM technologies on the ground, based on the understanding of need developed under subcomponent 2.1 and specifically encouraging experimentation with the design of incentive packages. In particular the key GEF outputs will include (a) Development of SLWM menu of options, manual & incentive structures linked to an environmental index, (b) a SLWM training program and set of training materials for extension service providers (district extension service providers trained), and (c) a capacity strengthening program for the District staff.

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

This subcomponent will finance operational costs of incentive provision to farmers, as well as for establishing and monitoring SLWM contracts. GEF funds will mainly support (a) drawing up contracts with farmers which includes recording the GPS location and size of plot, (b) independent verification of the SLWM contracts through checks of total volume of contract and review of remote imagery, (c) provision of improved seeds, other agricultural inputs and complimentary inputs such as nurseries and output-based rewards conditioned on performance.

Subcomponent 2.4: Management of riparian biological corridors (\$1m GEF [Biodiversity])

Activity 1: Implementation of Corridor Management Plan in the Western Corridor (USD 600,000).

Key GEF outputs will include (a) establishment of Two Collaborative Wildlife Management Areas, (b) creation of 4 waterholes for wildlife use (c) development of Ecotourism based market analysis report, and (d) development of small enterprises related to eco-tourism development, craft making and NRM.

Activity 2: Support to Gbele Resource Reserve Management (USD 400,000).

Key GEF outputs will include (a) Training program for strengthening capacity of communities, (b) an inventory on floral composition in the GRR (c) Development of a Fire management manual, (d) training of FSD and Gbele Park management staff on fire management and (e) creation of two waterholes for wildlife use

Subcomponent 2.5: Monitoring SLWM & environmental services. (\$0.5m GEF)

This component will finance monitoring and evaluation activities that will link local activities to national SLWM objectives, to strengthen their broader impact and replicability. This includes the monitoring of environmental services generated in the project area and two discrete national level activities to support the wider adoption of SLWM and impact of project activities; development of monitoring systems for national SLWM policies, and the

evaluation of the role of PES in promoting SLWM in northern Ghana.

Component 3: Project Management and Coordination (GEF \$0.7m Land Degradation)

GEF financing will support routine administration activities, annual audits, annual and quarterly progress reports, Impact evaluation, supervision, documentation, dissemination of M&E findings.

E. Incremental value added by GEF funding

The proposed GEF operation adds incremental value through 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 its innovative approach. Although a range of technologies exist that can enhance soil productivity, biodiversity and watershed services, the roll-out of these technologies remains limited, however, due to high transaction costs and a frequent focus on technical feasibility rather than socio-cultural acceptability. This project will seek to enhance efficiency and effectiveness through the following innovations:

- iv. **Using market-based instruments** for effective incentives and efficient aggregation of diffuse investments: The Communities and individual farmers will be free to select from a menu of sustainable land management (SLWM) technologies and support packages appropriate to local conditions. The portfolio of SLWM investments will be managed to maximize returns according to an index of environmental services associated with each SLWM technology. And the project will encourage competition between local extension service providers, and eventually between bottom-up innovations in both SLWM technology and support service delivery. Finally, the project will be tailored to address barriers for uptake of specific technologies, but favoring output-based payments where feasible. Notably, the proposed operation will aim at removing key barriers (policy, institutional, technical and financial) that have so far prevented a wider adoption of SLWM technologies and practices and at promoting innovative and alternative financing and incentive mechanisms that would leverage larger SLWM investments (e.g. PES). Particularly, this operation will support three strategic choices, in developing, an integrated landscape approach that targets, in tandem, rural poverty and land degradation resulting in declining local and global environmental services by: **(i)** addressing institutional, policy and incentive barriers and strengthening the enabling environment for the adoption of SLWM; **(ii)** addressing technological barriers through strengthening the capacity of extensionists/ service providers as well as of farmer/ producer organizations to support SLWM delivery/adoption and to integrate climate vulnerability and risk mitigation into decision choices; and **(iii)** addressing financial barriers that constrain widespread implementation of good land management practices (e.g. through provision of appropriate outcome based economic incentives that would stimulate land use changes/improved land use that generate greater environmental services). The incremental financing support adds value through providing a significant amount of technical assistance to farmers, local communities and decision makers on the implementation of SLWM systems. Successful farms adopting SLWM technologies would act as showcases to demonstrate the multiple benefits of these systems. Innovative techniques of knowledge sharing would be utilized, i.e. farmer to farmer extension and participatory communication approaches, to replicate the model and transfer experiences to other farmers.
- v. **Creation of marketable environmental services** to support costs of (or at least significantly subsidize) sustainable land management: The project will innovatively introduce the principle of payment for (biodiversity, watershed & carbon sequestration) environmental services, and linking to or establishing viable markets for the services by the close of the project. Links will be made to a range of potential buyers of services, as a single service alone may not provide sufficient revenue for rehabilitation.

- vi. **A landscape management approach**, integrating community protection of riparian wildlife corridors with sustainable land management in the surrounding watersheds, will offer investment synergies. Significantly, through complimentary landscape management activities the proposed intervention will incrementally bring a biodiversity dimension to the SLWM agenda. The protection of natural riparian habitats will contribute greatly to watershed function since they are mutually reinforcing activities, whilst investments in biodiversity corridors will be buffered by more sustainable management of surrounding lands. Through supporting key activities identified in the management plans of the GRR and forest management plans for the corridors, the Gbele Reserve will be a strategic refuge for wildlife of global importance that will be protected within this better managed protected area. Within the corridors there are a number of critical ecosystems whose integrity will be protected and even enhanced through supporting these corridors (e.g. river banks, riparian forests, specific habitats for wildlife etc) which would not be possible otherwise. The project will essentially provide a better chance for biodiversity to survive and an opportunity to establish biological corridors that would reinforce the viability of migrating and large range animals.

As an overall result, incremental improvements in the capacity of the country to reduce, halt and possibly reverse the current trends of land degradation are expected, thus allowing securing the integrity, regulating functions and services of critical ecosystems. Additionally, the GEF involvement will bring to this project an opportunity of becoming part of the regional platform for knowledge management, information exchange, and dissemination of best practices and help in mainstreaming SLWM into the sector policy dialogue.

Incremental Cost

The GEF's grant of **US\$ 8.15** million (from both the Land Degradation Focal Area [US\$ 7.15 million] and the Biodiversity Focal Area [US\$ 1 million]) along with a Government contribution of US\$ 7.8 million is integrated with the Social Opportunities Project (SOP, US\$ 9.5 million), a SIL, and will be complemented with financing from: (i) the Agriculture budget support operation (AgDPO II, US\$10 million) which promotes SLWM policy in agricultural land; (ii) the Natural Resource and Environmental Governance Program (NREG III, US\$ 4 million), a multidonor budget support operation which tackles land degradation policy issues in the environment, forestry and mining sectors; and (iii) the Northern Rural Growth Programme (NRGP) with an estimated funding envelope of US\$ 104 million which is aiming to achieve sustainable agricultural and rural livelihoods and food security for the rural poor in northern Ghana. Thus, the total project cost under the baseline scenario is US\$ 135.3 million and the GEF alternative is US\$143.45 million.

Table X: Incremental Cost Matrix

Component	Category	Estimated Expenditures (US\$ million)	Local Benefit	Global Benefit
1. Capacity building for integrated spatial planning	Baseline	NRGP: 2m Govt: 2 m	Planning and coordination of regional development activities for poverty alleviation.	Plans will identify green drivers of growth that would enhance global biodiversity & carbon sequestration benefits.
	With GEF Alternative	NRGP: 2m Govt : 2 m GEF: 1.0m	Similar to above, with strengthened spatial tools & more efficient outcomes	Improved technical capacity to incorporate large and small water and land management investments.
	Incremental	1.0		
2. Water & Land Management	Baseline	SOP: 9.5 m NREG: 4m NRGP: 102m AGDPO:10m	Limited efforts in improving management of wildlife corridors and	Increased awareness and knowledge of stakeholders at community, district and national level related to the

		Govt: 4.6 m	promotion of SLWM options among selected communities	benefits of CREMAs, SLWM and PES.
	With GEF Alternative	SOP: 9.5 m NREG: 4m NRGP: 102m AGDPO:10m Govt: 4.6 m GEF: 5.95 m	<p>Greater community involvement land use and water shade planning and development.</p> <p>Improved long-term productive capacity of rural land due to enhanced land quality, soil fertility through SLWM supported by PES</p> <p>Improved management of wildlife corridors providing connectivity between protected areas and promotion of SLWM options among selected communities</p> <p>More effective land use planning capacity at the community and district considering environmental sustainability. Strengthened capacity of extension service providers to supply communities with knowledge and skills on management of wildlife corridors and SLWM options relevant for the different sites.</p>	<p>Improved fertility and climate resilience of agricultural land, reducing risk of desertification and pressure on surrounding natural habitats.</p> <p>Regulation of surface water flows and increased availability of groundwater.</p> <p>Carbon sequestration through improvements in soil structure and organic content, as well as increase in standing biomass from sustainable land management practices.</p> <p>Improved ecosystem services from better managed smallholder production systems, with improved soil health, carbon sequestration, water infiltration and availability, reduced erosion and sedimentation major rivers and improved biodiversity both on farms and rangelands as a result of increased demand-driven and economically viable SLWM options supported by sustainable PES investments.</p> <p>Enhanced biodiversity through (i) more complex agricultural ecologies favoring integration of native species (e.g. through agro-forestry, live mulches, etc), (ii) reduction of pressure on natural habitats through agricultural intensification, improved fire management and stemming loss of groundwater, and (iii) restoration of flows and reduction of siltation in aquatic environments.</p>
	Incremental	5.95		
3. Project Management, Monitoring and Coordination	Baseline	Govt: 1.2m	Improved project management for project implementation,	

			efficient administration of project funds, improved coordination with implementing institutions, monitoring of results indicators for project progress and impact	
	With GEF Alternative	Govt: 1.2 m GEF: 1.2 m	Same as above.	Improved availability of and access to knowledge on productive and land conservation practices specific to Ghana's agro-ecological zones as a result of the establishment of a Technical Knowledge Base, reinforced with a Management Information System. Demonstration of role of PES in African context.
	Incremental	1.2		
Total	Baseline	135.3		
	With GEF Alternative	143.45		
	Incremental	8.15		

F. Role of Cofinancing

Financing Plan Summary by sources of financing

Components	Financing Plan					Total
	GEF Land Degradation	GEF Biodiversity	Govt. (in-kind)	IDA (SOP)	Associated Financing	
1. Capacity building for integrated spatial planning	\$ 1.0 M	0	\$ 2 M	0	NRGP: \$2M	\$ 5.0M
2. Water & Land Management	\$ 4.95 M	\$ 1 M	\$ 4.6M	9.5 M	NREG: \$ 4M AGRDPO:\$10M NRGP: \$ 102M	\$ 136.05 M
3. Project Management and M&E	\$ 1.2 M	0	\$ 1.2 M	0	0	\$ 2.4 M
Total	\$ 7.15 M	\$ 1	7.8 M	9.5 M	118.0 M	143.45 M

G. Donor Coordination

There are strong existing donor coordination structures in Ghana, which will benefit the project and provide strong partnerships. As part of the implementation of the Comprehensive Development Framework initiated in Ghana in 1999, donors active in the sector (European Union, CIDA, DFID, GTZ and JICA) have been meeting more frequently to discuss GoG's strategy and policies in and related to the agriculture sector. A donors meeting was held during the preparation of this proposed project to share information and seek synergies with projects ongoing in the northern region. Programs and initiatives that are also engaged in land management interventions include the Integrated Drylands Development Programme (IDDP II) funded by UNDP with financial assistance from Danish Government, the Ghana Environmental Management Project / Natural Action Programme to control and combat desertification in Ghana funded by CIDA and the Volta River Program funded by Denmark.

