ENVIRONMENTAL ASSESSMENT

OF

NORTHERN SAVANNA BIODIVERSITY CONSERVATION PROJECT (NSBCP) (DRAFT)

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February, 2001
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List of Acronyms

CIPSEG - Co-operative Integrated Project on Savanna Ecosystems of Ghana

CITES - Convention International Trade in Endangered Species of Wild Flora and Fauna

DPA - District Planning Authorities

EIA - Environmental Impact Assessment

EPA - Environmental Protection Agency

GERMP - Ghana Environmental Resource Management Project

GIS - Geographic Information System

LI - Legislative Instrument

MOH - Ministry of Health

MLF - Ministry of Lands and Forestry

NEAP - National Environmental Action Plan

NSBCP - Northern Savanna Biodiversity Conservation Project

PMCU - Project Monitoring and Co-ordinating Unit

SRMC - Savanna Resource Management Component

UDS - University of Development Studies

UNESCO - United Nations Education, Scientific and Cultural Organisation
ACKNOWLEDGEMENTS

The Consultant wishes to express his appreciation and gratitude to the Ministry of Lands and Forestry for giving the assignment.

Special thanks are also due to Mr M Abu-Juam (Project Co-ordinator), Mr Amissah, Project Administrator and the staff of the Ministry on the Natural Resources Management Project for their assistance and co-operation.

He wishes to thank Dr E. Dwumfour of the World Bank, Ghana Office, for his invaluable advice during the preparation of this report.

The following persons and institutions, who helped in various ways, especially during the field trips are acknowledged: Mr N. Ankudey, Director of Wildlife Department and his staff, Mr Moses Anangora, Senior Wildlife Officer in charge of the Gbele Resource Reserve, Mr Haizel of the National Game Reserve Mole, Mr Daniel Kojo Anko and Mr Eddie Telly of the Bolgatanga and Tamale offices of the Environmental Protection Agency respectively, Mr Abudulai Ziblim, M.O Abebrese, and Mr Moses Wondoh all of the Forestry Services Division and Mr. M. Kumah of SRMC.

District Chief Executives and the staff of the districts assemblies, where the projects are sited and indeed the chiefs and people of various project sites, spent several hours to interact and discuss the biodiversity problems with the consultant and his team, for which the Consultant is grateful.
EXECUTIVE SUMMARY

The Northern Savanna Biodiversity Conservation Project (NSBCP) is designed with the primary objective of improving the environment, livelihoods and health of the people of the Northern Savanna Zone of Ghana through the conservation and sustainable use of natural resources. Specifically the project aims at the optimal use of the savanna ecosystem - to restore and conserve agro-biodiversity, medicinal plants, wood fuel, bush meat and grazing lands- and sustain poverty alleviation.

The project consists of five main components:

- formulation of a policy framework;
- capacity building of key government institutions;
- promotion of biodiversity conservation, research and development;
- developing community-based management actions; and
- programme management, monitoring and evaluation.

Project interventions would be through:

a. support for community-based savanna woodland and wildlife resource management

b. support for improved management and monitoring of savanna biodiversity through the establishment of special protection areas in addition to and within the existing system of savanna reserves that explicitly incorporate biodiversity conservation as an integral management objective.

c. stimulating and supporting improved land management practices to support agro-biodiversity (e.g. through reforestation of degraded savanna areas, cultivation of indigenous crops, etc.) and
The purpose of this environmental assessment is to determine the potential environmental and social impacts of establishing special protection areas in addition to existing system of savanna reserves and also of agro-biodiversity and medicinal plants conservation and suggest mitigating measures for any adverse impacts.

An impact matrix analysis of the project activities against environmental parameters indicates that the project generally has strong positive environmental objectives and orientation. The perceived impacts of the project activities from the impact analysis show that they are mostly beneficial. No perceived significant adverse impact has been registered for the project activities.

However, the absorption of communal forests (dedicated forest) into the two proposed fauna corridors and use of crop lands for medicinal plants cultivation would have some impacts that need to be addressed.

These impacts include:

- Landuse conflict as a result of the community having to give up potential farming lands in communal forest for the fauna corridors and medicinal plant cultivation.
- Conflict between humans and animals in the use of water and other resources.
- Loss of cultural beliefs and practices
- Migration to and population increase around the pilot sites.

The impacts would be felt in all the local communities, which derive their livelihoods from the land and especially from the communal dedicated forests that would form part of the project sites.
The women in some communities believe that provision of credit during the harvesting period would enable them to alleviate poverty through shea butter extraction, processing of dawadawa and malt and par-boiling paddy for sale.

To ensure that the project objectives are realised the following mitigation measures are proposed:

- Restoration of the fertility of old farmlands to enable substantial crop yields from them
- Provision of funds to support cultivation of medicinal plants and abandoned local crop varieties
- Provision of dams/dugouts for watering livestock and dry season gardening
- Provision of potable water
- Provision of alternative livelihood source for the communities - credit facilities especially for women to go into agro-processing
- Provision of facilities and funding for communication, education and training
- Provision of funds to build natural resources management capacities of District Assemblies.
- Restriction of employment from the project to members of the local communities.

It is further proposed that:

- In each of the pilot communities, a community-based land use model should be introduced that integrates well with the community’s land use system, which should lead to a community land use plan.

- A baseline survey (inventory) should be conducted to identify products of commercial value and promoted to take the pressure off the land.

- Initiate efforts to enhance resource availability by locating private, indigenous or external, government or donor support.

- Evolve terms and conditions of access to and exploitation of renewable resource; both formal and effective rules.
The socio-economic survey proposed under the project should include the following:

- Current availability of renewable natural resources - wood stock (plants, bushes, trees) pasture, soil, water and human food supply conditions.

- Existing supply and demand situation of resources in surplus, equilibrium and deficit areas.

- Identification of the nature of user communities exploiting each renewable resource in terms of benefits, e.g. environmental stabilisation and soil regeneration, provision of wood for fuel and construction materials.

In most parts of the Northern Savanna Zone of Ghana, there is threat from free-grazing by livestock to forestry activities and therefore, the preference in cultivation is for tree species which are unpalatable to animals - especially teak which is exotic. This is dangerous environmentally and a threat to biodiversity. Native species of plants should be encouraged for ecological tolerance, pest and disease resistance, long-term viability and adaptation to the environment, though slow-growing.

The project should ensure that communities bordering reserve areas receive benefits and not only bear cost of maintenance. Emphasis should be on community participation through a revenue sharing mechanism and community use of park resources.

Communities fringing wildlife corridors should be educated on the reasons for community reserves, their responsibilities and the benefits that would accrue to them to ensure that they are fully integrated in the creation and management of corridors.

Bushfire control is critical to the success of the project, as bush burning is one of the most serious problems affecting the environment and causing the present deterioration of biodiversity. The success of the UNESCO CIPSEG Project and declaration of no-burning areas by some communities should be promoted in pilot
communities under the project. An early burning regime can be introduced initially to the communities as a first step towards a no-burning regime.
1.0 INTRODUCTION AND BACKGROUND

1.1 Purpose

The purpose of this environmental assessment (EA) is to identify the potential impacts that the Northern Savanna Biodiversity Conservation project (NSBCP) could have on aspects of the biophysical and socio-economic environment. The document describes environmental benefits that will occur as a result of the project and the likely mitigative measures that will be required to avoid and/or minimize the negative impacts.

1.2 Rationale for the Project

Savanna vegetation in many areas of Africa as in Ghana provide valuable environmental services and serve as habitats for biodiversity and protect soil and water resources against degradation.

In Ghana the savanna covers about 60% of the land area, supports about 18% of the population and supplies about 70% of Ghana's total annual firewood and charcoal requirement estimated at 16 million $m^3$. It also provides medicinal plants (the primary source of health care for residents), roofing grasses, fencing poles, bush meat and indigenous farmer crop varieties (cereals, roots/tubers and legumes).

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

Preserving the genetic stock and knowledge of their use will require specific interventions to ensure that the wild varieties are not completely lost through inappropriate practices or replaced by introduced varieties. Indigenous crop varieties should be grown alongside introduced varieties.
The key natural resources management issues in the northern savanna are loss of vegetative cover and land degradation, resulting mainly from inappropriate farming practices.
This is inter-linked with other contributing factors such as:

(i) poorly developed market system that does not price exploited natural resources at their real economic value thus providing easy and open access to dwindling but cheap natural resources.

(ii) inefficient public regulating agencies with overlapping responsibilities

(iii) inadequate/negligible involvement of key stakeholders including local communities in natural resource management.

(iv) weak institutional capacity in the wildlife sector and little involvement of communities in the management and sustainable use of wildlife resources and

(v) lack of inter-agency co-ordination in planning/monitoring of natural resource use, especially at the district and community levels.

The Northern Savanna Biodiversity Conservation Project (NSBCP) is designed to address these problems.

2.0 DESCRIPTION OF PROJECT

The detailed description of the project including a description of each of the five components and budgets as well as the project design summary (in matrix form) is reproduced in this report at Appendix II from the Project Appraisal Document (PAD). The $7.6 million NSBCP will complement the $8.7 million GEF support to the high forest biodiversity conservation component of the ten-year APL Natural Resources Management Program (NRMP).

Project objectives

Northern Savanna Biodiversity Conservation Project
The development objective of the NSBCP is to improve the environment, livelihood and health of communities in the northern savannah zone of Ghana through the conservation and sustainable use of natural resources including medicinal plants. The project would support the promotion of sustainable use and management of Ghana's northern savannah zone through:

(i) Improving livelihoods and health status in the Northern Savannah Zone
(ii) Ensuring social and rural development by building capacity in communities
(iii) Reducing poverty through better management of productive resources and
(iv) Increasing community productivity in the more disadvantaged rural part of the country.

The global environmental objective is to identify, monitor and conserve key components of the biodiversity of the Northern Savannah Zone through:

(i) protecting the existing biodiversity in and around reserve areas, adopting an ecosystem management approach and developing a policy to manage and conserve the savannah biodiversity.
(ii) identifying habitats and 'hotspots' of endemic species in need of greater protection.
(iii) protecting sacred groves, other sources of biodiversity such as medicinal plants through cultivation and conservation.
(iv) preserving the knowledge of traditional medicinal plant use and
(v) maintaining the cultivation of indigenous farmer crop varieties.

**Project Components**

As described in Appendix II, the key components of the NSBCP are:
a) Formulation of a policy framework;
b) Capacity building of public, private and civil society organisations in management of biodiversity;
c) Collaborative Biodiversity Conservation, Research and Development;
d) Community-based Management Actions; and
e) Project Management, Monitoring and Evaluation.
3.0 ENVIRONMENTAL POLICIES, LEGISLATION AND INSTITUTIONAL ARRANGEMENTS

3.1 Some National Environment-Related Policies

Although no one comprehensive legislation exist in Ghana dealing with the protection of biodiversity, there are several pieces of biodiversity-related and natural/environment resources sector-based legislation. Since the 1990s Ghana has developed a number of policies and legislation, regulations and procedures aimed at ensuring that the management of biological resources and the environment is sound and sustainable. Among these are the Wildlife Conservation Regulations of 1971 (LI 685), National Environmental Policy (1991), National Environmental Action Plan (1991), Forestry and Wildlife Policy (1994), Environmental Protection Agency Act of 1994 (Act 490), Forestry Development Master Plan (1996), Draft National Biodiversity Strategy and Action Plan (1998 ?), Environmental Assessment Regulations of 1999 (LI 1652), National Land Policy (1999). These and some biodiversity related global policies to which Ghana is signatory, e.g. Convention on Biodiversity, Convention on Desertification, Convention on International Trade in Endangered Species (CITES), etc., have been reviewed in Appendix III.

NSBCP and National Land Policy (NLP)

The NSBCP will support biodiversity conservation, research and development through:

(a) The development of systems for resource management.
(b) Enhancing protected area management and boundary demarcation.
(c) Improving land management and restoration of degraded land and
(d) Ensuring sustainability of medicinal plant resources

The National Land Policy is supportive of the NSBCP, providing a framework for most of the land conservation activities identified under the components of the project. The NLP provides for the full recognition of protected area systems (PAS) and lands outside PAS for ecosystem maintenance and biodiversity conservation. The policy is conservation sensitive, emphasising on the placement of shrines, sacred groves and other categories of
land (for example the so-called dedicated community forest reserves) with potential for
ecosystem maintenance, biodiversity and scenic preservation under protection and
leaving management of such lands under the collaborative effort of major stakeholders
including the government and the community.

NSBCP and Forest and Wildlife Policy

The Forest and Wildlife Policy aims at conservation and sustainable development of the
country's forest and wildlife resources for maintenance of environmental quality and
perpetual flow of optimum benefits to all segments of society. Specifically, the policy will,
among others, ensure that the country’s permanent estate of forest and wildlife resources
are managed and enhanced for preservation of vital soil and water resources,
conservation of biological diversity and the environment and sustainable production of
domestic and commercial activities. Strategies for ensuring sustainable resource
management outlined by the policy include PAS expansion, rehabilitation and
development of lands on and outside PAS, protection of endangered plant and animal
species, provision of incentives and assistance for conservation, enhancing public and
civil society involvement in management through consultative and participatory
mechanisms, promoting public awareness and education, and promoting collaborative
research and extension. These are in support of the activities identified under the project
components.

NSBCP and National Environmental Policy/Action Plan

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

NSBCP has been categorised during project preparation as a Category B projects under the World Bank’s guidelines and therefore does not require a full environmental assessment. Given the nature and scope of the project, the intended beneficiaries, the activities identified to support achieving the outputs and the objectives of the project, and extent of any perceived impacts, the project requires just a relatively little environmental and social work in the form of an analysis. For this project, the implementation of certain activities may trigger the World Bank’s Safeguard Policies on Environmental Assessment (4.01), and to a lesser extent on Pest Management (4.09).

4.0 Methodology for Developing Environmental Assessment

4.1 General

The NSBCP has been pre-appraised in September 2000 by the World Bank, Government of Ghana and a host of organisations including private and civil society institutions. An aide memoir, covering essential issues emanating from the mission and wrap up meeting was prepared and agreed upon by the stakeholders. A draft project design was developed immediately and is ready to be appraised soon. Accordingly, the EA is based on the draft project design, which was circulated recently as the draft Project Appraisal Document. The World Bank Safeguard Policies and Guidelines on Environmental and Social Assessment require that environmental and social concerns need to be integrated into project design and implementation as the over-arching objective of the Bank’s intervention is sustainability of poverty alleviation.

Since the project is covering pilot areas spread over the three northern savanna administrative regions, the assessment could not be carried out at each individual pilot site or communities living in or on the pilot sites. Only sample reserves and non-reserve areas have been visited as well as a sampling of communities adjacent to these areas for purposes of collecting primary data and knowing the extent of community knowledge and interest in the project. The EA has been carried out by an interdisciplinary team consisting of an environmental management specialist, sociologist, a natural resources management specialist, rural foresters, development planners and agricultural specialists.
4.2 Desktop analyses

Baseline information for the EA was gathered from a comprehensive review of reports on studies commissioned for NRMP, SRMP and NSBCP or existing in other organisations.