At the local level, the project will aim to strengthen involvement of civil society organizations in SLWM. NGOs will be engaged in participatory approaches, and (with private sector organizations where appropriate) in the delivery of extension services for SLWM. The Gia/Nabio Agro-forestry Development Organisation (GNADO), a local NGO focusing on poverty reduction, environmental and natural resources management, is aiming to build an Environmental NGOs Coalition within Northern Ghana with assistance from SNV. This could provide complementary and or direct support for project activities.

Annex 16: Appropriate SLWM Options for Northern Ghana

GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

Appropriate SLWM options for northern Ghana presented in this annex were determined through a participatory process involving local stakeholders and based on local conditions and socio-economic context, including farm size and assets. The common technical elements that underpin most of the “win-win” SLWM options include; maintenance of good ground cover, restoration of soil organic matter and soil fertility, conservation and management of water, improved management of farm components, and control of pests and diseases. SLWM options are presented according to farming system and land type. Benefits to be derived by farmers and associated social and environmental issues as well as minimum requirements are also highlighted.

SLWM technologies are organized into 4 categories below. Within each category, a large number of specific techniques may be included, but for the sake of devising a manageable menu of options, and assigning environmental services indices to these, they will be grouped into a small number of models, each of which will be associated with a specific environmental index value that will determine the relative magnitude of the support that can be offered for implementation of that model, within the PES framework. Each model may therefore include a range of specific techniques, with some flexibility as to which is applied in a particular case, but will be defined by a set of minimum standards, with some techniques obligatory, others interchangeable and others optional.

For instance, conservation agriculture within existing rainfed farming systems could potentially be subdivided into 3 models: improved soil management (e.g. through crop rotation, mulching, composting, etc), which would earn less potential support than improved soil management with physical erosion control structures (e.g. bunding, etc), which would earn less than improved soil management with physical erosion structures on sloping lands. This is just illustrative; additional categories could be added if certain soil management techniques or erosion control structures were considered to have a significantly greater environmental return than others, or incremental scales of support could be offered depending on the number of e.g. soil management techniques applied. Environmental benefits and levels of support could also be differentiated on the basis of zonation of land according to erosion risk or watershed value (beyond the distinction between flat and sloping lands alluded to above).

Packages of support offered for implementation of SLWM technologies will inevitably include training and demonstration activities, and where new crops or products are being produced, assistance with identifying markets will also be necessary. These forms of support are essentially provided up-front, however, and so cannot easily be used to incentivize delivery on implementation agreements. In addition, incentives may comprise elements of the following:

- Subsidy or provision of inputs needed to implement the techniques. All assistance with inputs defrays the investment costs of a new technology; they do not address initial opportunity costs of technologies that take some time to deliver a return.
- Cash payments are a direct and transparent way of supporting direct and opportunity costs associated with the establishment of a new technology. However, there is reluctance amongst some district extension officers to introduce cash payments because they fear this will create a precedent that would undermine their work in the longer term. Making cash payments to individuals in largely subsistence economies can also involve risks that the money will be used on unproductive expenditures that don't benefit the wider household or farm development.

- One way to avoid cash payments whilst providing scope for increased support is to provide extended inputs, e.g. subsidies of for inputs that are needed beyond the scope of the SLWM technology itself (such as vouchers redeemable for discounts on fertilizer), or to provide significant capital assets (e.g. water butts, treadle pumps) and subsidize (or forgo) repayments as long as the agreed SLWM technology is implemented.
- Commercial arrangements (e.g. contract farming) provide incentives by guaranteeing a market for new products. It is unlikely that Districts can guarantee markets, but there may be specific activities (e.g. introduction of fruit trees) that could be of interest to local agribusinesses and have environmental benefit. In this event, the project could offer output-based payments to companies on the basis of the area of new crops established.

(a) SLWM options by farming system

Agricultural land (rainfed farming)			
SLWM option	Farmer benefits	Environmental benefits	Social and environmental issues
1. Conservation agriculture	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - Improved soil chemical and physical properties - Carbon sequestration - Reduced erosion - Reduction of shifting cultivation & reduced land degradation - Improved water use efficiency 	<ul style="list-style-type: none"> - 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
2. Agroforestry	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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 favorable sites/micro-climate for on-farm biodiversity 	<ul style="list-style-type: none"> - 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

Along rivers and dams (dry season farming)			
3. Dry season gardening and protection of river banks	<ul style="list-style-type: none"> - 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) - Improved water quality 	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - Potential occurrence of salinity - Potential conflicts between upstream and downstream water users - May result in pollution of rivers due to increased use of agro-chemicals (misuse) - Highly labor and capital intensive (fencing, irrigation, guarding, etc) - Social exclusion for farmers without land along rivers - Communities may become unwilling to protect river banks due to land shortage
Communal land (dry season)			
4. Fire management in agricultural landscapes	<ul style="list-style-type: none"> - Increased availability of native species - Reduced losses associated with bush fires - Protection of sacred grooves - Increased growing of annual crops, e.g. cassava) 	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - Herders & hunters may favor 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)

(b) Specification of SLWM options by land type

SLWM	Flat land	Sloping land (additional)
1. Conservation agriculture	<ul style="list-style-type: none"> - Minimal burning - Slashing & mulching - Minimum tillage & direct planting - Ridging and furrowing - Crop rotation & intercropping - High quality seed (right variety, high yielding, pest & disease resistant) - Manure/compost - Optimal chemical fertilizer use - Integrated pest management 	<ul style="list-style-type: none"> - Contour ridging - Strip cropping - Contour bunds or stone lines - Vegetative barriers (trash-lines/ grass strips)
2. Agroforestry	<ul style="list-style-type: none"> - Scattered & boundary planting - Woodlots - Woody fallow - Fodder banks - Live fences - High value fruits 	<ul style="list-style-type: none"> - Planting Pits & semi-circular bunds - Contour bunds with trees
3. Dry season gardening and protection of river banks	<ul style="list-style-type: none"> - Canals and/or water pumping equipment - Earth basins/retention ditches - Furrows - Efficient water use - High value crops, especially vegetables - High quality seed (right variety, high yielding, pest & disease resistant) - Improved crop rotation - Integrated nutrient & pest management 	<ul style="list-style-type: none"> - Same
4. Fire management in agricultural landscapes	<ul style="list-style-type: none"> - Minimum/or spot burning (crop land) - Early burning/prescribed (parklands or grazing lands) - Community land zoning and management - Bush burning plans - Fire volunteers (fire management teams) 	<ul style="list-style-type: none"> - Same

B) Detailed information on selected SLWM options

1.1 Technique: Conservation Agriculture

Conservation Agriculture (CA) is a practice that reduces soil erosion, sustains soil fertility, improves water use efficiency, and increases crop output for small-scale farmers. It is based on three simple principles: (i) disturb the soil as little as possible; (ii) keep the soil covered; and (iii) mix and rotate crops. Farmers can choose from many different technologies to do this and by applying these principles, they can improve their soil fertility and grow more food, using less labor, and at lower cost.

1.2 Appropriate land type

The three principles of CA can be applied in a wide range of conditions/situations. On good soils, CA keeps the soil healthy and maintains yields while on poor soils, it is a good way to rebuild soil fertility and enhance water-holding capacity, hence increasing production. In the semi-arid lands in northern Ghana, CA will help to retain water in the soil, keep the soil temperature even, and protect the land from erosion during heavy downpours. Maintaining soil moisture is the main challenge in semi-arid areas. Rainwater harvesting methods can be very useful in increasing the amount of water available for crops. Farmers will have to rely on mulch or crop residue to keep the soil covered and livestock are important in providing manure. Farmers will have to restrict grazing on their fields to keep as much soil cover as possible.

1.3 Specification

CA will target crops that make a significant contribution to food security and/or have high commercial value. In northern Ghana, such crops include sorghum, millet, maize, yams, cowpeas, soybeans and groundnuts. The most appropriate CA techniques in northern Ghana include; (a) Minimal burning (slashing and mulching); (b) Minimum tillage and direct-planting techniques; (c) Crop rotation and intercropping. In addition, farmers will be encouraged to use improved seed (early maturing, high yielding and pest and disease resistant).

Minimum-burning (slashing and mulching): Farmers will slash the vegetation with a cutlass or machete and leave it to dry for use as mulch. Maize, cowpeas, soybeans or other favored crops will be planted directly through the mulch. Burning will only be used in situations where it is necessary and in localized sites. Weed control will be done manually using a cutlass or with a hand-held hoe. Fertilizers (NPK, sulphate of Ammonia & Urea) may be applied to boost the system. Pests and diseases will be controlled through integrated pest management, using chemicals only if deemed necessary. In addition, the physical and biological properties of the soil will improve after the mulch decomposes.

Minimum tillage and direct-planting techniques: Land will be prepared using chemicals. A glyphosate-based herbicide- Round-Up, Chemosate, or Helosate will be. The cut vegetation will be left on the soil surface without burning, and the farmer will wait for 7–10 days before planting crops. Direct planting will be done in rows through the mulch using improved seeds provided by agro-input dealers with advice of the extension service providers. Farmers will benefit from soil water conservation and total weed control from the mulch. Preventing weeds from producing seeds results in a reduced weed seed bank and weed pressure will be reduced over time. Soil fertility will be improved after the mulch decomposes in the subsequent seasons.

Crop rotation and intercropping: Will involve the planned order of specific crops planted on the same field. Farmers will ensure that the succeeding crop belongs to a different family from the previous one. The planned rotation may vary from one cropping season to another or longer period of say every 2 or 3 years so as to break the pest cycles. This will involve planting a cereal (corn, sorghum, millet), followed by a legume (beans, soybean, cowpea) and then a root crop (cassava, yam, potato) before returning to a cereal. In some cases, vegetables, such as, tomato, pepper and eggplant may be included in the rotation.

Intercropping will involve the cultivation of two or more crops simultaneously on the same field. The rationale behind intercropping is that the different crops planted are unlikely to share the same insect pests and provide adequate surface cover, thus protecting and conserving the soil. Intercropping with legumes will be promoted under this practice. Individual farmers can decide to practice; mixed or multiple cropping, relay cropping and strip cropping. CA will be practiced on different types of farms, with different combinations of crops and sources of power. Animal pulled implements will be used for a different set of CA practices. For instance; use of a subsoiler to break up the hardpan (if it exists), only necessary in the first year; use of a ripper to open up a narrow furrow for planting seeds.

1.4 Environmental services and impacts

CA aims at maintaining a soil cover, which protects the soil from erosion by wind and water, increases rainwater infiltration, reduces water losses through evaporation, suppresses weed growth, improves soil quality, thus ensuring the sustainable productivity of land. CA will improve soil fertility and secure production even in marginal areas that have been seriously degraded, or in years of drought. The environmental benefits of CA can therefore be vividly categorized into short-term and long-term benefits.

Short-term environment benefits (1-3 years): Increased water infiltration largely due to the protection of soil from the explosive effect of rain drops. Increase in water infiltration rate may be seen in the first season of CA. Reduced soil erosion, both from water and wind, due to the protection by the mulch and the absence of pulverized soil. Farmers in northern Ghana are convinced that leaving crop residues in the farm has beneficial effects of reducing runoff and soil erosion and improving the soil conditions.

Long-term benefits (> 5years): Increased carbon sequestration, increased soil organic matter (SOM) content due to reduced rate of decomposition of crop residues and plant roots, and the continual accumulation of SOM into the soil by fauna and flora. There will also be increased nutrient availability and soil water-holding capacity due to the increased SOM, and improvement in soil aggregation and other physical properties such as soil structure due to the minimum soil disturbance (minimum tillage) and continuous accumulation of SOM.

There will be increased soil biodiversity, thus increased biological activity both above and below the ground, due to the continuous presence of the residues as food source and habitat. Increased below-ground biological activity is vital for the improved soil structure. Increased aerial biological activity may result in more pests, but generally results in higher populations of predators and thus, more biological pest control. Reduced weed competition as weed seed is not incorporated into the soil, the seed bank will be exhausted, residues impede weed germination and growth, and increased biological activity results in lower weed seed viability. Reduced residue burning reduces oxidation of SOM and reduced losses of fertilizers under CA practices leads to substantial build up of soil carbon and remarkable reduction in emission of greenhouse gases resulting in eco-friendly farming practices for which farmers

need to be rewarded through cash payments or provision of farm inputs.

1.5 Current extent of uptake in project area

Farmers in northern Ghana have been practicing CA as part of their traditional land preparation technique for several decades. A number of initiatives on CA techniques, such as, no-tillage, minimum tillage, and the use of cover crops have been ongoing in Ghana since the early 1980s (Boahen *et al.*, 2007). Although there are no clear documented results in technology adaptation and impacts, the practice has been spreading rapidly in northern Ghana. In 1996, only a handful of farmers grew a single crop – maize – using CA. With support from Sasakawa Global 2000, Monsanto and GTZ, their numbers had risen to 350,000 by 2002. They grow a broad range of crops, including root crops, legumes, vegetables and tree crops. The Sedentary Farming System Project's impact assessment report (SFSP 2001) indicated an increase in the number of farmers applying at least one of the CA practices.

Between 2002 and 2003, more than 35% of participating farmers have applied at least one CA practice in two consecutive years and beyond, 28% of the farmers being women. Farmers indicated that CA practices were beneficial in lowering production costs and increasing yields. Minimum tillage and direct planting demonstration plots increased from 170 in 1996 through 321 in 1998 to 440 in the year 2000 (Ekboir *et al.*, 2002).

1.6 Local attitudes and barriers to uptake within the project area

A number of challenges influence the uptake of CA in northern Ghana, some of these include:

- Farmers have strongly accustomed to the conventional agriculture and the transition to CA is therefore difficult. A strong belief has to be created among the farmers to adopt CA. Mere knowledge acquisition, sharing experiences and exposures do not convince farmers to shift to CA, they must, however, be involved initially in CA practice in at least 10% of land owned for practical learning.
- It usually takes a long time to realize the benefits of CA, therefore it might not be an immediate solution to short term food needs. Other means to provide food are therefore required while CA is developed as a long-term solution to food security and sustainable land management.
- Changing from conventional farming to CA requires investment in equipment, tools and chemicals which are beyond the reach of the resource poor farmers.
- Benefits are long term and some are of a public good nature (e.g. environmental conservation). It therefore requires patience, persistence and appreciation of strategic long-term goals to practice CA. Farmers need to be motivated with incentives.
- CA involves radical changes in what extension services do. An effective way to promote CA is through farmer field schools and other approaches that put farmers and their needs at the centre, rather than seeing them as mere recipients of advice. Extension staff will need intensive training so they can learn the necessary technologies and ways of transferring them to farmers. Field demonstrations and awareness-creation campaigns will therefore be needed. The mass media must be harnessed to support the campaign.
- Keeping the soil covered is important in CA, however, this is currently a challenge in the case of northern Ghana with short rainy season and long dry period. Farmers have many uses for crop residues: as fodder, fencing, thatching material and fuel. Livestock keepers let their animals graze on the stubble. With only one rainy season, it is difficult to grow a cover crop in most parts of northern Ghana. If they are to keep the soil covered, farmers will have to protect their fields and

find alternative sources of fuel and fodder. Integration of trees into the farming systems (agroforestry) can help in addressing this.

1.7 Timeframe

Among other things, the adoption of CA is influenced by the time it takes to realize the benefits as well as the opportunity costs of abandoning conventional farming practices. Some of the benefits are apparent soon after initiation of the new system while others may take 3-5 years to be evident. In addition to the short term-environmental benefits, some of the benefits of CA such as reduced cost of production and increased farm profitability may be apparent in less than 3 years.

1.8 Economics

Like other new farming practices, adoption of CA is influenced by the returns to investment in CA compared to alternative practices such as slash-and-burn systems. In Ghana, positive effects of the promoted CA practices on labor use have been observed and reported through on-farm trials and farmer group meetings. In a comparative analysis of conservation agriculture practices with slash-and-burn systems, a human labor reduction of at least 30% (SFSP, 2002) was achieved by practicing CA technologies (minimum tillage and direct planting). In addition, maize yields of 3 t/ha without fertilizer was achieved with CA compared with 1.2 t/ha from slash-and-burn. This represents an increase in yield that is more than double. The net return per hectare was 145% higher in CA than in slash-and-burn, due to better productivity of maize (Adjei *et al.*, 2003).

1.9 Support requirements & potential incentives

At least where land availability is limited, CA systems should be clearly in farmers' interests, but the time taken for the establishment effort and costs to pay back in terms of higher or more sustained yields can be significant and necessitate considerable start-up support.

- Establishment of farmer field schools where farmers can acquire knowledge and skill on CA in their own fields and with demonstrations by extension agents to enable farmers to see CA in practice as they try it out themselves.
- Equipping extension service providers promoting CA with the knowledge and skills needed for its promotion and for mainstreaming gender related issues in their activities to enhance adoption of CA.
- Provision of improved seed varieties, fertilizers and CA implements (e.g. ridger, subsoiler, etc) at subsidized rates through agro-input dealers.
- Link farmers to support services especially, markets and financial institutions (e.g. microfinance)
- Payment for environmental services to encourage adoption of CA as a way of sustainable land management option.

1.10 Safeguards issues

Tenure issues relating to land have always been a major area of conflict in northern Ghana and this could in one way or another pose a challenge to the long-term practicing of CA, especially among the landless people.

2.1 Technique: Agroforestry practices

Agroforestry (AF) involves integration of trees/shrubs and sometimes animal husbandry in the farming system. Integration of trees into the farming system will help to restore soil fertility, reduce land degradation and make productive use of degraded farm sites. In addition, AF offers benefits to a farmer

through increased earnings, soil improvements and provision of tree products.

2.2 Appropriate land type

Application of AF practices has no restrictions on slope, soil type and rainfall. The land in northern Ghana is generally flat and annual rainfall in the savanna zone varies between 1000 mm and 1200 mm for the Guinea savanna and 900-1000 mm in the Sudan savanna. The two zones are characterized by a unimodal rainfall regime (April – October) with November-March being dry and characterized by the dry desiccating harmattan winds and mean temperature of 27.8 to 28.5°C. These conditions coupled with annual bush fires and free ranging livestock make some agroforestry practices, such as improved fallows and cover crops less suitable for most areas in northern Ghana.

2.3 Specification

The following agroforestry practices are recommended for all projects sites in northern Ghana

Practice & main products	Specifications	Remarks
MPTS on farmlands – scattered and boundary planting (timber, poles, fuelwood, fruits & fodder)	<i>Species: Senna siamea, Albizia lebeck, Grevilea robusta, Albizia chinensis and Tectona grandis</i> <i>Planting sites:</i> Scattered on farm land, along farm boundaries and roads, & around homes <i>Planting:</i> seedlings to be raised using quality seed during dry season & planted in rainy season (April – June) <i>Management options:</i> pruning, pollarding (for some spp) and coppicing	<ul style="list-style-type: none"> • Spacing will depend on desired end product. • Fruit and fodder trees to be grown near home for protection • Quality planting materials will be obtained from seed centers or research institutions • Seedlings to be raised by farmer groups or central district nursery
Woodlots (Poles and fuelwood)	<i>Species: Senna siamea, Tectona grandis, Azadirachita indica, Albizia lebeck, Eucalyptus camaldulensis, E. tereticornis</i> and other locally preferred species. <i>Sites:</i> Unproductive sites in the farm <i>Planting:</i> Seedlings to be raised by farmer groups in dry season and planted during early rains (April – June). <i>Spacing:</i> 2 x 2m (firewood) – 2.5 x 2.5m to 3 x 3 m (poles) <i>Management:</i> weeding, pruning and coppicing	<ul style="list-style-type: none"> • Maintain weed freed in the first two years • Short crops e.g. legumes to be integrated between lines in the first 2 yrs for short-term benefits • Protection from fire – fire lines and protective burning • Should be used to rehabilitate degraded farm sites • Help to harbor agents of biological control • If left to grow tall, they can serve as windbreaks to protect cropland.
Woody fallows (Soil fertility improvement)	<i>Species: Calliandra calothyrsus, Gliricidia sepium Sesbania sesban and lebeck, Cajanus cajan</i>	<ul style="list-style-type: none"> • Shortening of the natural fallow (from current 4-5 years to 1 -2 years) • Economic benefits from wood