**Biophysical Data**

All the biophysical data is secondary and has been obtained from studies commissioned by the NSBCP preparation process. The Environmental Assessment report utilised a number of documents including the survey reports on (i) flora of the project pilot sites (Abbiw, 2001), (ii) fauna of the project pilot sites (Aallangdong, 2001), (iii) checklist of savanna plant species (Ekpe, 2000), (iv) indigenous farmer crop varieties (Dery, 2000), and (v) biodiversity change (Adam, 2000).

**Socio-economic Data**

In addition to reviewing the 1984 Population Census of Ghana and the provisional results of the 2000 Population and Housing Census and other literature on the socio-economic characteristics of rural populations in the northern savanna, the studies undertaken by Prof. Saa Dittoh (a lecturer at the University of Development Studies) in 1999 and Maja Naur (a consultant with the World Bank) in 2000/2001 for the SRMP were utilised in the EA. The EA team also made field visits to the project areas, held discussions with and interviewed a cross-section of people and communities who may be affected by the project.

4.3 Field Visits

The consultant and his team also visited the pilot areas to gather supplementary data by interacting with government officials, assembly members, NGOs, opinion leaders, chiefs and a cross-section of people, especially women and the youth in the communities. Communities that were visited live in or on the fringes (5-10 km) of existing protected
areas such as the Gbele Resource Reserve, Mole National Park, Keni-Keni Forest Reserve, Tankwidi West and Tankwidi East Forest Reserves, Sisili Central Forest Reserve, White and Red Volta River Forest Reserves. In the field, the team used interviews and the administration of questionnaires to gather data and information. The substance of the questionnaire focused on general socio-economic conditions in the communities, and how communities perceived environmental and social issues and problems relating to the project as a whole and specifically to the proposed establishment of wildlife corridors and creation of community dedicated reserves, re-introduction of farmer crop varieties and enhancement of agro-biodiversity.

4.4 Stakeholder Participation

The spectrum of people to be involved in the project is broad and varied. These include public organisations (Ministries of Finance; Lands, Forestry and Mines; Food and Agriculture; Health; Local Government and Rural Development; Energy; Environment, Science and Technology and Departments; and Agencies such as Forest Service Division, Wildlife Division, Environmental Protection Agency, District Assemblies), private organisations (forest and wood industry), and civil society (research and academia, NGOs, CBOs, women and youth groups and communities).

In view of the direct effect that the project will have on communities and villages within the pilot areas, a sample of these communities was visited. Staff of MLFM, the Savanna Resources Management Center, Wildlife Division, Forest Services Division, EPA, MOFA and a number of traditional healers in the three regions participated actively in the preparation of the EA. The process has been very participatory and consultative.

A submission of the initial draft of the EA to Ministries, Departments and Agencies (MDAs), SRMC, industry, NGOs, civil society and communities was made in January 2001. The EA is yet to be presented in a workshop before a broader audience to consolidate people's views and to incorporate these into the final document. The World Bank was given the opportunity to review the initial draft document and provide comments which were used in the preparation of the draft final document.

4.5 Scoping

The basis of scoping has been the identification of those important environmental and social features of a people, community or area, which need not be adversely impacted.
upon by the project during its preparation and implementation. These are elements, which stakeholders have identified as critical and need to be watched, protected and enhanced during project implementation. These so-called Important Environmental and Social Components (IESCs) are listed in Table 2. The bounds of the EA have been set arbitrarily, mainly to the extent of the reserves and the off-reserve area, and the immediate area occupied by the relevant communities.

4.6 EA Team

The EA team comprised the following:

Adu Boadi Acheampong Team Leader/Environmental management Specialist
Boakye-Dankwa Boadi Rural Development Specialist
Musa Abu-Juam Biodiversity Specialist
Dr. David Millar Rural Sociologist
Mathew Ababio Forest Specialist
O.I. Aalangdong Wildlife Specialist
Adam Abu Rural Forestry Specialist
Tabi Agyarko Environmental Specialist
Joseph Osiakwan Natural Resources Management Specialist
Emmanuel Mante Collaborative Resources Management Specialist

5.0 DESCRIPTION OF PROJECT ENVIRONMENT

The Northern Savanna forms more than half of the total Ghana land surface cover of about 239,000 square km (23.9 million ha). The project area lies between latitudes 8° and 11° N and longitude 1° E and 3° W. Togo bound it to the east, Burkina Faso to the north, Cote d'Ivoire to the west and the high forest ecological zone to the south (Fig 1). The economy of the northern savanna ecological zone is based mainly on agriculture, which is the basis of livelihood for a majority of the population. The small-scale family holding is the basic unit of production.
5.1 Physical Environment

5.1.1 Climate and Meteorology

The Northern Savanna has an annual average rainfall varying from 950 mm to 1,300 mm, which falls during a single rainy season from April to October. The mean monthly temperatures vary from about $36^\circ C$ in March to about $27^\circ C$ in August.

During the dry season, the harmattan prevails, causing high rate of evapo-transpiration and soil moisture deficiency. Relative humidity is high during the rainy season but falls to about 20% in the dry season.

Evaporation from open water on annual basis is very high (approximately 1,840 mm per annum) and exceeds rainfall (highest being 1,300 mm per annum). The annual moisture deficit is the major climatic factor affecting the length of the growing season. In the project area, the period of adequate rainfall for crop growth is about 130 days.

The Northern savanna exhibits varying levels of vegetation including patches of woodlands which have beneficial effects on the local climate and constitute a natural barrier to the harsh harmattan winds from the Sahara Desert, thus helping to maintain a favourable climate for agriculture production.

5.1.2 Geology and Topography

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

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

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

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

**Voltaian Sandstone Basin**
This is an almost flat and extensive plain covering more than 80% of the Northern Region. The bulk of the area falls within heights between 60 and 150 metres above msl. Gentle-dipping or flat-bedded sandstones, shales and mudstone underlie it, which generally speaking are easily eroded, resulting in almost flat and extensive plain.

In this basin soils are relatively poor. Laterite is the most extensively distributed soil, covering 75% of the basin. The upper horizons of the soil become waterlogged during the rainy season but dry up in the dry season. The texture ranges form silty to sandy loam when developed on shales and coarse sand when developed over sandstone. The soils, including the savanna ochrosols (a prominent soil group in the basin) are generally low in organic matter and nutrients and sometimes highly acidic and very susceptible to erosion.

The river valleys of the region are generally associated with acid gleisols.
5.1.3 Surface and Groundwater Hydrology

The Northern Savanna Zone is mainly drained by the White Volta and its tributaries Morago, Red Volta, Atankwindi and Asibelika in the Upper East Region, Kulpawn with its tributary, Sisili in the Upper West Region and the Black Volta, Nasia and Oti in the Northern Region.

All the principal branches of the Volta flow permanently during the wet periods. In the dry season the volume of water in the rivers of the two upper regions reduce considerably, breaking into pools or drying up at the peak of the dry period. The Volta with its tributaries is an important source of surface water in the Northern Savanna Zone.

Ground water is the most important source of potable water in the project area. However, the yields are in general insufficient to meet the needs of large communities or irrigation agriculture. Water supply thus becomes one of the key demands of the project pilot areas. In all the communities visited, water supply was one of the major concerns raised by the people.

5.2 Biological Environment

5.2.1 Ecology

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

5.2.2 Flora

The Guinea savanna covers more than 90% of the land surface area of the Northern Savanna Zone but not restricted to it. It stretches from the upper regions down south to the forest fringes. The zone includes the grassland of the north and the derived savanna on the fringes of the forests.
An annotated checklist of Savanna Plants of Ghana (Ekpe, 2000), commissioned by the Ministry of Lands and Forestry provides a comprehensive list of plants of the interior savanna. The interior savanna contains 1,519 vascular species known to be indigenous or naturalised to the savanna zones of Ghana. Six species including *Ceropergia gemmifera*, *Commiphora dalzielii*, *Ptleopsis habeensis* and *Eugenia coronta* are rare in Ghana and internationally.

The Guinea Savanna consists generally of fire tolerant, deciduous, broad-leaved trees interspersed in a ground flora of mainly grass, sometimes more than 1.5m high. The more important grasses of grazing value include *Andropogon gayanus* and in densely populated areas, *Diectomis fastigiata*, *Pennisetum pedicellatum* and *Loudetia togoensis* are common. Other species that occur are *Hetropogon confortus*, *Schoenfeida gracilis* and *Aristida a hordeacea*. The common trees include *Vitellaria paradoxa* (shea), *Parkia biglobosa* (dawadawa), *Piliostigma thonningli*, *Combretum glutinosum*, *Anogeissus sp.*, *Detarium sp.*, *Afzelia sp.*, *Prosopis sp.*, *Pterocarpus sp.*, *Butyrospermum sp.*, *Antiaris sp.*, *Vitex sp.*, *Pilosstigma sp.*, *Lonchocarpus sp.* and *Acacia sp.*

The Sudan savanna occurs mainly in the Bawku East, Bawku West and Bolgatanga districts at the extreme northeastern corner of the Northern Savanna Zone. Its total coverage is less than 10% of the zone. The vegetation is made up generally of open savanna with short grass interspersed with relatively short low branching deciduous, broad and thin-leave trees. The common trees include species of *Adansonia*, *Butyrospermum*, *Acacia* and *Parkia*.

The vegetation in most of the project area is characterised by a mosaic of forest, savanna, marshes and grassland. The ecology is for the most part severely altered. This is a reflection of prolonged unregulated grazing, burning, and intensive cultivation.

There are 72 forest reserves in the northern savanna made up of 23, 33 and 16 in the Northern, Upper East and Upper West in that order. They range in size from 0.4km$^2$ to 1,116km$^2$. However, many of these areas are under pressure from subsistence farmers, livestock herders and others who engage in illegal activities in the reserves.
5.2.3 Fauna

Many of the large wildlife species, which are common to tropical Africa, are also found in Ghana. They live mostly in the savanna eco-system and include *Panthera leo* (lions), *Panthera pardus* (leopards), *Loxodonta africana* (elephants), *Syncerus caffer* (buffalo), *Neotragus pygmaeus* (royal antelope) and *Colobus* and *Cercopithecus sp.* (monkeys), *Hippopotamus amphibius* and *Crocodilus sp.* Snakes include pythons and poisonous ones such as *Naja nelanoleuca* (cobra), *Bitis gabonica* (gaboon viper), Lizards, e.g. *Veranus niloticus*, often of striking colours are common, as are large snails, spiders and scorpions which are found in large numbers. The insect fauna is also very rich. The bird species include *Francolinus sp.* (bush fowl) *Falconidae sp.* (falcons, hawks, and eagles) *Psittacus erithacus* (grey parrot), *Neophron sp.* (vultures), *Guttera edouardi* (guinea fowl) and many more.

Savanna fauna comprises at least 93 mammal species, about half of which can be considered to be large ones, over 350 bird species, 9 amphibians and 33 reptiles. About 13% of the 860 recorded butterfly species in Ghana are associated with the savanna.

The Wildlife Conservation Regulations of 1971, (LI. 685) has schedules which contain lists of wild animals found in Ghana. Fifty-five of these are completely protected.

5.2.4 Rare or Endangered Species

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

Wild animal movement between reserves, groves and sanctuaries in the northern savanna may be limited because these are either fragmented or interspersed with farmlands. Studies have shown that wild animals move from Togo into Ghana and vice versa, using gallery forests along the Red Volta River. It is also on record that wild animals move from the GEF supported Nazinga Game Ranch in Burkina Faso to farms on the Ghana side of the Ghana-Burkina Faso border. Communities outlying protected areas have occasionally had their farms and property destroyed by wild animals mainly elephants that move outside the reserves, particularly in the dry season, in search for water and food. In 1997 elephants invaded some villages including Widinaba, Zongoiri, Nangodi, Sekoti and Datoko, all at the fringes of the Red Volta Forest Reserve, which is a natural trail for elephants moving from Togo into Ghana. Where villages received no help from the staff of Wildlife Division in driving these animals back into the reserves (or gallery forests) they resorted to killing the rampaging animals.

5.3 Socio-Cultural Environment

5.3.1 The People

According to provisional results on the 2000 Population and Housing Census released by the Ghana Statistical Services Division, the population of the three northern regions (Northern, Upper East and Upper West) stands at 3,346,105. The Northern region carries the highest human population of 1,854,994, followed by the Upper East region with 917,251 and the Upper West region with 573,860 in that order. However, population densities follow the reverse order – 104 persons/km$^2$ for Upper East, 31 persons/km$^2$ for Upper West and 26 persons/km$^2$ for the northern region. Land hunger is greatest in the Upper East, where soil productivity is lower and climate harsher than in the two other regions. Most areas in the three regions are food deficient, but food security situation is worse in the Upper East region than in the Upper West and Northern regions.

The main ethnic groups in the project pilot areas include the Dagbani, Mamprusi and Gonja in the Northern Region, Dagaaba and Sisala in the Upper West Region, Builsa,
Kassena, Nankani, Grunnie, Nabdam and Kussasi in the Upper East Region. In all these ethnic patrilineal inheritance is the norm and traditional authority is vested in the chief, who sits on a skin, an acknowledged symbol of identity of the group and authority.

5.3.2 On-farm livelihood activities

The majority of people in the three northern regions are traditionally crop and livestock farmers, growing cereals, root and tubers and keeping livestock, mainly goats, cattle and sheep for subsistence and gain. Outside farming season activities include farm produce processing and marketing, livestock grazing and “pastoralling”, bush fire prevention and control and renovations/rehabilitation of residential accommodation.

Cattle husbandry plays an important role in the socio-economic life of people of the three regions. Wealth is mostly invested in cattle. The number of cattle a person owns determines ones wealth. Cattle are used for bride price and on other important social occasions. Most cattle owners, therefore, put greater emphasis on the herd size, rather than the quality of their stock. To them large herds mean security, wealth and prestige in the community. This leads to overstocking in many parts of the northern savanna area.

With respect to range tenure, grazing is on communal basis and anyone with animals may graze his/her animals on communal lands in the community where he/she lives. On the contrary, herders from other communities will have to obtain grazing rights from the village chief or head of the land-owning group before putting their animals on communal lands to graze. For inhabitants of a village or community there are no restrictions to the use of the communal grazing lands provided that the user of the land does not change the land use form, for instance, into human habitation.

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

In the Upper West and Upper East regions, where most of the project pilot sites are located, ownership of land is vested in the Tindanas (Landowners), while in the Gonja area of the Northern Region the land-owning authority are the "skins" or chiefs.

In most parts of the three northern regions undeveloped and unoccupied land may be described as communal lands and subject to common rights. These may be termed as local 'public' lands since they are for the benefit of the whole community. Access to these lands is free to all, including strangers and the benefit derived carry no reciprocal consideration. Such lands are still available in the Tumu gap, the Nadowli east zonal area of the Upper West Region, Builsa District in the Upper East Region and in most parts of the Northern Region.