	<p><i>Sites:</i> Degraded lands that need fallow</p> <p><i>Planting:</i> Seedlings to be raised by farmer groups initially but later sown directly when they become plentiful</p> <p><i>Spacing:</i> 1.5 x 1.5 m or seed broadcast directly in the field</p> <p><i>Management:</i> weeding in early stages and protection against fire. Trees replaced with crops after 1-2 years</p>	<p>harvest obtained from first growing trees</p> <ul style="list-style-type: none"> • Crops can be integrated in year one for shorten benefits and tress allowed to fully occupy the area in second year
<p>Fodder banks (Supplementary fodder for goats and sheep)</p>	<p><i>Species:</i> <i>Gliricidia sepium</i>, <i>Calliandra calothyrsus</i>, <i>Cajanus cajan</i>, <i>Albizia lebbek</i> <i>Sesbania sesban</i></p> <p><i>Planting site:</i> near home and should be fenced to protect from livestock – use live fencing or wire. Also to be planted on soil conservation structures</p> <p><i>Planting:</i> direct seeding in a well prepared land and plant in a block for ease of fencing</p> <p><i>Management:</i> weeding, cut and carry system to avoid animal destruction</p>	<ul style="list-style-type: none"> • Farmers to be trained on recommended feeding to avoid side effects • Protect from fire by regular weeding and establishment of fire lines • Resulting wood to be used as stakes for tomatoes or as firewood • Provides supplementary fodder rich in proteins
<p>Live fences (Protection & environmental services)</p>	<p>(i) Live fence posts - widely spaced, single lines of woody plants, regularly pollarded for supporting barbed wire - <i>Gliricidia sepium</i>, <i>Erythrina abyssinica</i>, <i>Albizia lebbek</i>, <i>Jatropha curcus</i></p> <p>Plant stakes (1.5m tall) and allow the shoots to grow for 6 to 10 months before cutting them back.</p> <p>(ii) Barriers or hedges - more densely spaced fences and can have different species, re-enforced with barbed wire or reeds at early stages. Species -, <i>Euphobia tirucalli</i>, <i>Calliandra calothyrsus</i>, <i>Jatropha curcus</i></p>	<ul style="list-style-type: none"> • To replace the current use of dead wood cut from the wild • Will provide biodiversity niches/corridors • MPTs incorporated to provide wood products & mulch • Hedges will help to reduce erosion & act as wind breaks • Natural barriers to deter both animal & human trespassers from entering into the farm. • A good method for farm demarcation & securing land ownership where the law permits • Can act as nutrient traps
<p>High value trees – Improved mangoes (fruits)</p>	<p><i>Varieties:</i> Kent, Keitt, Van Dyke, Ngowe, Apple mango, Sensation, Alphonso & Tommy Atkins.</p> <p><i>Site:</i> Sandy soil with good drainage</p>	<ul style="list-style-type: none"> • Using good quality planting stock targeted to existing and potential new markets • Farmers will raise rootstocks in group nurseries with appropriate scion provided by

	<p><i>Spacing:</i> 7 x 10 m to 10.5 x 10.5 m</p> <p>If 100 trees per acre are to be maintained, hedging & topping are required to control size</p> <p>Planting holes - 60 cm deep & wide and enriched with manure</p> <p><i>Management:</i> Manure/compost or NPK for (3-4 times a year. Supplementary irrigation needed during dry season, weeding, mulching & fencing required</p> <p>Mistletoe removed when they develop</p>	<p>extension staff</p> <ul style="list-style-type: none"> • Minimum planting area of ½ acre is required for a farmer • Legumes intercropped in the first 3 years for short-term benefits <p>For fencing, start with a conventional wire fence supported by dead fence posts and gradually establish live fence posts to substitute for the decaying posts</p>
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2.4 Environmental services & impacts

Increased vegetation cover and root system reduces erosion. Some of the trees to be used are leguminous, hence will fix nitrogen, one of the major limiting nutrients in tropical soils. Scattered trees on farms will recycle nutrients from deeper soil layers and make them available to crops through litter fall. There will be increased carbon sequestration resulting from more standing biomass on farms. Tree roots will bind soil particles making the soil more resistant to soil erosion. Trees will act as wind breaks and provide favorable conditions for biodiversity on farms. Extra demand for water will be managed by planting trees in specific sites e.g. woodlots, fodder banks and high value trees will be planted on degraded farm sites as a block and other MPTs on farm boundaries and around homes.

2.5 Current extent of uptake in project area

Multipurpose trees and shrubs (MPTs) on farmlands – This is a traditional practice carried out by most farmers in the project area. *Vitellaria paradoxa* is the most common indigenous tree species retained on farms. Under this project, the number of species will be expanded so as to provide multiple benefits.

- **Woodlots** – these are popular especially among women groups who use them as a source of firewood and income generation. There is however, need to expand the range of species to be planted based on the ecological conditions of the area. *Azadirachita indica*, *Albizia lebbek*, *Eucalyptus camaldulensis* are selected in addition to the currently used *Senna siamea* and *Tectona grandis*. The limitation with *Tectona grandis* (Teak) is its slow growth.
- **Woody fallows**- Currently limited in the project in the project area but with great potential. They are more or less similar to woodlots but the purpose will be for soil fertility regeneration.
- **Fodder banks** – these are rare in the project area due to free ranging livestock. They are however, preferred by farmers to provide supplementary fodder to goats and sheep. Damage by livestock will be overcome by use of low cost live fences with unpalatable species such as *Euphorbia tirucalli*.
- **Live fences** – Only a few farmers are using live fences in northern Ghana. However, fencing is currently practiced by many farmers but mostly using dead wood. This has negative effect on vegetation cover since young trees are cut for fencing. Use of live fences will have protective and environmental benefits in addition to provision of some tree products.

- **High value trees** – grafted mango growing is being promoted in the project areas by both government and NGOs, however the number of farmers benefiting is still low due to cost of planting materials and a need for irrigation during the dry season. There is need to train farmers on grafting techniques to facilitate the up-scaling of mango cultivation.

2.6 Local attitudes and barriers to uptake within the project area

Farmers in the project area are generally aware of all the agroforestry options except live fences which are restricted in its coverage. However, only MPTs on farmlands is widely spread since it involves retention of valuable trees on farms. Level of success has been high for woodlots and grafted mangoes. The major constraints for adoption of agroforestry include; limited planting materials, land tenure, narrow species range, animal damage and bushfires. Some farmers have been taught to raise their own seedlings by both government and NGOs service providers but the coverage is limited. The project will therefore conduct wide sensitization to increase awareness on the technologies, facilitate or contract extension agents to provide specialized services to farmer groups, provide wide species range and involve chiefs, land owners and users to find a common understanding on tree planting and benefit sharing. Communities will also be supported to develop ways of controlling bush fires and roaming animals. By-laws have already been put in place in some communities to address some of these challenges and these initiatives need to be supported and strengthened.

2.7 Timeframe

Technology	Benefits time frame	Remarks
MPTs on farmlands	After 4 years and continue for several years	Nutrient recycling realized when trees are bigger (>6 years)
Woodlots	First harvest after 3-4 years and subsequently after every 2 years	Watershed benefits realized over time, especially when adopted by many farmers
Woody fallows	Wood obtained in 1-2 years and soil improvement realized after 2 years and continues for about 3 years.	Fires and livestock during the dry season may pose a challenge during the first year
Fodder banks	Within 1 -2 years	With plenty of grass in rainy season, prunings will be used to improve soil fertility and/or mulching
Live fences	Realized from 1 – 2 years	Species that are unpalatable to animals e.g. <i>Euphorbia tirucalli</i> will be more appropriate
High value trees	From 3 years, increase at 4-5 years and reach economic levels there after	Other benefits from crops integrated with mangoes

2.8 Economics

Most agroforestry practices including woodlots, woody fallows, trees intercropped with agricultural crops, boundary plantings, contour plantings, live fences and alley cropping, have been found to be financially profitable to the farmers in other countries. These agroforestry practices have positive net present values (NPV), at a 20% real discount rate. In many cases, the NPV and the return to labor are superior to the alternative use of the land, especially crop monocultures. In the savannas of northern

Ghana, woody fallow has been shown to be economically viable with Benefit Cost Ratio (CBR) of 2.07 and Economic Rate of Return (ERR) of 34.3%. Payback period is one to six years except for cases where timber is the desired end product (10-30 years). Returns are however, sensitive to tree and agricultural product price. Even high labor input practices are profitable, so long as output prices or productivity are high. Technical compatibility between tree and crop components is important for high returns. On the other hand, many AF products have high marketing risks or face limited market demand. Payment for environmental services (PES) can therefore be used to promote agroforestry as a sustainable land use option.

2.9 Support requirements & potential incentives

In the initial stages, when markets are not well-established and wild alternatives can still be readily harvested, it may be difficult to convince farmers to turn agricultural land over to agro-forestry or silviculture. Initial success may therefore be more easily gained by combining elements of agro-forestry with other systems – e.g. planting trees along bunds or as boundary fencing for wet season gardening. In particular, those trees that require dry season watering and protection from livestock during the establishment phase, may be difficult to introduce if not part of a large dry season agriculture package.

Key requirements for the successful introduction of agroforestry include; planting material (seed and seedlings) and training on establishment and management. Fencing will be required for grafted mangoes, fodder banks and woodlots. MPTs, woodlots and mangoes are ready for wide scaling up while live fences and fodder banks still need a pilot approach. Current cropping procedures can still be applied in all cases, especially when the trees are young (1-2 years). Incidentally, all the practices involve planting trees at the start of the rainy season which coincides with the period for planting most crops. The labor shortage can be offset by providing cash incentive to farmers. Seed for most of the tree species recommended are readily available within Ghana and some research institutions in West Africa.

2.10 Safeguards issues

Like in most African countries, tree planting is associated with laying a claim to land ownership. Fencing may alter current patterns of use rights, for instance, open grazing. There will be a need to develop clear understanding between land owners (Tindanas), users and chiefs on sharing tree benefits. The use of chemicals, especially on mangoes will be at lower scale, thus without any serious environmental consequences. Some of the trees and shrubs to be used will themselves serve as sources of organic pesticides to be used in conservation agriculture.

3.1 Technique: Dry season gardening

Dry season gardening will involve the growing of high value crops, especially, vegetables such as onions, pepper, tomatoes, okra and gardens eggs near rivers and big dams. Farmers will also be supported to protect buffer zones along rivers while carrying out dry season gardening. Small scale irrigation schemes will be managed by farmers under the current water use associations with technical support from the Water Commission on water abstraction and extension agents on appropriate agronomic practices. The pump and canal methods of distribution will be promoted.

3.2 Appropriate land type:

Productive/profitable use of land a long major rivers which is otherwise flooded during the rainy season.