The essential principle is that all lands, including wasteland and unoccupied land, are owned by the community or group on a communal basis. Benneh (1988) states that customary tenure easily accommodates concurrent and successive use of the same piece of land by different groups or persons. For example, one person may have rights of cultivation while at the same time another could have rights to trees. The acquisition of the allodial title was made in ancient times by conquest, original occupation or discovery, purchase or gift. This basic principle establishes the patterns of ownership of land in Ghana.

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

The pilot sites are presented in Table 1 and plotted in Fig. 3. A brief description of three of the pilot sites namely, Gbele Resource Reserve, the proposed northwestern faunal corridor and the northeastern faunal corridor is given below. Data on some communities in the pilot areas have been presented in Appendix V.

Table 1: List of pilot areas

<table>
<thead>
<tr>
<th>SITE</th>
<th>DISTRICT</th>
<th>REGION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Keni-Keni F.R.</td>
<td>West Gonja</td>
<td>Northern</td>
<td>Forest reserve adjoining Mole National Park</td>
</tr>
<tr>
<td>2. Mole National Park.</td>
<td>West Gonja</td>
<td>Northern</td>
<td>National Park</td>
</tr>
<tr>
<td>3. Nuale F.R.</td>
<td>Wa</td>
<td>Upper West</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>3a. Naaha</td>
<td>Wa</td>
<td>Upper West</td>
<td>Community reserve</td>
</tr>
<tr>
<td>4. Ambalara</td>
<td>Wa</td>
<td>Upper West</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>5. Kulpawn Tributaries F.R.</td>
<td>Sisala</td>
<td>Upper West</td>
<td>Form part of the proposed north-western faunal corridor</td>
</tr>
<tr>
<td>6. Gbele Resource Reserve</td>
<td>Sisala</td>
<td>Upper West</td>
<td>Accommodate Gbele village</td>
</tr>
<tr>
<td>7. Kulpawn Headwaters F.R.</td>
<td>Sisala</td>
<td>Upper West</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>8. Mawbia F.R.</td>
<td></td>
<td>Upper West</td>
<td>Form part of the proposed north-western faunal corridor</td>
</tr>
<tr>
<td>9. Sisili Central F.R.</td>
<td>Builsa</td>
<td>Upper East</td>
<td>Form part of the proposed north-eastern fauna corridor</td>
</tr>
<tr>
<td>10. Chiana Hill F.R.</td>
<td>Kassena Nankana</td>
<td>Upper East</td>
<td>Form part of the proposed north-eastern fauna corridor</td>
</tr>
<tr>
<td>11. Tankwidi West F.R.</td>
<td>Kassena Nankana</td>
<td>Upper East</td>
<td>Forest reserve</td>
</tr>
<tr>
<td>12. Tankwidi East F.R.</td>
<td>Bolgatanga</td>
<td>Upper East</td>
<td>Forest reserve</td>
</tr>
</tbody>
</table>
13. Red Volta F.R.  | Bolgatanga/Bawku West  | Upper East  | Form part of the proposed north-eastern fauna corridor
---|---|---|---
Morago F.R.  | Bawku East  | Upper East  | Form part of the proposed north-eastern fauna corridor

### 5.5.1 Gbele Resource Reserve

The Gbele Resource Reserve (GRR) was compulsorily acquired and gazetted in 1975. The state paid compensation to the land-owning chiefs who failed to share the proceeds with the people of Gbele village, which is still located in the reserve. GRR has an area of 565 square kilometres, with a typical Guinea Savanna vegetation containing a number of endangered wildlife species including, *Panthera leo*, *Loxodonta africana*, *Cercopithecus sp.*, *Syncerus caffer*, *Kobus sp.* and *Neotragus pygmaeus*.

GRR is situated about 66 kilometres south west of Tumu. The Gbele village was already in existence before the creation of the reserve. The village has a population of about 180 with a male: female ratio of 1:1. The people cultivate millet, maize, yam and cotton under bush fallowing. There is only one borehole in the village that provides water for both humans and livestock. There is no school; the nearest school is at Dasima, about 10 km from the Gbele village, while the nearest clinic is at Jefisi, 30 kilometres away from Gbele.

Government in the past had intended resettling the people of Gbele village. Government has abandoned this option and the village will remain within the reserve (See a copy of letter from WD attached as Annex 1). The Wildlife Division has started drawing up a comprehensive plan that will include the community as an integral part of whatever management systems are installed. Essentially, the village will be zoned as a multiple land use zone, allowing the resident community to stay in and engage in livelihood support activities without compromising the integrity of the reserve. NSBCP would support WD's efforts by financing reserve management activities and providing limited infrastructure and alternative livelihood opportunities to the community.
Another village, Dasima lies on the fringes of the Gbele Resource Reserve. Dasima has a population of about 1,600 with about 54 houses. It has a primary school with a population of 103 pupils and a junior secondary school with 40 pupils. A state health centre at Jefisi, a town about 20 kilometres, provides health care and health services from Dasima which runs a mobile clinic for the people of Dasima. An indigene of Dasima village has been trained to provide first aid services to community members when the nurses from Jefisi are not around.

Communities in and around GRR have expressed their preparedness to participate actively in the management of the reserve. The chief of Dasima, Kuoro Kejepe Jugbele, was however worried about having no access to harvesting of resources in the reserve. However, he said the people of the community would be willing to participate in reserve management if WD would permit the community once a year to enter the reserve to kill one or two roan antelopes which the people use in performing certain rituals during their annual festivals.

5.5.2 The Faunal Corridors

NSBCP would support the expansion of existing forest reserves in the northern savanna area by assisting communities to establish non-formal community "dedicated" reserves and linking these to the formally gazetted reserves. These dedicated reserves would form corridors to existing permanent estates, which are hardly connected. Corridorization would facilitate the movement of wild animals between reserves and between neighboring countries of Burkina Faso and Togo. Most of the lands that may form the corridors are community lands, which are currently used for cattle grazing, and crop farming. While this is certainly true in the case of the faunal corridor proposed for the Red Volta River (East and West) Forest Reserves – White Volta River Gallery Forests – Morago River (East and West) Forest Reserves continuum linking Togo, Ghana and Burkina Faso, most lands between the Sisili Central Forest Reserve, Podo Forest Reserve, and Chiana Hill Forest Reserve on the Ghana side and the Nazinga Game Ranch in Burkina Faso are farm lands.

The question of compensation payment to communities and individuals will not arise since community and individual lands that are considered for inclusion in the corridors will not be
acquired by the project. The project does not anticipate displacing communities or individuals nor will the corridorization result in loss of assets. Individual landowners and communities will continue to exercise their traditional rights over these lands and have access to the resources in or on these lands, and they will continue to put the land into use forms selected by them, including crop farming and livestock grazing. However, communities and individuals will be encouraged to integrate biodiversity conservation strategies into the land management systems already adopted. Farm and grazing lands and other degraded lands within the corridors will be greened, using farming technologies and strategies such as agroforestry, mixed cropping, fodder cropping, medicinal plant cultivation, woodlot establishment, organic manuring, integrated pest management (IPM), etc., with plant species of ecological, socio-cultural and economic importance.

Land owning communities and individuals will be encouraged to collaborate with major stakeholders such as staff from the frontline Ministries of Lands, Forestry and Mines (MLFM), Food and Agriculture (MOFA), Local Government and Rural Development (MLGRD), Energy (ME), District Assemblies (DA) and civil society organizations (NGOs, CBOs, Trades Associations, Women and Youth Groups, etc.) in environmentally sound resource management. Using expertise at all levels such as the extension staff of MOFA, MLFM, Savanna Resources Management Center (SRMC), the project will support this by creating community (public) awareness on sustainable biodiversity utilization and conservation while building and strengthening capacities of communities to implement strategies and plans of action to maintain and enhance ecosystem integrity and health, population and species of animals and plants. Participating communities will receive training in technologies such as proper fodder and hay production, no-burn agriculture, water harvesting, contouring and bunding, game ranching and game restocking, domestication of wild animals, etc. guarantee traditional rights over these community or individual lands that will form part of the corridor the project will assist landowners in establishing and maintaining intact boundaries by planting boundary lines with life fence, using species that are of significant ecological, socio-cultural and economic importance.

The Sisili Central Forest Reserve-Podo Forest Reserve-Chiana Hills Forest Reserve Corridor

The Sisili Central Forest Reserve-Podo Forest Reserve-Chiana Hills Forest Reserve Corridor would begin from the Sisili Forest Reserve and encompass the Podo Forest Reserve in
the Upper West Region and go through the Chiana Hills Forest Reserve in the Upper East Region of Ghana and link with the Nazinga Game Ranch in Burkina Faso. The Sisili River runs through this corridor. Since the greater part of the lands between individual reserves are communally or individually owned, the establishment of the corridor would require that these lands are "dedicated" as part of the corridor by the communities or individuals without the lands losing their initial status and use for which they were put to and without the owners losing any rights on the land.

The areas identified to form the corridor have low population density, with a sparsely distribution pattern. The areas lack basic infrastructure. The Sisili-Chiana-Kulpawn-Fumbisi Valley circuit, within which this corridor is situated, is very rich in fauna. The non-reserved intact savannas of the Sisili River Gap, between Chiana in the Upper East Region and Tumu in the Upper West and the Red Volta River Gap in the Upper East Region serve as habitats for migratory elephants from Burkina Faso to Ghana and vice versa (Aalangdong, 2001). The corridorization would therefore, create suitable conditions for fauna movement and genetic mixing of free moving animal populations.

The creation of animal corridors would traverse villages and communities. One such village would be Basisan, which fringes the western part of the proposed corridor. The village lies on the main Navrongo-Tumu road, about 7 km to the west of the Sisili River. It has a population of about 500 people, consisting of migrants from Podo (a virtually deserted village about seven kilometres away on the border with Burkina Faso) and indigenes. The demographic characteristic is typical of all small rural communities in the northern part of Ghana dominated by children, women and the aged. Some of the able-bodied have migrated to southern parts of Ghana in search of employment and better livelihood. The people are Sissalas in ethnic origin and organised into patrilineal lineages, which are referent for rights to property and other social privileges and obligations. The majority of the people are of the Islamic faith. Literacy is low among all age groups. The local primary school has 105 pupils made up of a boy: girl ratio of 6:4.

The town has no potable water and a dugout provides the source of drinking water. During the dry season women and children walk over three kilometres into the intact savannas to fetch water from water that gather in pools in the bed of one of the tributaries of the Sisili River. Basisan has no health post and relies mainly on herbal medicines administered by
local herbalists. The nearest health post is at Chiana, 30 kilometres away. Inhabitants are aware of the deadly disease HIV/AIDS, but are not aware of any HIV/AIDS related deaths in the village.

The people are mostly subsistence farmers, engaged in the cultivation of sorghum, millet, maize, groundnuts, cowpeas, soya and round beans and vegetables. Charcoal production is also undertaken on a relatively large scale. The women process sorghum into malt and pito (a local alcoholic drink) and dawadawa fruit into condiments and spices while the men produce charcoal for sale at the Navrongo market (45km away) held every fourth day. There is no grinding mill in the village and the women have to pound their cereals into flour or have to travel to Chiana to turn dried cereal grains into flour for making pito, porridge and preparing other dishes.

The Red Volta River (East and West) Forest Reserve -White Volta River Gallery Forest - Morago River (East and West) Forest Reserve Corridor

The proposed The Red Volta River (East and West) Forest Reserve -White Volta River Gallery Forest - Morago River (East and West) Forest Reserve Corridor would stretch from the Burkina Faso/Ghana border through forest reserves on both sides of the Red Volta River, gallery forests (not gazetted) on both sides of the White Volta River and forest reserves along the Morago River to the Ghana/Togo border. Communities whose lands are situate within the corridor include Widinaba and Zongoiri on the eastern fringe and Nangodi, Sekoti and Datoko on the western fringe of the Red Volta Forest Reserves. These communities farm on communal lands set aside by the Tindanas and occasionally in the reserved forests. Livestock holders drive their animals to the Red Volta River.

The Widinaba village is described below as a representative community. Widinaba is located near the Ghana-Burkina Faso border, about 15 kilometres away from Tili on the Bolgatanga-Bawku road on the eastern fringes of the Red Volta Forest Reserve. It has a population of about 560. The people are Kussasis in ethnic origin. The demographic characteristic is typical of all small rural communities in the northern part of Ghana dominated by children, women and the aged. Some of the able-bodied have migrated to the southern part of Ghana in search of livelihoods. People are organised into patrilineal
lineages, which are referent for rights to property and other social privileges and obligations. Widinaba is predominantly a Christian community. The local primary school has 130 pupils, while the junior secondary school has 78. Literacy levels are low. There are two grinding mills and a permanent market, where people from within and neighbouring villages meet to trade and socialise every fourth day by inclusive reckoning.

Common diseases prevalent in the community are malaria and waterborne diseases such as diarrhoea. Riverblindness has been a problem in the past. There are three boreholes that supply the people with potable water. The only health facility in the vicinity is located at Zebilla, the district capital, and a distance of about 25 kilometers from Widinaba. Although the Ministry of Health has provided the community with a mobile clinic, the people rely mainly on herbal medicine. Orthodox medicinal healthcare is unaffordable to the people. Culturally, people have been long associated with herbal treatment and still patronise the use of herbal medicine. There are three resident herbalists and four traditional birth attendants (TBAs) at Widinaba. The Ministry of Health staff carry out periodic health awareness and education campaigns on human health including HIV/AIDS.

The people are predominantly crop and livestock farmers, practising subsistence farming and cultivating sorghum, millet, maize, groundnuts, cowpeas, soya and round beans and vegetables. Women engage additionally in income generating activities such as the processing of sorghum into malt and pito and the dawadawa fruit into condiments and spices. Shea butter extraction for sale is done predominantly by women.

6.0 EVALUATION OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS OF PROJECT

6.1 General

The project's development objective is to improve the environment, livelihood and the conservation and sustainable use of natural resources including medicinal plants. The project generally has strong positive environmental objectives and orientation as it seeks
to tackle the issue of conservation of biodiversity in the savanna ecological zone by addressing human-induced impacts on land, forest and wildlife resources. The implementation of activities identified under the various components would lead to minimisation of land degradation, deforestation and desertification, which are the most pervasive environmental and natural resource management issues in Ghana. In addition, the project activities would enhance the ex-situ conservation of agro-biodiversity, including threatened farmers’ crop varieties and medicinal plant species on which a large number of rural people depend for their health care needs. The project will support communities in regreening degraded areas (on and off reserve lands, sacred groves, community-dedicated forests, etc.)

The emphasis of the project on building capacities in environmental and natural resources management at all levels including at the district assembly level, village and community level and among stakeholders would impact positively on biodiversity conservation. NSBCP is community-focused and is assisting in developing and implementing community-based actions including the use, protection and documentation of indigenous knowledge for enhancing sustainable utilisation and conservation of biodiversity. NSBCP recognises the need to promote public awareness and education among all stakeholders and users of biological resources to conscientize them on the importance of wise use and conservation. The impact from these actions identified under the project components would be generally positive. Some benefits will be derived in the short and medium term while others may occur in the long term during implementation of the project.