3.3 Specification:

Crop	Specification	Remarks
Onions	<ul style="list-style-type: none"> • Use of improved seed as advised by extension agents • Planted in earth basins and flood/basin irrigation applied. • Minimum economical land size per farmer is 0.2 ha (0.5 acres). • Use of NPK and urea as recommended. Manure applied as cheap alternative and to supplement chemical fertilizers • Minimal spraying needed. 	<ul style="list-style-type: none"> • Major dry season crop. • Gives high profits due to low inputs • Requires technical & financial incentive for farmers to continue irrigating
Pepper, tomatoes garden eggs and okra	<ul style="list-style-type: none"> • Use of improved seed • Planted in lines and furrow irrigation applied • Minimum economical land size is 0.2 ha. • Manure, NPK and urea applied as recommended. Crop rotation to break pest cycles • Tomatoes require increased spraying 	<ul style="list-style-type: none"> • Fertilizers cost about 70% of the external inputs • Use of manure to be encouraged since farmers are aware of its benefits • Pepper and tomatoes demand more labor
Cabbage	<ul style="list-style-type: none"> • Planting pits. Small holes (0.5 x 0.5 m) at a spacing of 1 m; 4 – 6 plants per pit • Compost or manure applied in pits before planting to improve soil fertility 	<ul style="list-style-type: none"> • Efficient use of irrigation water and plants benefit from increased moisture in pits • Most effective use of manure and fertilizers
River bank protection	<ul style="list-style-type: none"> • Retention or planting of vegetation along buffer zones adjacent to cultivated areas • Planting of flood resistant species e.g. <i>Ceiba pentandra</i>, <i>Balanites aegyptiaca</i>, <i>Khaya senegalensis</i> 	<ul style="list-style-type: none"> • To be promoted alongside dry season gardening • Farmers to protect adjacent river buffer zones as a condition for support in vegetable growing

3.4 Environmental services & impacts

Promotion of dry season farming will create an incentive to restore and protect the river buffer zones. It will offer an opportunity to make contracts with farmers whose land borders the White and Black Volta Rivers to protect river banks in exchange for support provided for dry season farming. Restoring vegetation along rivers will be critical in maintaining the ecological integrity of the river by reducing erosion and sedimentation.

3.5 Current extent of uptake in project area

All areas along the Volta River (Black and White Volta) and those close to large dams are appropriate for dry season farming. The practice is however, currently common along the River Volta. Farmers have formed water use associations and receive technical support from the district extension services as well as the Water Commission.

3.6 Local attitudes and barriers to uptake within the project area

All farmers in the target project areas are aware of dry season gardening including the choice of

appropriate crops. The level of success is generally high for onions and pepper and farmers are satisfied with the economic benefits from dry season vegetable growing. Major bottleneck to wide scale adoption is limited irrigation infrastructure, especially pumps, canals and dams. Most of dams are small, not regularly de-silted and therefore dry up during the peak of the dry season hence many can only support supplementary irrigation during rainfed farming. The pumps used are small and cannot pump water far off the river buffer zone. This has resulted in use of the river buffer zone for dry season gardening. The cost of fuel for water pumps and mechanical breakdowns have also led to reduction in farmed areas. In some cases, farmers have reverted back to manual irrigation using buckets and watering cans. In addition, farmers have to guard their vegetables plots against livestock damage during both day and night. Grazing is mostly done by Fulani herdsmen from the neighboring Burkina Faso. Women farmers have to rely on their neighboring male farmers to help in guarding so that they can attend to other domestic activities.

3.7 Timeframe

All the vegetables irrigated give benefits in about 3 – 4 months. For sustainability of dry season gardening, relevant institutions have to consider; adequacy of irrigation water, efficiency of irrigation water use, equity of irrigation supply, and dependability of irrigation supply.

3.8 Economics

Financial and economic returns from all the crops, except tomatoes are favorable to farmers compared to rainfed agriculture. There are increased costs of spraying for tomatoes that reduce expenditure on fertilizers, leading to sub-optimal yields. Techniques to reduce pesticide used should be used, e.g. crop rotation and use of organic pesticides. Farmers however, need to be made aware of some of the hidden costs of irrigation, such as, loss of pasture to herders and increased costs of labor.

3.9 Support requirements & potential incentives

Provision of irrigation for dry season or at least extended cropping is a key demand of farmers in northern Ghana, and little encouragement is likely to be needed for the adaption of such systems. More problematic for the project, however, is to ensure that such systems justify support in terms of providing a clear environmental gain. The project will need to therefore develop models of intervention based on: (i) improving existing dry season farming systems (or those being introduced in parallel by others), i.e. through improved soil and fertility management, introducing more efficient (drip or clay pot) irrigation system, etc.; or (ii) introducing dry season farming systems as part of a package that includes obligatory steps to protect land around irrigation structures or on river banks. Protection of river banks is of particular importance for watershed health, but difficult given that these are often the most fertile areas. Support for dry season farming can be conditioned on river bank protection, but thought still needs to be given as to how to make this sustainable beyond the life of the project. In the long run, it will require either enhanced enforcement of river bank buffer regulations, or convincing communities that vegetated river banks are in their own interest in terms of reducing the destructive and enhancing the beneficial impacts of annual flooding. River bank irrigation also commonly relies on the use of diesel pumps, which present an issue for a project aimed at achieving net environmental benefits. Where the project is required to install river-side irrigation, it should investigate the feasibility of treadle pumps or small diversion systems.

Farmers need training on construction of irrigation structures (earth basins, furrows and canals) for efficient use of irrigation water, and appropriate agronomic practices for dry season crops (vegetables),

including sowing densities, composting, fertilizer application and pest control. Farmer groups will need to be supported to produce tree seedlings for buffer zone planting; Materials needed include; seed, potting materials, wheel barrows, spades, watering cans and cutlass. Farmers will require to be supported with improved seed varieties (onions, pepper, tomatoes, garden eggs and cabbage), fertilizers (NPK, Sulphate of Ammonia & Urea), pesticides, water pumps and water tubes.

3.10 Safeguards issues

Ownership of the land along river buffer zones needs clarity to facilitate the sharing of benefits between the land owners and users. Dry season farming could affect existing riparian interests e.g. create conflicts between farmers and herdsmen who need grazing land. Increased water abstractions up-stream may impact on other uses downstream. Increased use of agro-chemicals (misuse) may have negative impacts on water quality. However, all these are expected to be of minimal magnitude, thus with no need for full environmental impact assessment.

4.1 Technique: Fire management in agricultural landscapes

Fire has long been a useful management tool for croplands, rangelands, national parks and forests. The most common technique is prescribed burning, which involves controlled application of fire to vegetation in either their natural or modified state, under specified environmental conditions which allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to attain planned resource management objectives (FAO and GFMC, 2003). In the savannas, such as those in northern Ghana, controlled burning can be used to maintain an area in its most productive state or to maintain a full range of species. Burning is a disturbance event that allows ecological processes to change in the desired direction. It can be used to either maintain a larger area in a similar condition for example to aid a pastoral system or it can be used on a smaller scale to create a more diverse habitat structure. It is important to note that complete elimination of fires in the savannas may be counterproductive.

4.2 Appropriate land type

Spot burning will be applied in croplands while prescribed burning will be applied in rangeland (grazing land) and woodlands. The main land management objectives that burning can be used to support include: creation of firebreaks; reduction of fuel loads; breaking-in new agricultural land; improving grazing (forage production), especially the early bite; removing branches and other slash, post tree-felling and prior to re-planting and controlling weeds, insect pests and diseases.

4.3 Specification

Various firing techniques will be used to accomplish burning objectives. The technique chosen will be determined by the fuels, topography and weather factors so as to ensure that goals of fire management are met while preventing undesired damages. Fire management will encompass appropriate use firing techniques including use of; backing fire, strip-heading fire, flanking fire, point fires, centre and circular (ring) firing and pile and windrow burning.

4.4 Environmental services & impacts

Prescribed burning will help to remove surface vegetation, the top litter layer and/or the encroachment of bush and trees to aid the natural regeneration of desired plant species endangered by succession. It will also help improve habitat mosaics for insects, birds and other forms of wildlife. In addition, prescribe burning can help to maintain open cultural landscapes especially preservation of culturally important agricultural systems.

However, burning often causes air pollution (smoke). Smoke from vegetation burning is a complex mixture of carbon, tars, liquids, and different gases. This open combustion source produces particles of widely ranging size, depending to some extent on the rate of energy release of the fire. The major pollutants of burning are particulate, carbon monoxide, and volatile organics. Nitrogen oxides are emitted at rates of from 1 to 4 g/kg burned, depending on combustion temperatures.

Prescribed burnings will not cause changes in the structure of mineral soil, because the elevated temperatures are of brief duration. However, burning piled debris, or burning when fuel and/or soil moisture conditions are extremely low, may elevate temperatures long enough to ignite organic matter in the soil as well as alter the structure of soil clays. Under many conditions, burning increases nitrogen fixation in the soil, which more than compensates for any direct nitrogen loss to the atmosphere during the fire.

The main effect of prescribed burning on the water resource is the potential for temporarily increasing runoff. When surface runoff increases after burning, it may carry suspended soil particles, dissolved inorganic nutrients and other materials into adjacent streams and lakes, reducing water quality. Problems can be avoided by leaving unburnt buffer strips adjacent to streams and lakes. In sandy soils, leaching may also move minerals through the soil layer into the ground water before they can be captured by new plant growth.

4.5 Current extent of uptake in project area

There is limited recorded information on the use of fire as the land management tool either by farmers, herders or hunters in Ghana. However, records of the use of bushfires in Ghana can be traced to the frequency of drought periods because most drought years are accompanied with widespread bushfires. In northern savanna Ghana, fire is currently used by herders who often start the fires haphazardly to stimulate the growth of young shoots. Fires are, however, started at the middle of the dry season when most vegetation is dry and temperatures are high (35 – 40°C), thus making it destructive to vegetation and causing land degradation. According to herders, the re-growth or young offshoots are more palatable and contain more nutrients for their livestock. Hunters also use fire to drive out game. Ghana's Environmental Protection Agency (EPA), Nandom Agricultural Development Project, the Green Sahara Organization and Community Based Rural Development Project (CBRDP) among others are promoting fire management activities in northern Ghana. These initiatives need to be scaled up.

4.6 Local attitudes and barriers to uptake within the project area

According to the International Forest Fire News (1996), the use of fire as a land management tool is one of the challenging 'man versus environment' conflicts in Ghana. The culture of burning is part of Ghana's traditional farming, hunting, religious and ceremonial practice, a traditional way of life, especially in semi-arid northern regions. Bush burning has a long pedigree in Ghana, and Africa in general. It would seem that the culture of burning is inextricably interwoven with the socio-economic fabric of the Ghanaian Society. Many people in northern Ghana burn the bush or grass because it is customary to do so. In fact some people cannot resist the urge to set fire to dry grass, and debris on their

farms (Korem, 1985). The ordinary farmer in the rural areas does not understand why burning should be forbidden by government at dry period of the year. Traditionally Ghanaians have used fires for their slash and burn method of farming. Farmers burn before planting, and when the burning goes out of control (especially in the dry season) it results in bushfires. However, some of these fires once started can become unmanageable and often destroy people's properties including dry season crops. For instance, in 1984-85, about 145 unmanageable bushfires started by hunters, herders and even farmers were reported in the northern savanna zone of Ghana alone, destroying large fields of crops especially rice and maize (International Forest Fire News, 1996). In 2010, bushfires were reported to have destroyed about 76 homesteads in west Gonga district.