The project falls under Category "B" of the World Bank Safeguard policies and Guidelines and the components and the activities to be implemented under the project may trigger (at negligible extent) the Bank’s Operational Policies on Environmental Assessment (OP 4.01) and on Pest Management (OP 4.09).

6.2. **Important Environmental and Social Components used in the Analysis**

Important Environmental and Social Components (IESC) are those components of the environment and the social set up that have been considered worthy of attention and protection during project implementation. They have been identified with guidance from
the World Bank's Safeguard Policies and the Ghana National Environmental Assessment Guideline and Procedures and provide the basis for the identification and analysis of impacts. In evaluating the potential environmental and social impacts of the project, an impact analysis matrix was used for each component and some activities of the project (Appendix VI). The activities under each project component were weighed against three main environmental and social parameters, which are:

- potential ecological implications,
- potential implications for natural resources (plants, animals, agro-biodiversity) and
- potential socio-economic/health implications.

A subjective significant rating of each benefit is provided (very high, high, moderate, low, or none) as well as a rating for each impact based on a simple system using criteria such as extent, duration, severity, frequency, reversibility, likelihood of occurrence and significance of impact. Positive impacts have been described as benefits. An overall impact rating for each Important Environmental and Social Component (i.e. physical, biological and social environment) derived through consideration of both the negative impact and the benefits are given. In some cases the negative impact (before mitigation) will outweigh the benefits to be gained. A MODERATE negative impact could be lowered to an overall negative impact of LOW/NEGLIGIBLE as a result of a benefit to be gained. In other cases the benefit may be so significant as to give a positive overall impact, and thus negate the negative impact. All overall impact ratings are based on “before mitigation”. Also a positive overall impact does not remove the negative impact and it would still require mitigation action.

Table 2: Important Environmental and Social Components (IESCs)

<table>
<thead>
<tr>
<th>Physical</th>
<th>Ecological/Biological</th>
<th>Socio-Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microclimatic</td>
<td>Flora composition and quality</td>
<td>Local population</td>
</tr>
<tr>
<td>Local climate</td>
<td>Fauna composition and quality</td>
<td>Social activities</td>
</tr>
<tr>
<td>Macroclimate</td>
<td>Rare and endangered species</td>
<td>Cultural values and benefits</td>
</tr>
<tr>
<td>Mineral resources</td>
<td>Rare and endangered habitats</td>
<td>Traditional right</td>
</tr>
<tr>
<td>Air quality</td>
<td>Biodiversity</td>
<td>Land and tree tenure</td>
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<tr>
<td>Hydrology</td>
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<td>Assets</td>
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<td>Water quality</td>
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<td>Infrastructure</td>
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<td>Soils</td>
<td>Access to resources</td>
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<td></td>
<td>Education/Training</td>
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<td></td>
<td>Potable water</td>
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<td></td>
<td>Poverty</td>
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<td></td>
<td>Aesthetics</td>
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<td></td>
<td>Migration</td>
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<td></td>
<td>Religion</td>
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<td></td>
<td>Jobs/Employment</td>
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6.2.1 Potential Ecological Implications

Parameters considered in the subjective rating based on the objectives, outputs and activities of the components included the ecological integrity and health of critical natural habitats such as forest and wildlife reserves and scared groves, and areas with high suitability for biodiversity conservation, species richness, degree of endemism, maintenance of adequate areas to conserve biodiversity, level of protection of watersheds, streams and waterways, level of fire control, level of rehabilitation efforts in degraded reserves and agro-ecological zones.

6.2.2 Potential Implications for Natural Resources

Selected parameters for analysing the potential implication (negative impact or benefits) of the project on natural resources included level of management of natural resources, maintenance of natural resources base, level of use of natural resources, level of plant/animal disease situation and compatibility with defined environmental goals.

6.2.3 Potential Socio-economic/Health Implications.

For the NSBCP, potential socio-economic/health implications may generally be beneficial and include enhancement of traditional agricultural values and practices, as well as community livelihood base. The project may affect positively the quality of life, health and safety of the people; may effect improvement of price of on-farm (agricultural) and off-farm
products, enhancement of community benefits, reasonable apportionment of cost and benefits between private and public organisations, and inter-generational equity and gender sensitivity.

6.3 Overall Result of The Analyses – Impacts and Benefits

NSBCP will support ecological activities such as the rehabilitation and restoration of degraded areas (on and off-reserve) with indigenous tree and medicinal plant species; the establishment and cultivation of field gene banks (ex-situ conservation) with medicinal plant species, herbs, spices and long abandoned farmer crop varieties in community dedicated reserves and in species-rich home gardens. Where appropriate and suitable the project will restock savanna habitats with wild animal species, which are not foreign to the areas.

(I) Physical Environment

Impacts
All these ecological activities mentioned earlier above will have no negative impact on the physical environment. The project will support only a limited community infrastructure investment such as the construction and rehabilitation work of ranger field stations and observation posts in protected areas and rehabilitation of SRMC office facilities in Tamale. It is not anticipated that noise, dust emissions, and loss of vegetation that could result from these limited civil works would have any adverse impact on the physical environment (e.g. air and water quality). The severity of these environmental issues will be negligible, their extent localised and the duration very short.

Rating: Negligible, localised and of short duration.

Mitigation: NONE.

Benefits
The project components and activities (i.e., reserve and degraded area rehabilitation, woodlot establishment, gene bank and home garden establishment, re-introduction of farmer crop varieties, medicinal plant cultivation, wild animal restocking, etc.) would enhance the overall climate, air quality, hydrology, water quality and productivity of soils of
the northern savanna area positively. Planting of trees and medicinal plant species as well as indigenous farmers’ crop varieties within and outside reserves, and maintaining the integrity and health of important ecosystems and habitats through adoption of sustainable exploitation technologies would improve the local microclimate, the quality of water and air, fertility and productivity of soils and the hydrology in the areas. As these improve, crop and medicinal plants as well as wild animals and their domesticated counterparts would benefit as day temperatures and wind movements (especially during the harmattan period) would reduce. Small savanna plantations would serve as windbreaks and provide shelter. Globally, greening of savanna landscape would contribute to combating desertification and reducing greenhouse effect and thereby offsetting CO₂ build up in the atmosphere and preventing global warming. The re-introduction of threatened farmers' crop varieties may have none or negligible effect on soils if suitability match between soil and species is not considered. Planting these varieties (including leguminous varieties) in mixtures will increase soil fertility and productivity.

Streamlining national policy issues related to biodiversity conservation (e.g. farmers' right, patent right, intellectual property right, benefit sharing, etc.) and aligning these to global protocols and conventions will ensure that the rightful owners of biodiversity reap full benefits from the sustainable utilisation and conservation of biodiversity. Once stakeholders receive fair and equitable share of the benefits from rational resource management, they will adopt conservation and harvesting technologies that will be less damaging to the physical environment. The review, development and enhancement of existing organisational, operational and management system through training of stakeholders and development of leadership qualities, development of management information systems, and promotion of public awareness and education among all stakeholders will bring quality in the way natural resources are managed and conserved and therefore ensure the integrity and health of the physical environment.

Overall effect of the project: (+) High

Ecological and Biological Environment

Impacts
Highlighting the importance and use of medicinal plant species in human and animal healthcare will result in the immediate term in increased harvesting levels. Naturally, as the resource becomes scarce in areas near people's homes, reserve areas, as repository of biodiversity and biological resources will be exploited more. The no-project scenario will be that people will travel longer distances away from their homes to harvest biological resources in intact savanna forests. The with-project scenario will be that impact on the ecology as a result of emphasising the use of medicinal plants would be severe in the immediate term, but localised and of moderate duration since medicinal plants will be established in home gardens, sacred groves and in degraded areas by practising herbalists and communities with assistance from the project.

Farmer crop re-introduction will happen under traditional (conventional) mixed farming systems and cultivation of medicinal plants will be done as mixed crop on farmers' farms and in home gardens and in either pure stands or mixed stands on degraded areas. Degraded areas will be planted with indigenous tree, herbs and shrub species. It is anticipated that these activities will not result in any significant level of pest resurgence, pest resistance or increased use of pesticides and other agro-chemicals. There will be negligible or no ecological consequences (including damage to non-target organisms and natural enemies, contamination and persistence in water, soil and food chain). In terms of impact, therefore, the with-project scenario will enhance ecological health and enrich habitats.

The limited investments in infrastructure (rehabilitation of ranger stations and observation posts for wild animal and bushfire) at the community and village levels will have negligible or no impact on the ecology and biology of the pilot areas and the savanna ecological zone in general. Land clearing for infrastructure such as buildings will be minimal and will hardly affect the ecological and biological integrity of the areas.

**Rating:** LOW/NEGLIGIBLE

**Mitigation:** NONE. But in the event that the use of pesticides and other agro-chemicals could be triggered because there is a rise in pest levels or a decline in soil fertility and crop yield, mitigation would include the use of organic manure instead of inorganic fertilisers and the application of integrated pest management (IPM) strategies that could involve cultural practices, biological control, mixing crop species on farms, crop rotation,
and minimal use of pesticides {in accordance with the criteria for selection and use of pesticides as outlined in the World Health Organisation’s Recommended Classification of Pesticides by Hazard and Guidelines to Classification (Geneva: WHO 1994-95), the World Bank’s Operational Policies on Pest Management OP 4.09, and the Ghana National Pesticides Management Act}. The Ghana National Pesticides Act was derived from and is consistent with the WHO’s pesticides classification and guidelines. The policy of the Ministry of Food and Agriculture is to use less and less pesticides and other chemical inputs in agriculture and to promote integrated pest management technologies. Successful IPM packages have been implemented in rice and other cereals, fruit tree farming in the northern regions of Ghana where the NSBCP is going to be implemented. Training and skills upgrading in the application of IPM has been conducted countrywide mainly through FAO assistance to the Ministry of Food and Agriculture (MOFA) in what has become popular as farmer schools in IPM. The extension staff of MOFA and other public and private organisations with presence in the three northern regions have developed IPM extension packages which can be taken swiftly to farmers. Ghana’s IPM policy is consistent with the FAO’s policy on integrated pest/disease management.

**Benefits**

In the long term excess produce of medicinal plants from home gardens will be produced for sale to other herbalists. This will lead to a decrease in the number of herbalists exploiting medicinal plants directly from intact savanna woodlands, resulting in maintaining a better ecosystem integrity and health. Ex-situ germ plasm conservation and re-introduction of farmer’s abandoned crop varieties will enhance the integrity and health of savanna woodland and agro-ecosystems by increasing the degree of biodiversity on home gardens and farms. In addition, these activities will enhance fauna biodiversity and populations as food sources and refuge for wild animals may be created. While corridorization will expand the existing protected area size and provide refuge it will further enhance biodiversity and genetic mixing of populations as animals begin to move freely between various habitats existing in Togo, Ghana and Burkina Faso. The development and implementation of sustainable biodiversity management plans for some reserves and adjacent lands in close and active collaboration with all stakeholders including communities and villagers would ensure that having identified their roles, responsibilities, rights (including the sharing of benefits) and obligations all stakeholders will be committed to promoting wise resources use and enhancement of the quality and health of these
areas. The EA reveals that reviewing government policies relating to biodiversity conservation and sustainable use (e.g. IPR and patent right, bioprospecting protocols, farmers’ right, biodiversity strategy and action plan, etc.) will enhance stakeholder empowerment, participation and involvement in the management and decision making process in conservation and benefit sharing, and increase public awareness in conservation and development of natural resources.

Overall effect of the project: (+) High

(iii) Socio-economic Environment

Impacts

The components and activities identified under NSBCP will have negligible or no adverse impact on the socio-economic set up in the pilot areas. The project will not acquire any community or individual lands to carry out any of the planned activities. No activity or action will lead to displacement, dislocation or resettlement of communities or people within or outside forest reserves and no compensation payments will be made. The Gbele village inside the Gbele Resource Reserve will continue to exist in the resource reserve. The Government of Ghana has formally agreed to allow the people to stay in the reserve while pursuing an integrated and community collaborative approach toward natural resources use and conservation. Project activities will not negatively affect employment/jobs, health and safety of the people, sanitation and potable water situation in the communities and will cause no deterioration of the level of poverty in the areas. The project will not disadvantage women and the youth; it is gender sensitive, supporting this group in the cultivation of medicinal plants and endangered crop varieties, and in the establishment of woodfuel plantations. The project targets capacity building for women by giving them training.

The project will establish two distinct corridors as a network of state forest reserves with community and individual lands that could be farmlands or intact savanna forestlands set aside by communities as dedicated forests. The concept of corridorization has been widely discussed with the affected communities and it has been agreed mutually that they will participate in natural resource management by still using their lands for those purposes they were earlier put and without losing any of their traditional rights or requesting for compensation payment. Community and individual traditional rights,
including access to land and resources (firewood, non-timber forest products), tree/crop
tenure; cultural values, beliefs and religion will remain intact. The project will not affect
community and individual assets and aesthetics of the areas since there will be no
devastating change in the landscape. There are no archaeological features in the pilot
areas and therefore the World Bank's Operational Policy on Cultural Property OP 4.30 will
not be triggered.

Conservation and cultivation of medicinal plants, endangered and abandoned farmers'
crop varieties, rehabilitation and restoration of degraded lands will not result in land use
conflict since no cultivable land will be set aside specifically for the cultivation of medicinal
plants and therefore taken away from food crop production. The project will rather support
gene bank establishment and reintroduction of crop varieties on lands fertile for crop
production such as in home gardens and on farmers' farms as mixed or polycultures. On
the other hand, woodfuel plantations and medicinal plant cultivation will take place
predominantly on degraded lands, which are poor for crop farming. Since there will be no
competition for land for the cultivation of food crops these activities mentioned above will
not result in localised food insecurity.

**Rating:** LOW

**Mitigation:** NONE. The project will extend to farmers well-tested soil fertility enhancing
technologies including the application of organic manure to ensure that where medicinal
plants are cultivated on the same plot with food crops there is no decrease in yield of the
food crop, which could result in localised food insecurity. Farmers will be encouraged by
the project to use manure to improve their farmlands instead of using inorganic fertilisers.
It costs an average of $3 to move a donkey cart of compost to manure half an acre of
farmland.

Some herbalists the team talked to during the field visits expressed the fear that the
cultivation of medicinal plants in home gardens and degraded areas as well as in herbaria
could remove the mysticism and cultural beliefs surrounding traditional medicine practice
since many people would have access at any time to the plants. They feared that the
traditional indigenous knowledge (IK) associated with traditional medicine practice could
also erode with the onset of the project and more so with the artificial establishment of
medicinal plant gardens. These fears are unreal since the project (i) is only interested in
documenting the type of plants used and for what diseases they are used to treat or cure, and IK, and (ii) will formulate policies (e.g. IPR, bioprospecting protocols, biosafety guidelines, policy on savanna resource management, etc.) that will protect their rights. Furthermore, the project will create awareness and educate the Tindanas and practitioners of traditional medicines about the need to have the source of their medicine in close vicinity and also the need to pass on their knowledge to their children, relatives and others so that these are available to present generations and preserved for those yet unborn. The project should support public outreach programs to sensitise and educate herbalists and traditional healers on the need to document indigenous knowledge. The public outreach program may cost about $50,000. To mitigate the impact

In the absence of market outlets for re-introduced crop varieties farmers may be dejected and may want not to replant. The surest way of mitigating such impacts is to support the selected farmers with inputs such as organic manure, and certified seeds. In addition, the project should assist in finding markets or buy off excess produce.

**Benefits**

The formulation of policies relating to biodiversity conservation and sustainable use will restore and guarantee the traditional rights of communities and individuals, their intellectual property rights, right of access to land, tree and other resources on the land. It will also protect their cultural values and beliefs and religion. Education and mass awareness programs to be carried out by the project will show the relevance of conservation, management and sustainable use of biodiversity to the communities. The capacity building component under the project will involve training and skills upgrade at all levels including at the community and village levels in gene bank establishment, reintroduction of endangered farmer crop varieties, soil fertility and water management technologies, park management, etc. The project will increase social activity spectrum of the communities since they will participate in the implementation of the various activities identified by the project. Women will be provided with equal opportunities to cultivate medicinal plants, endangered crop varieties and establish woodfuel plantations from which they can make extra income.
Communities participating in the project will benefit economically through the sale of agricultural produce, medicinal plants, fuelwood, and domesticated animals and from royalties accruing from patent rights and tourism receipts.

The collaborative biodiversity conservation, research and development component of NSBCP would support the restoration of degraded areas and in the prevention and control of bush fires. These activities will enhance soil fertility and crop growth, resulting in food security and income generation for families and communities. Enhancement of agro-biodiversity and conservation and cultivation of medicinal plants have economic, social, cultural and spiritual implications for the people of the northern savanna zone. They see natural resources utilisation in a holistic manner. In some communities certain ceremonies and festivals have been abandoned because particular animal or plant needed for their performance are no longer in existence (Dittoh, S., 2000). These activities will provide benefit to communities.

Since the project is seeking to involve communities in resources management it will restore to them lost traditional rights of access to reserve lands and to non-timber forest products. Lands forming the corridors will contain small plantations that will be accessible to local communities for fuelwood, forage, building and other materials and for sale. Corridorization will enhance animal biodiversity and lead to increased nature tourism (once tourism infrastructure is developed and maintained), which may result in job creation and livelihood improvement of communities. The development and implementation of biodiversity management plans for some reserves and adjacent lands would enhance the quality and health of these areas, provide non-timber forest products and other goods and services which could generate wealth to families and communities. The project will support income generation schemes to induce collaborative resource management. Overall, there will be increased availability of goods and income for rural families and communities.

Improving the livelihoods of the most vulnerable of the society namely, women would require the establishment and provision of credit facilities. Most women talked to would need capital to begin income-generating activities such as in agro-processing. Providing the women with credit facilities would reduce the pressure they exert on the land, e.g. harvesting firewood.
Members of the local community should be hired temporarily to construct and maintain reserve boundaries and fire belts in the newly established corridors. Fire volunteer squads should be recruited and trained and old ones already in existence in some of the communities should be re-trained and equipped with simple tools to prevent and fight bushfires. The project should collaborate with the Ghana National Fire Service (GNFS). It will cost about $1,000 to train and equip a village fire volunteer squad.

Overall effect of the project: (+) High

7.0 INSTITUTIONAL ARRANGEMENT AND TRAINING FOR THE IMPLEMENTATION OF THE PROPOSED MITIGATION MEASURES

7.1 General

At the local level, the project is expected to collaborate with traditional, district and regional authorities as well as NGOs to develop a consultative process with them for biodiversity management. These institutions at the district levels have not been effectively involved nor shown adequate interest in this area of development.

7.2 Institutional Arrangement

There are well-established national institutions capable of developing and monitoring management frameworks for the conservation and sustainable utilisation of the natural resources of this country. Below this level existing structures and capacities, particularly at the district level for biodiversity management is weak and uncoordinated. Even the structures supposed to be created by law at this level namely the District Environmental Management Committees (DEMCs) and Community Environmental Committees (CECs) are not functioning efficiently and effectively due to lack of political commitment at the local government level. The activities of these local level institutions have not achieved the desired effects in the past. The implementation of the project components and any mitigation measures will depend to a large extent on how institutions involved in and benefiting from the project will work in a participatory and collaborative manner.
To make these institutions effective and efficient in implementing, co-ordinating, supervising and monitoring programs and projects in biodiversity conservation and use, proper institutional arrangements will have to be established. The institutions to be considered at the national, regional, district and community levels should include:

(i) Public organisations

- District Assemblies and their District Environmental Management Committees
- Ministry of Lands, Forestry and Mines
- Wildlife Division of the Forestry Commission
- Forest Service Division of the Forestry Commission
- Lands Department.
- Ministry of Food and Agriculture
- Environmental Protection Agency
- Ghana National Fire Service
- Ministry of Mines
- Ministry of Health
- National Mobilisation Program
- Institutes of the Council for Scientific and Industrial Research (e.g. Plant Genetic Resources Center, Savanna Agricultural Research Institute, Crop Research Institute, Animal Research Institute, Forest Research Institute of Ghana, Soil Research Institute)
- Council for Scientific Research into Plant Medicine at Mampong Akwapim
- University of Development Studies
- University of Ghana
- Kwame Nkrumah University of Science and Technology

(ii) Private and civil society organisations

- Community-based organisations and women and youth groups and champions at the community and village levels (e.g. Community Environmental Management Committees)
- Traditional Authorities (Skins and Tindanas)
- Non-Governmental Organisations
- Religious church organisations
- Federation of Traditional Healers
- Private sector

(iii) Programs and projects

- NRMP
- Village Infrastructure Project
- IFAD Root and Tuber Project

The institutional arrangements should comprise:
- Contacts to hold discussions to determine the roles of the institutions
- Selection of specific officers to be assigned
- Setting up timetable for each action to be taken and
- Discussion of resource and budgetary allocations and schedules of disbursement

Training of trainers workshops will be organised for these institutions to understand the responsibilities of each other to avoid hold-ups and ensures the success of the programme.

7.3 Training, Monitoring and Reporting on Environmental Management and Assessment

According to the country’s environmental regulations, Environmental Assessment is an environmental management tool to be used country-wide at all levels of government (i.e., national, regional, district and community levels) to analyse developments with regard to their environmental and social suitability and impacts and to prescribe mitigation measures to eliminate or reduce the impact. EAs assist national and local governments through the district assemblies therefore to track, monitor and where possible modify development activities. EAs have become useful tools for the analysis of projects and policies to determine their environmental and social viability and usefulness to the communities. Where organisational structures such as the District Environmental Management Committees (DEMC) or Community Resources Management Committees (CRMC) are not yet formed these will have to be established and strengthened to follow up on the implementation of environmental management plans and mitigation plans to offset impacts.
The project will support national bodies, district assemblies and their DEMCs, CECs and other major stakeholders to build their capacity to implement and monitor in close collaboration with communities’ action plans to address future social and economic impacts of biodiversity conservation and management. The process of ensuring that systems are built at all levels including at the local level for impact management and decision making should include:

(i) Identification of all the stakeholders at the national, district and community levels
(ii) Identification of the capacities and needs of participating bodies including those of communities and villages
(iii) Development and provision of environmental assessment manual prepared by MLFM with the assistance of the EPA and adapted to the local situation
(iv) Provision of logistics such as means of implementation including transportation (motorbikes, bicycles)
(v) Recruitment of qualified field officers to provide research and extension service to those implementing various components of the project
(vi) Organisation of training programmes to equip project participants, beneficiaries, facilitators and extension officers in the field for effective monitoring of progress and impact, dissemination of data and information and communication with and among the communities (e.g. teaching them the use of aids that are known to the people and therefore can sustain their interest)
(vii) Formulation of effective and efficient monitoring system that is sensitive to the needs of all participants and project beneficiaries. Such a system comprising monitoring indicators identified in the EA document to track mitigation of any perceived impacts will have to be incorporated into the general M&E system that has been developed for the NSBCP.

At the national level, the Ministry of Lands, Forestry and Mines (MLFM) will be responsible for the implementation of the impact monitoring and mitigation (environmental management) plan, ensuring that measures required for mitigation are carried out and that they achieve their objective in this regard. The MLFM desk officer with responsibility for monitoring the Savanna Resources Management Project (SRMP) will have oversight and provide technical backstopping to the Savanna Resources Management Center. MLFM will transfer the implementation responsibility to the Savanna Resources...
Management Center at Tamale which will designate an individual to be responsible for monitoring progress of the environmental management plan and the Northern Savanna Biodiversity project as it relates to addressing impacts. As indicated in the M&E system developed for NSBCP and since the district assemblies and the communities are involved in the implementation of the project they should be given responsibility in implementing the impact management plans and monitoring progress as well and feeding back to project management. The structures at the various levels should be networked to provide effective and efficient monitoring.

Environmental effects monitoring is necessary to ensure that the predicated impacts are addressed effectively and efficiently through the mitigative measures indicated. Three main objectives of monitoring are (i) to ensure that any additional impacts not identified in the EA document are addressed appropriately; (ii) to ensure that the mitigative actions are appropriate for addressing the impacts; and (iii) to feed information back to management in order that appropriate modifications can be made to either the operational activities or to the environmental management plan in terms of mitigative measures to be applied.

To ensure that environmental effects are mitigated effectively a monitoring unit should be established at MLFM and SRMC. These units would consist of the monitoring officer who would be assisted by field officers from the district assemblies’ DEMCS and at the community level by appropriately the chairman of the CECs or a champion, all of who would have received basic monitoring training. Persons involved in the monitoring duties will do so in accordance to a manual for monitoring that would be prepared by the Policy Planning Monitoring and Evaluation Division of MLFM. Such a manual would contain actions on baseline data requirements and how these should be identified, collected and used, identification of key indicators, monitoring schedule, measurement techniques, interpretation of results and presentation of findings, and the application of findings to management decision making.

Monitoring should be carried out on an on-going basis. Monthly monitoring reports would be provided to the management team for information, discussion and action. An environmental management plan will only be effective if monitoring is carried out efficiently and effectively and if the management team is prepared to act upon monitoring results.
and recommendations. This requires effective and efficient compliance and enforcement mechanisms at all levels. Monitoring indicators will include:

- The level of cooperation received from communities
- Acreage of degraded land reclaimed and rate of reclamation
- Percentage of farmers cultivating re-introduced local varieties, percentage sold, pricing and rate of sale
- Changes in the income levels within the communities
- Level of awareness created for biodiversity and agro-biodiversity in the communities
- Rate of incidence of bushfires
- Number of communities that are able to maintain no-burn regime
- Level of interaction between communities and project implementers
- Availability of medicinal plants and establishment of herbal clinics and the rate of patronage of these clinics
- Rate and nature of complaints from communities about wildlife raiding crops
- Improvement in essential life support systems and quality of life
- Rate of development of social and economic investments (e.g. tourism infrastructure)
- Number of training programs conducted every year

Skill upgrade and development and community awareness creation activities should include:

- Short courses for community champions and District Assembly staff
- Workshops on parks and reserve management
- Seminars for ranger/community leaders

These programmes should be made in such a way as to ensure gender equity.

About $50,000 would be needed to organise training programmes at each district level.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

(i) The general conclusion of the overall project is that it is generally environmentally and socially positive.
(ii) If the proposals put forward were implemented, the environment of the beneficiary communities would be improved in addition to enhancing their living conditions.

(iii) The project may have residual impacts that can be mitigated.

(iv) Local people in the communities to be affected by the project will give the project their full support.

8.2 Recommendations

To ensure that project goals are realised the following recommendations are proposed:

(i) In each of the pilot communities, a community-based land use model should be introduced, which integrates well with the community's land use system that should lead to a community land use plan. In this wise land use systems should be developed which make for optimal use of modern technologies and traditional local experiences. The experiences of the land and water management component of the GERMP implemented by the Ministry of Food and Agriculture and SRMP can be utilised as the savanna areas were a priority and agricultural officers were trained for this purpose.

(ii) The northern savanna zone is home to one of the poorest of the rural groups in Ghana. It is, therefore, essential that an alternative livelihood source for communities targeted under the project are identified which can serve as basis of a cash economy. The alternative livelihoods should help create jobs and opportunities for cash income during the long dry season experienced in the area. Discussions held during field visits indicate that the communities are ready to cooperate provided they are empowered to go into other ventures, dams/dugouts are constructed to enable them to go into dry season gardening, or their depleted lands are restored. In this wise the promotion of gum arabic from Acacia senegal has commercial potential especially in the Upper East Region. Trees of Acacia senegal yield gum for over 15 years. Apart from gum arabic, the trees provide browse, support honey production, and use of tannin. The gum is used in preparation of ink, manufacture of medicine, chewing gum confectionery, soft drinks and hardwood used in the manufacture of such items as tool handles.
(iii) A baseline survey (inventory) should be conducted to identify products of commercial value and promoted to take the pressure off the land. The women in some communities believe that provision of credit during the harvesting period would enable them to alleviate poverty through shea butter extraction, processing of dawadawa and malt and par-boiling paddy for sale.

(iv) In most parts of northern Ghana vegetation restoration has been done with fast growing exotic species - especially teak in monocultures. This may be environmentally unwise and a threat to biodiversity. Native species of plants should be encouraged for ecological tolerance; pest/disease resistance, long-term viability and adaptation to the local environment though slow growth.

(v) The project should ensure that communities bordering reserve areas receive benefits and not only bear cost of maintenance. Emphasis should be on community participation through a revenue sharing mechanism and community use of park resources. The idea of area reservation is not new to the communities. However, most of them have been forced to go into the forest reserve to farm because their old plots have become so depleted. The depleted lands have to be restored before they are prevented from going into the new areas to be demarcated.

(vi) Communities fringing wildlife corridors should be educated on the reasons for community reserves, their responsibilities and benefits to them to ensure that local communities are fully integrated in the creation and management of the corridors.

(vii) Bushfire control is proposed by the project. This is critical to the success of the project, as bush burning is one of the most serious problems affecting the environment and causing deterioration of biodiversity. The success of the UNESCO CIPSEG project and declaration of no burning areas by some communities should be promoted to pilot communities under the project. An early burning regime can be introduced initially to communities as a first step towards a no burning regime.
(viii) The socio-economic survey proposed under the project should include the following:

- Current availability of renewable natural resources - wood stock (plants, bushes, and trees) pasture, soil, water and human food supply conditions.
- Evolution of supply and demand situation for resource in surplus, equilibrium and deficit areas.
- Identification of the nature of user communities exploiting each renewable resource
- Derived benefits (non-consumptive benefits of environmental stabilisation and soil regeneration, and consumptive benefits of wood fuel and construction materials extraction)
- Existing management efforts to enhance resource availability (identify whether public or private, indigenous or external).
- Terms and conditions of access to and exploitation of renewable resources (whether rules are formal and effective).
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APPENDIX I

GHANA NORTHERN SAVANNA BIODIVERSITY CONSERVATION PROJECT

Environmental Analysis

Draft Terms of Reference

Introduction

In Ghana, savanna woodlands provide valuable environmental services, a crucial refuge for native biodiversity, and also protect soil and water resources against degradation. About 70% of Ghana's total supply of firewood and charcoal comes from savanna zones which also provide medical plants (the primary source of healthcare to residents), roofing grasses, fencing poles, bush meats and fruits. The northern savannas are a source of important farmer crop varieties (cereals, roots/tubers and legumes). The future survival of the majority of indigenous crop varieties is in doubt due to over-exploitation and environmental degradation. Similarly, an increasing number of the medicinal plants are threatened. Preserving these genetic stocks and knowledge of their use will require specific interventions to ensure that these wild/native varieties are not completely lost through inappropriate practices or replaced by introduced varieties.