4.7 Economics

There is very little information on the economic benefits of fire management/controlled burning. In northern Ghana, communities are increasingly becoming aware of the benefits of controlled burning but these are not quantified. Available information on studies conducted elsewhere indicates that an increase in managed by prescribed burning will lead to improvement in soil condition with associated increased crop yields.

4.8 Support requirements & potential incentives

Fire management on individual agricultural plots can to some extent be dealt with under conservation agriculture systems, but broader fire management requires community action and therefore incentives at the community level. If communities are in broad agreement with the need to reduce burning, assistance with training (e.g. on coordinated early burning systems) and some equipment for fire volunteers may be sufficient. Otherwise, payments to community funds or in the form of community assets could be provided, but thought would need to be given to how performance under fire management agreements could be verified.

In Ghana, there are a number of age-old institutions governing the use of fire. These institutions served as checks and balances to regulate the excesses in the use of fire. For example, in the past, a farmer could not burn his/her farm unless he/she had prepared a fuel break or fire belt around the slashed area. It was also a bad omen for the farmer to leave a fire burning on his/her farm unattended or overnight. It was believed that evil spirits would be attracted to the farm by the fire and hence destroy the fertility of the farm. Unfortunately, most of these and other built-in checks and balances governing the use of fire have fallen into disuse. These institutions therefore, need to be deliberately supported by development programs to prevent the misuse of prescribed fires. There is need for training programs geared towards training farmers, hunters and herders on controlled use of fires and enactment of by-laws. In the same way leaflets, posters, and guidelines on the management of fire need to be produced for farmers, herders and hunters. Farmers need to receive information on when and how to burn their fields safely.

4.9 Safeguards issues

Management of fire could create conflicts between the herdsmen who need new grass for their animals and the farmers who are more concerned about land degradation. There may be need for zoning of community areas for purposes of controlled burning. Chiefs will have a great role to play in enforcing controlled burning.

Tree and shrub species with agroforestry potential for northern Ghana

Species description	Requirements & propagation	Tree Management	Uses/benefits
<p><i>Senna siamea</i> (<i>Cassia siamea</i>)</p> <ul style="list-style-type: none"> Evergreen tree growing up to 18 m tall. Naturalized in tropics & performing well Ghana Fast growth even in infertile soils Drought tolerant 	<ul style="list-style-type: none"> Altitude: 0-1,000 m Temp.: 20-35 °C R/F: 400-2,800 mm Soil: most soil provided drainage is not impeded. pH: 5.5-7.5 Propagate by seed Establish by direct sowing Seed available in northern Ghana Will have slow early seedling growth but peaks up 	<ul style="list-style-type: none"> Weed in first 2yrs Apply moisture conservation measures (trenching, micro-catchments) due to semi-arid conditions For fuelwood plant at 2 x 2 m or 2 x 3 m. In hedges (alley cropping) use 1.5 m x 5 m Wood mean annual increment is 20-35 m³/ha Regenerate by pollarding (1.5m) or coppicing (0.3m) - leaving 2-3 shoots/stump 	<ul style="list-style-type: none"> Firewood (1yr) & charcoal (2yrs) Erosion control when used as a hedgerow - effectively increases topsoil infiltration, reducing runoff & combating soil erosion. Windbreak & shelterbelt when densely planted Reclamation of degraded land Soil improvement through litter fall used as green manure & mulch Used in alley cropping due to its coppicing ability & high biomass production
<p><i>Albizia lebbek</i></p> <ul style="list-style-type: none"> 15-20 m tall & up to 50 cm diameter Widely cultivated and now naturalized in dry parts of Africa including Ghana Tolerates drought 	<ul style="list-style-type: none"> Altitude: 0-1,800 m Temp.: 19-35 °C R/F: 500-2,500 mm Soil: well-drained loamy soils Tolerates acidity, alkalinity, poor soils & waterlogged sites Propagate by potted seedlings or direct seeding Pre-treat seed by scarification/hot water/cold water Seed available in Ghana 	<ul style="list-style-type: none"> Weed in first 2yrs Spacing: 3 x 3 m fuelwood & 5 x 5 m for timber Fuelwood (10-year rotation) will produce 50 m³ha⁻¹ Timber rotation is 20-30 yrs (30 - 50 cm dbh) Protect against strong winds & fire (vulnerable) Prune for good bole & reduce crop shading Regenerated by coppicing or pollarding 	<ul style="list-style-type: none"> Fodder for goats and sheep (leaves contain 17-26% crude protein) Pods not eaten in large amounts by sheep & goats, although cattle eat them readily – due to saponin. Whitish flowers good for bees provides good quality (light-colored) honey Excellent firewood and charcoal tree (calorific value of 5200 kcal/kg)
<p><i>Grevillea robusta</i></p> <ul style="list-style-type: none"> Medium-sized tree, 12-25 m tall Drought resistant - can stand up to 6 months of drought Used extensively in dryland agroforestry Moderate to fast growing 	<ul style="list-style-type: none"> Altitude: 0-2,300 m Temp.: 14 -31 °C R/F: 600-1,700 mm Soil: Loam & alluvial soils free of water-logging & mildly acidic to neutral. Also on clay & sand soil Propagate by seed raised in pots No seed pre-treatment is required Seed can be acquired from research/seed centers 	<ul style="list-style-type: none"> Plant at 3 x 3 - 4 m Weed in 1-2 years Volume increments; 5-15 m³/ha/yr Height increment 2–3m/yr Susceptible to termites in early yrs (use reagent 3G) Diameter increment -2 cm, in early years Prune & pollard to yield wood & regulate shading of associated crops Use rotations of 7-15 yrs for fuelwood production 	<ul style="list-style-type: none"> Provides firewood, charcoal & poles (calorific value 4,800-4950 kcal/kg) Yields medium-weight timber with economic potential Windbreak Reclamation of disturbed sites Soil improvement by providing abundant quantities of leaf mulch Good for intercropping due to a deep rooting system which causes little interference with shallow-rooted crops
<p><i>Gliricidia sepium</i></p> <ul style="list-style-type: none"> 2-15 m tall, and may be single or multi-stemmed 	<ul style="list-style-type: none"> Altitude: 0-1,200 m Temp.: 15-30 °C R/F: 600-3,500 mm Soil: From sandy to 	<ul style="list-style-type: none"> Plant at 2.5 - 3 x 2.5 - 3 m Regular weeding Fast growing, easy to propagate, N-fixing and 	<ul style="list-style-type: none"> For fodder -leaves rich in protein & highly digestible Improved milk & meat (supplementary feed)

<ul style="list-style-type: none"> • Naturalized in many tropical countries including West Africa • Establishes well on sloping sites • Can grow on disturbed sites such as, river banks and floodplains • Drought-resistant 	<ul style="list-style-type: none"> • deep alluvial deposits • pH: 4.5-6.2 • Propagate by seed • Seed pre-treatment often not necessary • Also propagated by cuttings, though not good in poor soils • Good land preparation needed for direct sowing • Inoculate seed with rhizobia for new sites 	<ul style="list-style-type: none"> • has light canopy • Pruning & pollarding are the main management activities • Pollarding at 2 m or above for optimal wood biomass production. • Coppicing to be used where primary objective is fuelwood production. • Tolerate lopping and browsing 	<ul style="list-style-type: none"> • Important species for honey production • Firewood and charcoal production (calorific value of 4,550 kcal/kg) • Can be used as a rodenticide & general pesticide • Erosion control when used in hedgerows in alley cropping • Reclamation of degraded land • Improves soil fertility – N-fixing & green manure • Boundary/barrier/support i.e. suitable for live fencing
<p><i>Calliandra calothyrsus</i></p> <ul style="list-style-type: none"> • Often multi-stemmed shrub- 5-6 m tall • Easy to regenerate & and fast growing – matures in about 6 months • Can be used in tree fallows 	<ul style="list-style-type: none"> • Altitude: 250-1,800 m • Temp.: 22-28 °C • R/F: 700- 4,000 mm • Soil: grows in a wide range of soil types but prefers light textured, slightly acidic soils • Tolerates infertile but not water-logged & alkaline soils. • Easily propagated by direct sowing & seedlings • Seed pre-treated by immersing in hot water or soaking in cold water • seeds can germinate without pre-treatment 	<ul style="list-style-type: none"> • Fast growing, easy to regenerate by coppicing • Weeding needed in the first year • To be pruned 4-6 months in alley-cropping systems to limit shade on associated crops • For fodder production, spacing should be dense: 0.75 x 0.75 m to 1 x 1 m • Also plant on soil conservation structures – cut at 50 cm from the ground, • Coppice every 6 months - cut at 50 cm 	<ul style="list-style-type: none"> • Fodder - leaves & pods rich in protein - 22% protein • Annual fodder yield (dry matter) - 7-10 t/ha • Can supply 40-60% of ruminant fodder needs • Supports beekeeping- profuse flowering lasting throughout the year • Provides good firewood - yields 15-40 t/ha of wood in just one year after planting • Erosion control - used to rehabilitate degraded areas • Soil improvement - N-fixing, high leaf biomass production- green manure • Boundary or barrier planting
<p><i>Euphorbia tirucalli</i> (figure euphorbia)</p> <ul style="list-style-type: none"> • Shrub or small tree 4-12 m high with brittle succulent branchlets • Widely planted hedge plant used in agroforestry systems in dryland Africa • Highly drought resistant 	<ul style="list-style-type: none"> • Altitude: up to 2,000 m • Soil: Almost any soil type • Easily propagated by branch cuttings • Cuttings obtained from older branches & left under the sun for 1-2 days before planting • Available in northern Ghana 	<ul style="list-style-type: none"> • To form a hedge/live fence, plant at very close spacing (0.5m) • Can be cut after 1 year & coppices well at 20-30 cm height. • Re-growth is excellent under semi arid conditions 	<ul style="list-style-type: none"> • Erosion control - protects bare soil in dry areas from wind and water erosion. • Its fence can act as erosion breaks • Reclamation of degraded lands • Pruned into hedge & used as a live fence around food crops
<p><i>Eucalyptus camaldulensis</i></p> <ul style="list-style-type: none"> • Grows to 20 m tall • Grown to a less extent in northern Ghana 	<ul style="list-style-type: none"> • Altitude: 0-1,500 m • Temp.: 21-40 °C • R/F: 250-2,500 mm • Soil: deep, silty or loamy soils with a clay base & accessible water table • Tolerates water-logging and periodic flooding • Tolerant to acidic soils 	<ul style="list-style-type: none"> • Spacing depends on the end products required (use 2-3 x 2-3 m) • Poor competition ability with weeds – weed 2-3 times a year • Slashing instead of clear weeding used when canopy closes at 3-5 years • For poles & posts, thin to 	<ul style="list-style-type: none"> • Firewood and charcoal - makes good-quality charcoal • Timber - great strength and good durability - wood density is 900-980 kg/cm³ at 12% mc. • Timber rotation is about 10yrs

	<ul style="list-style-type: none"> Propagated by seeds raised in nursery No seed pre-treatment 	<ul style="list-style-type: none"> < 700 stems/ha Coppicing is applicable 	
<p>Casuarina equisetifolia</p> <ul style="list-style-type: none"> An evergreen tree 6-35 m tall Has a finely branched crown Tolerance to strong winds and drought 	<ul style="list-style-type: none"> Altitude: 0-1,400 m Temp.: 10-35 °C R/F: 200- 3,500 mm Soil: well-drained and rather coarse textured, principally sands and sand loams Tolerates slightly alkaline soils but intolerant to prolonged water-logging Propagation is mainly by seed raised in pots 	<ul style="list-style-type: none"> Use 2.5 x 2.5 m spacing Trees are self-pruning Not fire resistant thus need protection Coppices only to a limited extent when cut young Growth rates are about 2 m/year in height Diameter of 5-7 cm achieved in 4 years Rotation period- 4-5 yrs for fuelwood & 10-15 years for poles 	<ul style="list-style-type: none"> Good fuelwood-calorific value > 5,000 kcal/kg Erosion control- used to control erosion along riverbanks & waterways Windbreak – tolerance to strong winds Used to rehabilitate barren, polluted sites N-fixing-has active root nodules Good for boundary - light shade
<p>Azadirachta indica</p> <ul style="list-style-type: none"> A small to medium-sized tree, usually evergreen, up to 15 m tall Grows almost anywhere in the lowland tropics Naturalized in Ghana Drought resistant 	<ul style="list-style-type: none"> Altitude: 0-1,500 m Temp.: up to 40 °C R/FI: 400-1,200 mm Soil: grows on a wide variety of neutral to alkaline soils pH: 6.2-7 Easily propagated in the nursery by seed Direct sowing of fresh seeds possible No seed pre-treatment Also propagated by root & shoot cuttings 	<ul style="list-style-type: none"> Spacing of at least 6 x 6 m Weeding is essential – Sensitive to competition Responds well to chemical and organic fertilizers Coppices freely, and early growth from coppice is faster than growth from seedlings. Withstands pollarding well 	<ul style="list-style-type: none"> Firewood & charcoal are of excellent quality Seeds produce oil burned in lamps in parts of Ghana Erosion control Nutrient recycling due to well-developed root system for extracting nutrients from the lower soil levels Good shade for humans & animals in semi-arid lands Leaves & small twigs are good for mulching & green manure
<p>Mangifera indica (grafted)</p> <ul style="list-style-type: none"> Naturalized in tropical lowlands Promoted in northern Ghana Can tolerant 6-8 months of drought 	<ul style="list-style-type: none"> Altitude: up to 915 m Temp.: up to 35 °C R/FI: 750-2,500 mm Soil: Sandy soil with good drainage & suited to irrigated fields Raised by seed of local mongo and scions of desired variety (grafted) 	<ul style="list-style-type: none"> Apply NPK or manures in planting holes & for 2-3 years after planting No pruning up to 4th year Top at 4 years to improve form & facilitate spraying & harvesting 	<ul style="list-style-type: none"> Fruit after 2-3 years Fruit yield at peak productivity can be 3,000 – 1,500 fruits Good exposure of fruits to the sun in semi-arid areas results in good color & relatively free of disease

Other potential species: *Kaya senegalensis*, *Tectona grandis*, *Jatropha curus*, *Erythrina abyssinica*, *Cajanus cajan*, *Eucalyptus tereticornis*, *Albizia chinensis*.

Annex 17: Biodiversity Profile and Significance of the Wildlife corridor areas and GRR

GHANA: SUSTAINABLE LAND & WATER MANAGEMENT PROJECT

A. The Wildlife Corridors

Communities in the corridor areas are among the poorest in Ghana both geographically and occupation-wise, as most of the inhabitants are food crop producers and rural by location. These communities derive their main source of livelihood from agriculture (food crop cultivation). Apart from the Sissili river basin, suitable farming land is a major constraint to agriculture and, for that matter, livelihoods. As a result game hunting and charcoal burning (especially in the Sissili river basin) have become important sources of livelihood. Destructive activities of wildlife, particularly elephants, are a frequent occurrence in the area. The result is a threatened livelihood. The implication is that unless farmers see very clear and tangible benefits from corridor development it will be difficult to convince them to participate in corridor activities.

The project will focus upon **Site 1 (W-KCWMA)** and **Site 3 (W-WCWMA)** within the western corridor which will be established as CWMA's.

Description of Site 1- Wuru – Kayero Collaborative Wildlife Management Area (W-KCWMA)

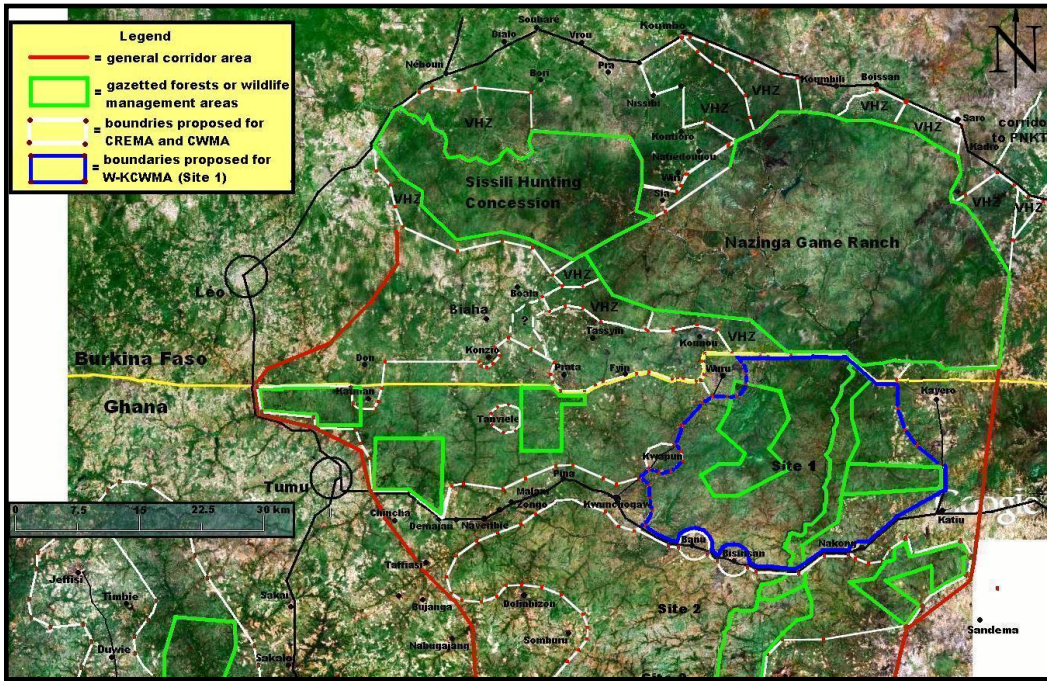
The site covering an approximate area of about 550 Km² lies south of the Nazinga Game Ranch in Burkina Faso and is bounded by the villages of Kayero, Katiu, Nakong, Bassisan, New Pudu, Banu, Kunchogu, Kwapun and Wuru. It is situated in between two main political districts namely: Kassena-Nankana West District in upper East Region and Sissala East District in the Upper West Region of Ghana. Although each village has a unique origin, beliefs and values, they speak a common language: Kasem. Over 90% of the population of the 9 surrounding communities are Kasenas and the remaining 10% comprise of the minority tribes such as Sissala, Kantosi and few Fulanis.

The proposed boundaries of the W-KCWMA include forest reserves of the Pudo Hills, Sissili North, Sissili Central, and the Chana Hills. These forest reserves, primarily established to protect the Sissili River, are under the direct management and control of the Forestry Services Division.

The natural vegetation is southern Sudan savannah giving way to Guinea savannah woodland. The site harbors all the species typical to this savannah biome, although in reduced densities. These include the Buffalo, Elephant, Hyena, Leopard, Lions, Korrigum, the Red-fronted Gazelle, Roan, Hartebeest and Waterbuck.

The area is identified as being part of one of the few remaining elephant ranges in Ghana and is significant in that it is adjacent to the Nazinga Game Ranch situated just across the border between Ghana and Burkina Faso where the elephant herd currently numbers about 600. The wildlife population, including the elephant, has however, been declining for quite a number of years, due to poaching and habitat loss due to deforestation from the activities of farm expansion, fuel wood collection and more recently, because of an annual invasion by migrant herdsmen and zebu, etc.

Map 1: Site 1- Wuru – Kayero Collaborative Wildlife Management Area¹⁷



¹⁷ Maps of sites copied from CREMA management plan developed under NSBCP.

Description of Site 3- Wahabu –Wiasi Collaborative Wildlife Management Area (W-WCWMA)

Map 2: Site 3- Wahabu –Wiasi Collaborative Wildlife Management Area



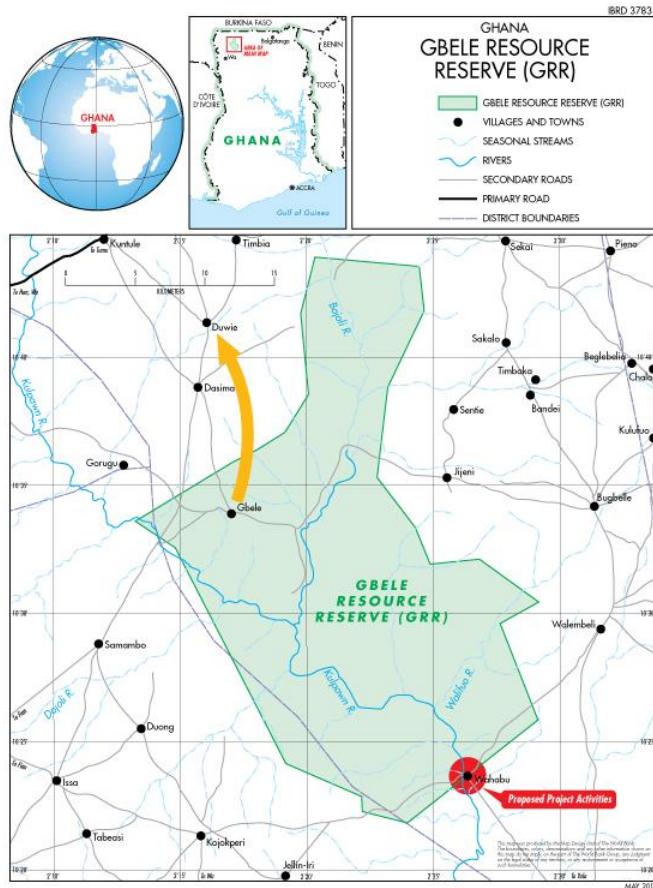
The W-WCWMA covering an approximate area of about 1422 Km² is situated between four districts, namely West Mamprusi, Builsa, Wa East and Sissala East and is bounded by 31 villages. Looking to the north, the site is adjacent to the Sumboru - Because Collaborative Wildlife Management Area, and further north again is the Wuri – Kayero Collaborative Wildlife Management Area. Looking southward, it is adjacent to the CWMA (Gbele – Mole Collaborative Wildlife Management Area) that would link it to the Mole National Park. This site will provide connectivity with the Gbele Resource Reserve and Mole National Park to the Nazinga Game Ranch.