The primary objective of the proposed project is to improve the environment, livelihood and health in the northern savanna zone of Ghana through the conservation and sustainable use of natural resources including medicinal plants. More specific, the proposed project aims to enhance the sustainable use of savanna resources (medicinal plants, wood fuel, bush meat, farmlands, grazing lands) through interventions designed to:

a. Support community-based savanna woodland and wildlife resource management;

b. Support improved management and monitoring of savanna biodiversity through the establishment of special protection areas in addition to and within the existing system of savanna reserves that explicitly incorporate biodiversity conservation as an integral management objective;
c. Stimulate and support improved land management practices to support agro-biodiversity (e.g. through reforestation of degraded savanna areas, cultivation of indigenous crops, etc.), and,

d. Efficient use of extracted savanna products (e.g. medicinal products, bush meat) that assures local users sustainable benefits.

**Objectives**

The purpose of the environmental analysis is to assess the potential environmental and social impacts of establishing special protection areas in addition to the existing system of savanna reserves and of agro-biodiversity activities.

**Scope of Work**

In an effort to gain an understanding of the potential environmental and social impacts of the project, the consultant will:

(i) Review Ghana's national environmental legislation, policies, regulations and procedures in conjunction with the World Bank's safeguard policies and identify possible gaps. In this context, particular attention needs to be paid to the country's legislation pertaining to conservation and sustainable use of biodiversity and the role of local communities, the national biodiversity strategy and action plan and the Traditional Medicine Practice Act.

(ii) Review Ghana's land use policy with regard to the establishment of new protected areas and the potential resettlement of the population living in the selected project sites.

(iii) Assess the environmental impact of increased social and economic infrastructure in light of the establishment of new protected areas particularly in community dedicated forests and faunal corridors.

(iv) Propose appropriate and costed mitigation measures including training for the identified impacts above.
(v) Assess the potential environmental and social impacts of proposed activities relating to agro-biodiversity, medicinal plant conservation and cultivation and propose appropriate costed mitigation measures.

(vi) Propose appropriate institutional arrangements including training needs and costs for the implementation of the proposed mitigation measures.

(vii) Propose an environmental assessment process enabling District level institutions, in co-operation with communities, to address impacts of future social and economic investments in biodiversity conservation and management.

(viii) Propose monitoring indicators for such social and economic investments and other aspects as necessary for inclusion into the project's monitoring system.

The Report

The environmental analysis report will include an Executive Summary in English, a discussion of the policy, legal, resettlement, land use, and administrative framework with emphasis on biodiversity conservation and sustainable use, a description of the proposed project, a description of the current and proposed protected areas.

Furthermore, the report will include:

A description of the potential environmental and social impacts of social and economic investment as a result of the proposed project,
A discussion of the proposed mitigation measures including training and their costs as well as appropriate institutional arrangements to facilitate the environmental management under the proposed project.

The Consulting Team

Ideally, this environmental analysis will be conducted by an individual consultant with the minimum of Msc./MA Degree in a related discipline. The Consultant must have a background in environmental assessment procedures. Furthermore, the consultant
should be conversant with biodiversity issues and have rich working experience in Sub-Saharan Africa.

**Duration**

The assignment will take 8 weeks (fieldwork and final report). The report should be available by November 30 2000.
APPENDIX II

SUMMARY DESCRIPTION OF NSBCP

Background

The key issues on natural resource management in Ghana are land and forest degradation, loss of flora and fauna biodiversity associated with unsustainable harvesting levels in both the high forest (timber extraction) and savanna zones (poles/woodfuel and medicinal plants), and unsustainable land use practices especially crop farming and livestock grazing.

The context of this GEF component is to complement the APL Natural Resources Management project: NRMP I (2 years), and the proposed NRMP II (4 years) and NRMP III (4 years). The development objective of the NRMP is to protect, rehabilitate, and sustainably manage national land, forest and wildlife resources and to sustainably increase the income of rural communities who own these resources. The global environmental objective is to increase the ecological security of the globally significant biological resources, especially within threatened tropical moist forest ecosystems. A 6-year GEF biodiversity component of $8.7 m (focusing on the southern high forest) was linked to NRMP I and II. Although the NRMP I was approved on May 15, 1998, it became effective on June 9, 1999. This 6-year Savanna biodiversity GEF project (focusing on the three northern regions) will overlap with the proposed NRMP II for 2 years and NRMP III for its 4 years.

The Sudan and Guinea savanna zones include the northern, drier, two thirds of the country, where the main economic activities are the production of annual crops (cereals, legumes, root crops, cotton) and livestock. While the northern savannas are home to about one third of wildlife species in Ghana, annual bushfires affect 50 percent of the savannas, destroying species of flora and fauna and reducing biodiversity.

The savanna zones are also under tremendous pressure from growing human and livestock populations, agricultural expansion, inappropriate farming practices, deforestation, bush fires, and introduction of new crop varieties that are replacing indigenous varieties. All these activities contribute to land degradation and loss of biodiversity are are identified in the NEAP as one of the major environmental issues in Ghana. A number of problems can be directly linked to increasing land degradation. They include: (i) a poorly developed market system that does not price exploited natural resources at their real economic value while providing easy (open) access to dwindling communally-owned natural resources; (ii) inefficient public regulating agencies with overlapping responsibilities; (iii) inadequate/negligible involvement key stakeholders including local communities in natural resource management; (iv) weak institutional capacity in the wildlife sector and little involvement of communities in the management and sustainable use of the wildlife resource; and (v) lack of inter-agency coordination in planning/monitoring natural resource use, especially at the district and field levels.

All forest and savanna woodland reserves in Ghana are owned by the local communities and traditional authorities and the government's role is to manage these resources in trust for the people. The key objectives of Government natural resource policy include: (a) ensuring sustainable production of forest products, (b) preventing further environmental degradation due to deforestation and inappropriate farming practices, and (c) stimulating community involvement in management of natural resources and enhanced economic well-being of rural communities. Specific policy and institutional reforms that were identified to address these objectives are directed at four areas: development of procedures for allocating timber utilization contracts, forest revenue policy, trade policy, and restructuring of forest and wildlife sector institutions. Technical and analytical studies to design a coherent sector-wide program of policy and institutional reforms have been undertaken, resulting in the adoption of a new National Forest and Wildlife Policy in 1994 based on three pillars of resource protection, sustainable production, and involvement of local...
rural people. Subsequently, a system-wide master plan, the Forest Development Master Plan (1996-2020), was developed to implement the policy. Companion Wildlife legislation is also being prepared.

Medicinal plants and the traditional knowledge of their use have been the mainstay of healthcare in northern Ghana for centuries. While the government is doing all it can to increase the availability of modern healthcare, especially in rural areas, the majority of public health posts are poorly equipped and administered and per capita allopathic drug expenditure is low. Two important government actions have given greater acceptance to the value of traditional healthcare in Ghana. First, to regulate the practice of traditional medicine, register practitioners and license premises for practice and to regulate the preparation and sale of herbal medicines a Traditional Medicine Practices Act (No. 575) was passed in 2000. Apart from being the first of its kind in Africa, this Act not only legitimizes traditional medicines and healers, but may also put more pressure on the affected plants species due to the increased national attention. Since the majority of plants used for traditional medicines are harvested from the wild, it is important that this basic resource is protected through sustainable harvesting and/or cultivation. Second, MOH has established a Traditional and Alternative Medicine Directorate (TAMD). The Directorate will serve to integrate a safe and regulated traditional medicine practice into the National Health System, and play an important intermediary role between MOH and MLF. Such a role will help link the demand for plant-based drugs and their sustainable supply from in-situ and ex-situ sources.

Other relevant government policies include: (a) the draft National Biodiversity and the National Forest Protection Strategy which seek to: (i) safeguard genetic diversity and diversity of indigenous faunal and floral species through an ecosystem approach to management within all ecological zones, (ii) improve knowledge of the distribution and status of rare, threatened and endemic fauna species through targeted surveys, (iii) enhance protection of critical areas for migratory species through improved monitoring and habitat management, and (iv) ensure sustainability and preserve genetic diversity within non-timber forest species that are collected by rural populations for medicinal and consumptive uses through improved data collection, regulation of harvesting, and proactive management; and (b) the National Land Policy (1999) which seeks the application of the principles of sustainable resource development to the management of the country's land and water resources.

Project Objective and Components

The proposed NSBCP project would be implemented over six years and focus on the three northern regions of Ghana. Its objectives seek improvement in environment, healthcare and economic livelihood, and the conservation of globally significant biodiversity in the northern savanna zone and would complement the last six years of the NRMP APL, and the baseline activities would be covered under the NRMP II (2 years) and NRMP III (4 years). The NSBCP consists of five components aimed at promoting application of improved savanna land and natural resources management techniques, involvement of communities in biodiversity and savanna resources conservation, management and use. The proposed project would apply lessons learnt and complement the community-based management planning processes being generated by the NRMP I for forest reserves, wildlife protected areas, savanna woodland and integrated community-based watershed management, from which specific action programs to enhance global benefits of savanna ecosystems would be developed and tested.

Project Component 1: Formulating the Policy Framework (US$0.50 million)

The objective of this component is to assist responsible ministries and agencies (e.g., Ministry of Lands and Forestry, Ministry of Health, SRMC, etc.), in defining and institutionalizing effective and long-term resource policies, strategies harvesting guidelines and management while promoting sustainable in-situ conservation and ex-situ, cultivation-oriented activities that support the local economy of the northern savanna areas. The project would ensure that policies/strategies developed would fit well into the draft National Biodiversity Strategy and Action Plan and the National Forest Protection Strategy.

Project Component 2: Capacity Building (US$0.80 million)
This component would support: (a) a review of existing organizational, operational, policies, and management systems; (b) professional development, leadership and training; (c) development of data, inventory and management information systems to support natural resources management; (d) development of people-sensitive participatory protected areas management planning guidelines; (e) public awareness and education programs related to Park/Reserve management; and (f) support traditional medicine services and delivery systems and organizations.

The project would support TAMD to assist healers to establish regional Traditional Healers Associations (THAs) that are mandated to register all traditional health practitioners, including addresses and areas of specialization. In addition, the project would assist the regional THAs, in particular Traditional Birth Attendants, to work closely with regional MOH offices and the Ghana HIV/AIDS Network (GHANET) in the use of traditional treatments for HIV/AIDS associated opportunistic diseases.

A small herbarium would be established at Tamale, NR with a qualified plant curator who would work under the Project Coordinator and be responsible for identifying and maintaining plant collections, with specific reference to medicinal plants species and indigenous farmer crop varieties. The Tamale herbarium would establish links with local (e.g., Ghana Herbarium, Aburi Botanical Gardens, etc.) and international herbaria. The species verification would be made at the National Herbarium, University of Ghana, Legon. In addition, the project would support establishment of databases at Tamale, NR, Wa, UWR, and Bolgatanga, UER with links to the central database at the University of Ghana, Legon on usage, distribution and status of _______ and medicinal plants used in human and livestock healthcare. The database would draw together information from oral, traditional, modern literature and herbarium collections. This systematic documentation and evaluation of threat, rarity and demand would be a first for the West Africa Region in terms of its scope and comprehensiveness and would have global and regional, as well as national benefits.

The project would fund under this component expenses for:

- purchases of goods including vehicles, motor bikes, computers, GIS hardware and software, data acquisition such as satellite images and maps;
- consultant services, both local and foreign technical assistance for organizational and institutional review, policy studies, community animators, park management planning, GIS;
- training in the form of local, regional, and national workshops; domestic and overseas training;
- salaries and allowances for incremental, contractual, temporary, and traveling MLF staff;
- incremental operating costs:- for vehicles, equipment and facilities maintenance, publications and information materials.

Key outputs from this component would be: (i) formulation and actualization of a long-term sustainable strategy for savanna resources management particularly those within and around key resource sites; (ii) a clear action plan for implementing community driven conservation programs; (iii) strengthened MLF, MOH and other agencies’ professional capacity (field and operational staff) in managing northern savanna resources; (iv) a stronger voice for local communities in key policy issues affecting savanna resources management; and (v) a functional spatially referenced GIS to monitor ecosystem status and changes.

Project Component 3: Biodiversity Conservation, Research and Development (US$3.30 million).

This component would support: (a) developing systems for regional and community biodiversity management, (b) protected area and boundary demarcations and conservation of new and additional sites/areas including biodiversity corridors, (c) improved land management and restoration of degraded lands in 3-5 pilot areas, (d) sustainability of threatened and declining agro-biodiversity and protection of indigenous crops, and (e) harvesting guidelines and ex-situ cultivation for sustainability of medicinal plant resources. In particular, the component would fund studies and surveys, the restoration of off-reserve degraded lands, the formulation of community-based park/reserve and off-reserve bushfire prevention and control schemes, the restoration of soil fertility and promotion of demonstrated farming/agriculture methods, formulation and implementation of management plans for the selected sites, and education and training. Management plans and remedial programs which would be developed and implemented for pilot areas,
including at least 10 priority areas of protected forests and three wildlife reserves with the active collaboration of local communities concerned. Adjacent social and agricultural systems would be taken into account and selection would be on the basis of biological diversity in the area, main threats, extent of participation from the communities, and net global benefits. The lessons learnt from these pilot activities would feed into the formulation of regional models for Park/Reserve management and continuity of productive (nutritive) indigenous farmer crop varieties and agricultural practices and would form a platform for the implementation of a long-term strategy for biodiversity conservation in the northern savannas.

**Sub-component 3(a): Regional and Community-based Management Systems**

The project would support surveys for gathering basic biological (ecological) and socio-economic and other primary level data, identification and mapping of endemic species and genetic 'hotspots', and determination of ecosystem changes and biodiversity status. Wildlife reserves in Ghana harbor a large number of wildlife species. Mole National Park, for example, has about 93 species of mammals and over 300 species of birds although this list is not exhaustive. There is no substantive list of wildlife species for Gbele Resource Reserve. Ecological studies on threatened, endangered species (e.g., black and white colobus, leopard, lion, yellow backed-duiker, elephant), and problematic species (elephant) would also be undertaken in these reserves. These studies would include census, determination of distribution and movement, population dynamics, and monitoring of population trends in the reserves. Data on the flora and vegetation types in the reserves would also be collected for sound management of these forest and wildlife reserves.

**Sub-component 3(b): Protected Area Boundary Demarcation and Community Resource Conservation.**

This sub-component would also support protected area boundary demarcation, strategies to reduce illegal bushmeat production/harvesting, and formulation of community-based actions to minimize or stop group hunting and bushfire prevention and control.