There are no gazetted forests or wildlife areas within the boundaries of this proposed CWMA and relatively few farms, so the greatest part of the site is covered by extensive areas of natural vegetation. Guinea Savannah Woodland gives way to flood-plains along the Sissili River, where relatively dense woodland and forest formations are found along the river valley. The site harbors a variety of species of large wild ungulate and small to mid-sized carnivores, although in reduced densities. These include the Buffalo, Elephant, Hyena, Leopard, Lions, Korrigum, the Red-fronted Gazelle, Roan, Hartebeest and Waterbuck.

B. The Gbele Resource Reserve (GRR)

Background: The Gbele Resource Reserve is one of the eighteen (18) Wildlife Reserves (Protected Areas) in Ghana (Map 4). It is the only gazetted Protected Area (PA) in the Upper West Region and a representative sample of the Guinea Savannah Woodland Vegetation. The Reserve was established under the Wildlife Reserves (Amendment) Regulation of 1975 (L.I. 1022). The management authority of Gbele Resource Reserve has, since its creation, been the WD of the Forestry Commission. Geographically, the reserve is located between latitude 10° 22' and 10° 44' N and longitude 2° 03' and 2° 12' W and covers a total area of about 565 km² with a perimeter of about 125 km. It is about the third largest protected area in the country after Mole and Digya National Parks in Ghana.

Map 4: The Gbele Resource reserve



The Gbele Resource Reserve administratively lies between three (3) Districts; namely, Sisaala East, Sissala West, and the Nadowli Districts. It is however strategically and approximately centrally located between the administrative capitals of these Districts: Tumu, 26 km north, Gwollu, 40 km northwest and Nadowli, 50 km respectively. The Reserve headquarters is located at Tumu, the District capital of the Sissala East.

The proposed project will focus its activities in the southern part of the Reserve which is removed from the area where a resettlement process to move the Gbele community outside of the boundaries is ongoing (see Map 4). As indicated in the map the resettlement process is ongoing in the northwest part of GRR, where the Gbele village communities are expected to be relocated to Duwie. The project will not involve any involuntary land-taking and no new reserves are being established, and management activities in CREMAs will be community driven. However as a precautionary measure OP 4.12 has been triggered, and a Resettlement Policy Framework (RPF) has been prepared.

Topography: The topography is relatively flat and low lying between 210 and 310 metres above sea level. There is a gentle slope that drains the area into the Kulpawn river. There are a few rock outcrops dotted around the reserve. In some areas these rock out crops are spread over a kilometre radius with varying shapes and sizes. The Kulpawn river has many tributaries that form a network of seasonal streams in the reserve and is major source of water for wildlife and livestock in the area. The Kulpawn river flows from the west of the reserve southwards to the White Volta dividing the reserve into two parts.

Vegetation: The GRR lies in the Guinea savanna zone which stretches across the whole of West Africa. It represents a fairly undisturbed ecosystem with dominant vegetation of the savanna woodland with grass layer 3 m tall during the rainy season. A recent survey conducted, although not detailed enough, reveals a large number/variety of woody and other species. The reserve is uniquely still pristine, with unmodified vegetative cover all over the reserve, with the only modified area being around the Gbele village area. There are many plants in the reserve that have commercial value. The fruits of sheanut and dawadawa trees are harvested and processed into edible oils and condiments. Many species of grasses, *Andropogon gayanus*, *Hyperhenia rufa*, *Ctenium* sp., are used for thatch, brooms and mats. Other plants produce edible wild fruits that are eaten for food. The vegetation is sustained by the annual burning during the dry season.

Fauna: The animals are distributed all over the reserve in different proportions. There is also a rich bird life in the reserve and a study of birds in 2005 showed that there are about 194 species of birds (including waterfowl). There are about 20 fish species in the reserve, which are often illegally harvested by the fringe communities (Table 1).

Table 1. Number of observations (no obs) and individuals (no indiv), Kilometric Abundance Index (KAI in N/km), Density (N/km²) and Mean Group Size (MGS) of GRR (Bouché, 2006)

Species	No obs	No indiv	KAI	Density	MGS
Roan	1	3	0.007	0.01	3.00
Buffon Kob	3	5	0.011	0.01	1.67
Bushbuck	2	2	0.004	0.01	1.00
Warthog	2	3	0.007	0.01	1.50
Common duiker	1	1	0.002	0.003	1.00
Patas monkey	1	4	0.009	0.01	4.00
White and Black Colobus	1	1	0.002	0.00	1.00
Total wild animals	11	19	0.042	0.05	1.73
Cattle	1	30	0.066	0.08	30.00

Threats: Ghana's environment and environmental resources have come under intense pressure and threat of utter degradation in the last decades. Increased population growth leading to human activities (such as farming, mining, poaching, bush fires, logging), pressures of poverty, application of low technologies in natural resource exploitation and utilisation and unsustainable farming practices, domestic animals in the reserve during dry season for watering, poor law enforcement in reserve, lack of surveillance strategy for the reserve, bushfires in the reserve every year and lack of support by law enforcement agencies are some of the key factors accounting for the rate of environmental degradation being witnessed. Rapid deforestation has not only reduced one time lush forest areas into grasslands in several parts of the country but also are being currently threatened with desertification. These have led to bio-diversity loss, destruction of habitats of wildlife and species extinction across the various ecological zones. The northern sector of the reserve has fewer animals than the southern area especially around the Kulpawn river. Many species of animals reported to exist in the reserve are now extinct. The buffalo, lion, and other animals are now extinct while leopard, hyaena, and wild dog are highly endangered in the area. The animal numbers are fewer because of the poaching and mingling of domestic animals (livestock) in the reserve, especially during the dry season.

C. Concept of CREMAs

Wildlife is a unique natural resource offering various opportunities for sustainable rural development and economic utilisation. Initially the control of and access to natural resources was vested in the Wildlife Division. In recent times however, the Ghana Forestry and Wildlife Policy of 1994 embraces collaborative management of the natural resources. This resulted in the Community Resource Management Area (CREMA) concept. With the CREMA, communities play a key role in the management and utilisation of the resources.

Creation and Definition of the CREMA: All villages located or not along the periphery of conservation areas may constitute a CREMA. The goals of this initiative are to participate in an apprentice-type program for community management of CWMA and to create village zones (CREMA) having hopefully a minimum size of 25 sq km to secure renewable natural resources and their use for the villages. Products from the zones, training programs, as well as experiences gained will contribute to the socio-economic development of the village. To enable this, a village committee for wildlife management is essential (CREMA Management Committee). This committee advised by village leaders and with guidance from the WD will then be able to establish management strategies for the 1 or more CREMA of the village. Preferably each village will establish a big-game CREMA and 1 or more bird-hunting CREMA.

It is important that the traditional authorities be implicated in as well as in agreement with the creation of a CREMA in their village and not just the effort of a few individuals. Similarly the village authorities and elders must be involved in the defining of the limits, especially where farmed and fallowed areas are to be incorporated. Although areas set aside for big-game CREMA must have fixed boundaries, bird-hunting CREMA can possibly remain variable in size from year to year as the villages decision for land use changes. The CREMA boundaries should be changeable with the management committee approval, enabling the village to expand the area set aside as the results of the first few years become evident. To avoid problems, it is important that neighboring villages be in agreement with the boundaries between CREMAs.

With this in mind, the inclusion of fallow fields and traditionally farmed areas in the transition zone are seen as a favorable economic development for the village, a necessary step in order to gain enough area to be financially significant. The CREMA once created would strive to become a management structure which profits the whole village.

Purpose and Functions of the CREMA: Even though big-game CREMA are for wildlife production purposes, any parallel activities which do not diminish wildlife production should be incorporated, as long as the goals and

rules set for the CREMA are respected. The establishment of bird-hunting CREMA will incorporate hunting as another activity amongst the other activities of farming, cattle herding, etc already in place. In this way, the CREMA will secure the various resources for the use of the inhabitants of the village and their paying clients. The CREMA functions may be summarized as:

- When adjacent to existing classified areas, the CREMA serves as a first line of defence for the protection of potential high wildlife density areas, helping to enhance their development and that of their profitability for the communities involved.
- The CREMA serves as the interface between high wildlife density areas and the village and farming areas.
- Bird-hunting CREMAs permit to put into value the game bird species that are concentrated around the farming areas of a village and increase the productivity of those zones, as well as increasing the attraction of adjacent big-game CREMAs for sport and safari hunters.
- The CREMA establishes a modern production system at the village that will generate some employment and other economic benefits from rational management of the natural resources.
- The CREMA supports the idea of managing spaces of natural vegetation on village lands for the profit of the village (extension and maintenance of wildlife habitat, of soil cover, of medicinal plant stocks, of firewood supplies and protection of river and drainage verges, etc.).
- The CREMA creates a basis for continual dialogue and collaboration between the community actors and the Wildlife Division and commercial/professional operators and acts as a catalyser for the establishment of an ecosystem council.
- The CREMA system valorises the experience and abilities of village hunters and permits them to exercise their profession within a legally acceptable context that is profitable for the whole village.
- The CREMA provides a forum for commerce and the training of youth and helps to prepare the resource managers of the future.

Changes in land use on soils turned to CREMA use: With the exception of inhabited zones, fields, fallowed lands and areas near river banks are excellent areas for bird hunting, often populated with the highest densities of game bird populations. A village therefore would gain more by integrating a maximum of these areas in the bird-hunting CREMAs, otherwise hunting will remain unmanaged in these areas and the revenues lost. Establishing CREMA will secure management use and the potential revenues. In the event that the village wishes to keep a certain area for its own hunting, they can set that mandate for the CREMA involved. The internal rules and regulations of each CREMA can be periodically revised by the village, subject to appropriate notification to the WD, the District Assembly, development and commercial partners.

Benefits and Contribution of CREMAs and CWMAs to ecosystem management: Unless completely isolated from other patches of natural vegetation, village committees cannot manage their CREMAs in isolation, as the adjacent and contiguous wildlife areas will form part of a much larger wildlife ecosystem implying many different actors. A profitable production requires collaboration between the different actors and a harmonization, or at least a rationalization, of use by the many different users of the communal resource. As these broader considerations will have a tendency to define or modulate the management at the level of individual management blocks, an understanding of an ecosystem approach is necessary, as well as of the roles and functions of CREMAs.

The collaborative management of several CREMA together in the form of a CWMA further intensify the need for collaboration between adjacent and contiguous participating villages. The inclusion of fallow fields and traditionally farmed areas in the transition zone are seen as a favorable economic development for the village, a necessary step in order to gain enough area to be financially significant. The CREMA once created would strive to become a management structure which profits the whole village.

Annex 18: Map of Ghana