Though there is high demand for bushmeat in Ghana, the availability of wildlife in non-reserved wilderness areas has been drastically reduced or exterminated in many off-reserve areas. Communities therefore engage in illegal hunting in the reserves. Poaching in and around forest reserves and Mole National Park and Gbele Resource Reserves is serious and chronic. Under this component, funds would be provided for incentive-based, anti-poaching activities in collaboration with local communities. Group hunting is another practice detrimental to wildlife conservation in the northern savanna area. Hunters, in groups numbering over a hundred, target for consumption every species encountered without discrimination as to number, sex, or age. The practice has contributed to decline in numbers and species, and contributed to the ultimate extinction of species outside forest and wildlife reserves in the savanna ecosystem. To lessen these practices, the project would support public education campaigns to educate communities on the hazards of group hunting as well as its effects on the fauna, flora, and associated socio-economic disadvantages. Other activities which would be funded include those assisting local communities, District Assemblies, law enforcement agencies, and natural resource management agencies in instituting and implementing hunting by-laws and strategies opposed to group hunting.

Also supported under this component is bushfire prevention and control. Annual wildfires destroy both vegetation and animal life by sweeping across reserves and the wilderness areas, resulting in loss of forage and cover for wildlife and domestic livestock and causing loss to property and human life. Bushfires in the savanna zone during the dry season are caused by accidents, or by hunters (especially group hunters), honey tappers, or charcoal burners. Support would be provided for educating communities on early and control burning, bushfire prevention and control, establishment of firebreaks within and around reserves, and training of community fire volunteer units, as well as public awareness programs.

**Sub-component 3(c): Improving Land Management and Restoration of Degraded Areas.**

An EPA survey (early 1990s) revealed that the Upper East Region is the most degraded land area in Ghana. Furthermore, degradation has increased in past decades, deforestation has progressed to the point where
climax and pro-climax vegetation are not visible in many areas except in reserved forest and patches of sacred groves, and soil erosion has been aggravated over the past 20 years. Although there has been donor support for projects in the three northern regions to arrest desertification, e.g., the Irrigation Company of Upper Region's (ICOUR) environmental restoration project funded by UNDP, the International Fund for Agricultural Development (IFAD) project covering selected communities in these regions, and the Upper Regional Agricultural Development Program (URADEP), these had little effects in the areas or communities that the NSBCP targets.

The sub-component objective is to bring about the sustainable development and management of dryland/savanna ecosystems through desertification control techniques. Under this sub-component, the project would support: (i) a bio-physical and socio-economic baseline survey of the selected communities, (ii) selection of communities/groups and affected areas to be included in the project, (iii) establishment of community-level committees and agreement to support project components, (iv) sensitization and awareness campaigns, (v) education and training programs for bushfire prevention squads, (vi) protection and maintenance of pilot areas, and (vii) distribution of plant seedlings to schools in the communities.

Pilot projects would be set up in the three Northern Regions which would link with the Savanna Resource Management Component of the NRMP which focus on the degraded landscape of the Northern, Upper East and Upper West Regions of Ghana. The principal project beneficiaries are expected to be the communities in the selected, affected areas who would be participating in the project activities. The pilot projects would be implemented in collaboration with the Desertification Control Unit of the EPA based in Bolgatanga, with the active collaboration of the Forest Services Division of the Forestry Commission and other relevant Governmental and Non-governmental organizations. The District and Community Environmental Management Committees, among others, would play an active role in project implementation. This component would be implemented by a core team coordinated by the National Focal Person on Desertification who is also the EPA Deputy Director in charge of the Upper East Region and would be assisted by EPA staff in the three Northern Regions, Technical Officers and Field Assistants.

Funds would be available for the purchase of inputs and supplies, training and equipment for the anti-bushfire squads, incremental staff salaries for maintenance and protection of the pilot areas, and distribution of seedlings.

Sub-component 3(d): Sustaining Biodiversity

This sub-component would support wildlife domestication, and the establishment of two wildlife corridors along the Sissili River and the Red, White, and Morago rivers. The sub-component would provide funding for activities which would promote wildlife domestication and/or ranching. Bushmeat is highly appreciated in Ghana but production in the homes is non-existent, especially in Northern Ghana. Wildlife domestication or game farming is not practiced in Northern Ghana probably due to lack of information on the husbandry. Other problems contributing to the limited interest in and practice of game farming could include difficulties in obtaining breeding stock, housing, and capital to start the domestication. The belief that the wild supplies an inexhaustible supply of bushmeat is also a contributing factor. Game farming has high potential since the demand for the product locally is high and a ready market exists. Suitable species for farming such as the grasscutter, giant rats, and other rodents which have a high rate of reproduction are available in the region and the project would provide support for demonstrations and training in farming techniques for these species. Producing bushmeat in the homes would also alleviate the pressure on wildlife and provide an opportunity for wild populations to recover, thereby contributing to biodiversity conservation and sustainable utilization.

Wildlife Corridors. Currently, there are 22 wildlife reserves that are mostly isolated from each other. The rate of loss of ecosystems and habitat in off-reserve areas and the pressure on wildlife in the protected areas could soon lead to loss of biodiversity. Over an extended period, these islands of ecosystem and the biological resources therein would not be able to sustain themselves because most of these habitats would have become too small and fragmented and the fauna would have experienced inbreeding and apparent weakening of their gene pool. However, a contiguous network of habitats or ecosystems in the form of
corridors using for instance riverine or gallery forests, state forest reserves that are augmented by managed
community wildlife/natural resource reserves would ensure that there would be un-impeded movement of
fauna between these habitats or ecosystems. Such a network of habitats would thus allow/support
intermixing of genetic material of species between habitats and hence enhancement of biodiversity.

Two biodiversity-rich corridors were identified and proposed for inclusion into the NSBCP. The first
proposed corridor to be situate in the north-western part of the country would begin from the Mole National
Park and include the Podo and Chiana Hills forest reserves, the Sissili River and Mawbia reserves in Ghana
and link with the Nazinda Game Ranch in Burkina Faso. The second corridor is situated in the Guinea and
sudanian savanna woodlands of northeastern Ghana. It runs from Burkina Faso and would link forests and
other vegetation along the White Volta, Red Volta, and Morago rivers and continue to Togo. These two
corridors are of international and global importance because the Sissili River-Mawbia contiguum serves as a
corridor for the movement of fauna including elephants between Ghana and Burkina-Faso while the Red and
White Volta-Morago River forest contiguum is used by elephants that move between Burkina-Faso, Ghana
and Togo.

The establishment and management of the Sissili River – Mawbia and Red-White-Morago Rivers Corridors
would be supported through specific efforts and activities (e.g., community reserves) to ensure that local
communities are fully integrated in the creation and management of these corridors.

Sub-component 3(e): Sustaining Medicinal Plant Resources

This sub-component would support studies to: (i) assess the supply and demand (socio-economic) of
current medicinal plant used for the ten major human diseases and five major livestock diseases, (ii) identify
guidelines for the sustainable harvesting of medicinal plant species in protected sites when ex-situ
conservation/cultivation is not possible; and (iii) methods for the propagation and cultivation of selected
medicinal plant species in home gardens, degraded habitats, and as components of agricultural
 diversification for use by healers and birth attendants, and as an additional source of income. The project
would also assist CSRPM to identify localities and traditional healer/birth attendants/farmers to cultivate
selected medicinal plant species needed for phyto-medicine production.

Despite the recognition of the importance of medicinal plants and their traditional use in the
healthcare system, they remain undervalued. The increasing demand in urban centers for traditional
medicines is placing increasing pressure on the wild resource-base. Market and field surveys would be
carried out to determine pressures on wild populations and habitats at selected savanna forest sites and to
better understand local community and northern region dependence on medicinal plants for human and
livestock health care. This information would provide input to the national and northern savanna databases
and priority setting for in-situ conservation and ex-situ conservation and cultivation activities.

Under all the above sub-components the project would fund expenses for:

* civil works for the construction/rehabilitation of ranger field stations in protected areas, park/reserve boundary
demarcation and maintenance, fire belt construction and maintenance, fire observation posts;
* goods including communications equipment, office equipment (e.g., computers, printers, fax, etc), vehicles, motor
cycles, bicycles, field implements (e.g., navigational and survey tools, clothing, cutlasses, etc); laboratory
equipment and chemicals (e.g., autoclave, analytic balance, incubators, luminar flow hood, reagents and chemicals,
portable fume chamber, microcentrifuge);
* consultant services – domestic and international consultants in the areas of protected areas management, terrestrial
ecology, biological and socio-economic surveys, fire prevention and control, anti-poaching operations, boundary
survey, remote sensing, community education and awareness, training, women issues;
* the establishment of pilot farmer-based cultivation/agronomic trials outside of reserve and protected areas would
utilize farmer knowledge to ensure a sustainable supply of medicinal plants and/or parts;
* training – community training and awareness activities, professional development for park/reserve management
staff, on-site ranger/community training programs, local community leaders training and workshops;

1 Traditional healers in rural areas seldom derive income from healthcare practices, their primary source of
livelihood is farming.
• incremental salaries and allowances – for community animators/contracting, contract staff, traveling responsible agencies staff;
• incremental operating costs – for field equipment and facilities maintenance, operation of vehicles, office equipment, etc..

Expected outputs for this component are:

(a) The formulation five-year site-specific management plans for the pilot forest and wildlife reserves; the management plans would be community-based and would address biological and human dimensions of resource use and conservation within protected areas and in the fringing communities;

(b) strengthened capacity of the responsible agencies and local communities to manage the pilot areas through professional development and community training;

(c) identification of sustainable cultivation methods for threatened and high-demand medicinal plant species with possibilities for improving through selective breeding their genetic basis without compromising their pharmacopeal properties;

(d) reduction in the incidences and magnitudes of the annual bushfires and their effects on the protected areas and fringing areas and communities, reduction in unsustainable and illegal harvesting of biological resources (especially wildlife) through activities such as group hunting;

(e) official recognition of the importance and establishment of two biodiversity corridors of regional/international/global significance linking faunal populations and reserves in Burkina Faso, Ghana, and Togo.

**Project Component 4: Community-Based Management Actions (US$2.40 million)**

The objective of this component is to collaboratively develop, test and replicate proactive measures which actively involve local communities more directly in the planning and management of northern savanna wildlife and forest reserves. The component would support the development of guidelines for community-based resource management action plans to encourage sustainable use of savanna resources. This component would address the development of community based initiatives directed at reducing pressure on the biological resources of wildlife and forest reserves, and enhancing management of off-reserve resources.

Communities adjacent to the reserves rely on the resources of these protected areas for daily subsistence needs. Experience from around the world indicates that conservation activities could be jeopardized in the long term as population increases if the economic needs of adjacent communities are not addressed as an integral part of conservation activities. Conversely, the CAMPFIRE program in Zimbabwe offers a means of sustainably harvesting wild animals in communal areas, for the benefit of local communities, where income receipts accrue to participating households. These communities now perceive wildlife as an asset with value and not merely posing a threat to life, crops and domestic livestock. The adaptation of the CAMPFIRE approach and the recognition of traditional leadership structures in the proposed project should catalyse the conservation and sustainable use of threatened plants by local communities. This component is included as a proactive measure to test ways to address community livelihood problems, disaggregated in gender terms, before they become an impediment to the conservation of biodiversity. Such an activity would include identifying guidelines for the sustainable harvesting of medicinal plants that can not be propagated ex-situ. Traditional values that include rules and regulations that forbid the cutting of fruit trees and other “sacred” tree species for uses such as fuelwood and construction will assist in the sustainable use of wild medicinal plant species.

The component would also support in-depth natural resource and socio-economic assessments of communities living in and around the reserves aimed at providing information on current livelihood practices, resource use patterns, cultural values, and other socio-economic conditions in selected communities. The component would also assist communities within and around reserves to develop village and community activities that complement conservation efforts and that could be funded through the Project.
Another activity supported would be ex-situ conservation and cultivation of medicinal plant species by communities including establishment of community reserves in priority areas. Home gardens maintained by women are the primary source of high-demand species as they are the first source of healthcare in the rural communities. Within a community the micro-environments of home gardens and selected agricultural sites contain high levels of species: medicinal, herbs, spices and farmer crop varieties of health and nutritional value. The home gardens are also points of experimentation, introduction of new varieties and/or species and genetic diversity as a result of plant (germplasm) exchange and supported by social-cultural diversity. TBAs are also major contributors to and users of home garden medicinal plants. The project would build upon existing gender knowledge by documenting species and proposing ways to address sustainability concerns within conservation, management and sustainable use components. The project would also support the protection of sacred groves which serve as sources of medicinal plants and help to conserve biodiversity.

The wealth of traditional knowledge and innovation on medicinal plants and their use by THs and TBAs over time is not recognized and appropriately rewarded under under existing Ghanaian patent regimes. The project will support efforts to develop and promulgate a sui generis system of Intellectual Property Rights (IPR) governing the value of indigenous knowledge and innovation, and the collection of biological resources and the sharing of equitable benefits with healers, birth attendants and local communities.

The project would support education and mass awareness campaigns of the relevance of conservation, management and sustainable use programs and the importance of Ghana's biodiversity. Radio broadcasts and videos extolling the value of good community-based management practices would be developed in collaboration with community chiefs, healers, NGOs, and relevant government ministries and agencies. The diversity of local cultures and languages would be recognized.

Items to be financed under this component include:

- rehabilitation of small community infrastructure identified during community planning process;
- purchase of goods including vehicles, motor cycles bicycles, office furniture, equipment, computers;
- payment for consultant services, domestic and international, PRA Techniques, anthropological surveys, resource assessments, community resource management, rural development;
- workshops that will provide new learning environment for healers, communities, researchers and government to establish an IPR policy framework that strengthens rural societies, with a practical recognition of their role in conservation and development;
- on-site staff training and awareness for SRMC, District Assemblies, and local community personnel, participation in national and international workshops;
- community development projects for initiatives such as small scale community infrastructure, alternative livelihood proposals, community resource management plans, identified by the villages and communities themselves;
- salaries and allowances for contract and temporary incremental staff;
- incremental operating costs -- for operations of vehicles, office consumables, publications, expendable materials, equipment and facilities maintenance and operations;

Key outputs would be: (i) strengthened capacity of MLF and SRMC, collaborating ministries, District Assemblies, THAs, and local communities to facilitate community development initiatives; (ii) methodologies/guidelines for developing community-based resource management action plans and for involving communities in reserve protection and management; (iii) increased community willingness to participate in initiatives which further reserve management objectives; (iv) establishment of a zoning system in pilot areas which guides land use within and adjacent to the park; (5) evaluation of incentive systems and livelihood alternatives which complement biodiversity protection and management initiatives.

Project Component 5: Project Management, Monitoring and Evaluation (US$0.60 million)

This component would establish a rigorous project management and administrative system to support all aspects of project planning, implementation and coordination. The project would support the establishment of a Project Management Coordinating Unit (PMCU) and contracting of the PMCU Biodiversity Coordinator for the duration of the project. The PMCU would be responsible for day to day
management of the project including work program planning, coordination and harmonization with other stakeholders, activities and programs. The project would provide the necessary facilities to ensure effective running of the PMCU.

The Project Biodiversity Coordinator (PC) would implement a systematic and detailed monitoring and reporting system focusing on both the output and outcome of the project. The system should allow an effective evaluation of: (i) the effectiveness of the project’s delivery mechanisms and procedures; (ii) the impact of the field activities on the basis of stated objectives, and input, output and impact indicators identified in the Project Design Summary (Annex 1); and (iii) the replication of the in-situ and ex-situ activities at a wider regional scale. The progress towards project outcomes would be evaluated during project supervision and an in-depth review 18 months after the project becomes effective; followed by a mid-term Review at the 36 month stage. The in-depth review after 18 months would determine the extent to which the project is performing vis-à-vis its development objectives. The Mid-Term Review at the 36 month stage would determine the status of the project regarding achievement of objectives at the completion date (72 months). An Implementation Completion Report would be prepared at least six months prior to final disbursement of the Grant. The Government would prepare its own evaluation of the project.

Expenses funded under this component would include:

- rehabilitation of office facilities in SRMC in Tamale;
- consultant services, domestic and international, in the areas of project management, accounting, performance M&E, auditing, procurement;
- purchase of goods including vehicle(s), office equipment;
- incremental operating costs for office consumables, equipment and facilities maintenance, domestic and other travel; and
- salaries and allowances for incremental contract and temporary staff, allowances for MLF and other government agencies staff working on the project.

Key outputs are: (i) improved capacity of PMCU to prepare annual work plans that are clear, realistic and monitorable; (ii) timely and adequate flows of financial resources to support all project activities; (iii) improved capacity of MLF to manage programs of international donors independently; and (iv) enhanced ability to monitor project performance.

### Project Design Summary

**Ghana: Northern Savanna Biodiversity Conservation Project**

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<tr>
<th>Objectives Summary</th>
<th>Key Performance Indicators</th>
<th>Monitoring and Evaluation</th>
<th>Critical Assumptions/Risks</th>
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<td><strong>C&amp;I Goal</strong>: Poverty alleviation through environmentally and socially sustainable economic growth.</td>
<td>Reduction on level of poverty in the savanna zone based on project activities.</td>
<td>M&amp;E component of the project.</td>
<td>(Goal to Bank Mission) Improved management of biodiversity and enhanced sustainable social and economic development through improvement in livelihoods and health.</td>
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<tr>
<td><strong>Sector-related C&amp;I Goal</strong>: Improvement in healthcare, environment and economic livelihood of northern savanna zone.</td>
<td>Improved healthcare and livelihood systems through biodiversity conservation and sustainable use of resources.</td>
<td>Government publications.</td>
<td></td>
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<tr>
<td><strong>GEF Operational Program Goal</strong>: Assessment and conservation of globally significant biodiversity in northern savanna zone.</td>
<td>In-situ conservation and management in the protected savanna forests and surrounding habitats</td>
<td>MLF/SRMP report.</td>
<td></td>
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<tr>
<td><strong>Project Development Objective</strong>: Improve environment, livelihood and health of communities in the northern savanna zone through conservation and sustainable use of natural resources including medicinal plants.</td>
<td>Policy framework developed based on improved capacity in the region. Improved biodiversity management plans in the Savanna Zone and appropriate and effective</td>
<td>Policy documents</td>
<td>GoG commitment to conservation, management and sustainable utilization remains strong.</td>
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<td></td>
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<td>Published reports and plans</td>
<td>Local authorities and</td>
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Northern Savanna Biodiversity Conservation Project
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<tr>
<th>Conservation measures involving communities and adopted by communities.</th>
<th>Baseline surveys, monitoring reports.</th>
<th>Communities cooperate and adopt support activities.</th>
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<td>Increased awareness of biodiversity issues and maintenance of plant and crop gene banks by communities.</td>
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**Project Global Objectives:**
- Identify, monitor, conserve key components of globally significant biodiversity in the northern savanna zone through ecosystem management, conservation and management policies, identifying endemic species habitats for protection, preservation of medicinal plants resources and knowledge, and maintaining cultivation of farm crops.
- Baseline surveys, monitoring reports.
- Number of communities effectively involved in propagation of important indigenous crops and medicinal plants.
- Enhanced security of natural habitats.

**Component Outputs:**

1. **Formulating Policy Framework**
   - a. Specific policy/strategies for northern savanna biodiversity conservation and management including bioprospecting and biosafety/quality formulated.
   - Specific policy/strategies and guidelines developed by end PY02 and implemented by end PY04.
   - As above.
   - Project supervision reports.

2. **Capacity Building**
   - a. MLF, MOH, MEST, GHATRAM, SRMC, regional and district level governments and communities capacity for implementing project activities strengthened and institutional collaboration established.
   - Institutional assessment conducted and training needs identified by end PY01; training completed by end PY02 and assessment by end PY04.
   - Institutional assessment conducted and training needs identified by PY01;
   - Training completed by PY02; assessment of status by end PY02; biodiversity component integrated into SRMC and fully operational under SRMC management by end PY02.
   - Functioning database and monitoring system. Training of staff completed by end PY01.
   - Implementation completion report.
   - Project supervision reports.
   - Resources are provided in timely manner.
   - MOH fully supports Directorate strengthening.

   b. Biodiversity component integrated into SRMP and fully operational and management procedures under SRMC established.
   - Project supervision reports.

   c. GIS database established identifying and documenting biodiversity including: medicinal plants, and farm crop varieties.
   - MOH fully supports Directorate strengthening.

   d. Traditional Medicine Directorate capacity for implementing activities strengthened and institutional collaboration established.
   - Monitoring reports and relevant data generation.
3. **Biodiversity Conservation, Research and Development**
   
a. Detailed socio-economic and biological surveys and zoning conducted for 10 forest, 3 wildlife reserves and adjacent lands.

b. Region and community biodiversity management plan for 10 forest, 3 wildlife reserves and adjacent lands developed and implemented.

c. Endemic species and "hotspots" identified in the northern savanna zone and priority areas located.

d. 3-5 pilot areas identified for each of the following:
   - restoration of degraded lands;
   - medicinal plant cultivation;
   - bush fire control.

e. Strategies for protection and cultivation of indigenous crop varieties and husbandry of threatened indigenous livestock species developed.

f. Field gene banks and strategies for sustainable production of threatened agro-biodiversity (indigenous crop varieties) and medicinal plant species developed.

4. **Community-based Management Actions**
   
a. Guidelines for community-based resource management action plans to encourage sustainable use of savanna resources, including harvesting regulations for medicinal plants developed.

b. *Ex-situ* community led pilot cultivation trials of threatened medicinal plants used in human and livestock healthcare initiated.

c. Community-based education and mass awareness campaigns publicizing value of biodiversity and medicinal plant species conservation and management implemented.

5. **Project Management, Monitoring and Evaluation**
   
a. Project Management operational and fully integrated into SRMC.

<table>
<thead>
<tr>
<th>Institutional assessment conducted and training needs identified by PY01.</th>
<th>Training completed by PY02 and assessment of status by end PY02.</th>
<th>Project supervision reports and MOH progress reports.</th>
<th>Implementation completion reports.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveys completed by end PY02.</td>
<td>Baseline survey and SRMC progress report.</td>
<td>SRMC reports.</td>
<td>Communities would not encroach on forest and wildlife reserves and would collaborate in achieving sustainable management objective.</td>
</tr>
<tr>
<td>Management plans for 10 forests, 3 wildlife reserves and adjacent lands(including 2 corridors) developed and adopted by PY03.</td>
<td>SRMC reports.</td>
<td>SRMC reports.</td>
<td>Local communities capable and willing to implement agreed activities.</td>
</tr>
<tr>
<td>Surveys completed by end PY02.</td>
<td>Project supervision and SRMC reports.</td>
<td>Project supervision and SRMC reports.</td>
<td>Willingness of stakeholders to actively participate in implementing activities on the ground.</td>
</tr>
<tr>
<td>Pilot area guidelines established by PY02 and implemented by PY03.</td>
<td>Strategies developed by end PY02.</td>
<td>Project supervision reports and SRMC reports.</td>
<td>Communities can provide early warning impact on species before changes in numbers become apparent.</td>
</tr>
<tr>
<td>Field gene banks established and strategies implemented by end PY02.</td>
<td>Number of farmers with field gene banks registered.</td>
<td>Project supervision reports and SRMC reports.</td>
<td>Public interest and support of communities; commitment to sustainable resource use/conservation activities.</td>
</tr>
</tbody>
</table>

| Action plans implemented by PY01. | Guideline documents published by the SRMC. | Project supervision reports and PMCU reports. | Commitment by MLF to support PMCU and implement |
b. Biodiversity project monitoring and evaluation system developed and implemented. 

- Monitoring and evaluation system fully integrated into SRMC by end PY01.

Project supervision reports. Availability of counterpart staff.

<table>
<thead>
<tr>
<th>Project Components/ Subcomponents</th>
<th>Inputs (budget for each component including contingencies)</th>
<th>Timely and adequate counterpart funds maintained.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Strengthening the Policy Framework</td>
<td>US$ 0.5 million</td>
<td>Disbursement reports.</td>
</tr>
<tr>
<td>2. Capacity-building</td>
<td>US$ 0.8 million</td>
<td>Annual audit reports.</td>
</tr>
<tr>
<td>3. Collaborative Biodiversity Conservation, Research and Development</td>
<td>US$ 3.3 million</td>
<td>Quarterly financial reports</td>
</tr>
<tr>
<td>4. Community-based Management Actions</td>
<td>US$ 2.4 million</td>
<td></td>
</tr>
<tr>
<td>5. Project Management, and Monitoring and Evaluation</td>
<td>US$ 0.6 million</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX III

REVIEW OF ENVIRONMENTAL POLICIES, LEGISLATION AND INSTITUTIONAL ARRANGEMENTS

Environmental Policy
The Environmental Policy stresses on the principles of:

Optimum sustainable yield in the use of resources and ecosystems
Delegation of decision-making and action to the most appropriate level
Public participation.

The objectives of the environmental policy are:

ensure reconciliation between and natural resource utilisation and conservation
maintenance of ecosystem and ecological processes
ensure sound management of natural resources and environment
protect human, animals, plants biological communities and habitats against harmful impacts and destructive practices.

The policy is being implemented through actions of

sound management of renewable resources
creation of awareness
development of procedures for utilisation of land resources

Forest and Wildlife Policy
The Forest and Wildlife policy of 1994 emphasises the principles of:

right of people to access natural resource
wise use
incorporate traditional methods of resource management
appropriate and efficient land use
develop decentralised participatory democracy involving local people
The relevant objectives of this policy to the project are:

- conservation and sustainable development of forest and wildlife resources for maintenance of environmental quality.
- enhance forest and wildlife resource through conservation of biodiversity.
- promote public awareness and involvement of rural people and development of capability at national, regional and district levels for sustainable forest and wildlife resources.

**The National Land Policy**

The National Land Policy, adopted in 1999, aims at protecting the variety of habitat types. The policy categorically states that "all lands declared as forest reserves, strict game reserves, national parks, wildlife and similar land categories are fully protected for ecosystem maintenance and biodiversity conservation".

Thus the legal framework exists for the implementation of the project.

**Rights to Resources**

Land usually belongs to a division of paramountcy within an ethnic group. It is either divided into stool/skin lands and family lands, or clan lands depending on the social structure of the people. Rights are normally for land use and not for sale of land. Security of tenure of land is based on the continual working on the land in addition to the rendering of all necessary customary services to the stool or family that owns the land.

**Lands in Reserves**

All lands in Forest Reserves are vested in the President in trust for the stools / skins. The President has the right "to execute any deed or do any act as trustee". However, any revenue derived from land and these vested rights must be placed into a Stool Land Account "for the benefit of people in the areas in which particular lands are situated" (Act 123. 17, 20). Thus the beneficiary rights remain with the traditional owners (Rosenthal, S. 1997).
Lands outside Reserves

Outside reserves the rights to timber and trees are also vested in the Government, in trust for owners. In 1994 the then Forestry Department was given responsibility for the control of off-reserve felling of trees. Timber concessions are used to grant timber harvesting rights both in and off-reserves.

NSBCP and NLP

The NSBCP, which aims at biodiversity conservation, research and development would support:

the development of systems for resources management.
Protected areas and boundary demarcations and biodiversity conservation
Improved land management and restoration of degraded land and sustainability of medicinal plant resources

Are all in line with the National Land Policy and there are no gaps between policy and project activities and conforms to World Bank guidelines.

The NSBCP would "Promote community participation and public awareness at all levels in sustainable land management and development practices to ensure the highest and best use of land and thereby guarantee optimum returns on land" (NLP, 1999)

The NLP provides for the creation of protected areas and boundary demarcation and biodiversity conservation under "ensuring sustainable land use (b) "all lands declared as forest reserve, strict nature reserves, national parks, wildlife sanctuaries and similar land categories constitute Ghana's permanent forest and wildlife estates and are 'fully protected' for ecosystem maintenance, biodiversity conservation and sustainable timber production"

Under enhancing land capability and land conservation, the policy provides that "any land with potential for ecosystem maintenance, biodiversity or scenic beauty preservation may be declared a protected area by the government through consultation and negotiation with"
the land owners and subject to the payment of annual rent as compensation. Management of such areas shall be by the collaborative effort of the government and the community."

**The Land Policy advocates:**
land as a common national or common property resource held in trust for people.
optimum usage for all types of land uses and,
community participation in land management and land development at all levels.

The objectives of the policy are to ensure:

judicious use of the nation's land and its natural resource by all sections of the society.
socio-economic activity consistent with sound land use
ensure payment within reasonable time of fair and adequate compensation
promote community participation and public awareness at all levels in sustainable land management and in development practices.

The actions through which principles and objectives would be translated are:

security of tenure and protection of land rights based on natural resources, conservation of land for future generation and protection of land rights of the present generation.
ensuring sustainable land use and
enhanced land capability and land conservation.

The common elements of these policy documents are wise use of natural resource, public participation, community-based management and importance of indigenous knowledge.

**Legislation**
There are a number of legislation relevant to conservation and sustainable use of biodiversity. These are reviewed below.

Traditional Medicine Practice Act
A Traditional Medicine Practices Act, Act 575, 2000 has been passed to integrate traditional health services into the national healthcare system and regulate the practice of
traditional medicine. The Act recognises the potential role of traditional medicine in primary healthcare especially poor rural and urban communities. A traditional Medicine Directorate has also been established to translate the Act into practice.

**Environmental Assessment L.I**
The Environmental Assessment Regulations, Legislative Instrument (LI) 1652 has certain aspect relevant to the project. Under Schedule 1 of the regulations which covers undertakings requiring registration and environmental permit, two activities under forest services has to be registered. These are introduction of exotic species of animals, plants or microbial agents and establishment of forests in previously forested and un forested areas.

For undertakings for which environmental impact assessment (EIA) is mandatory there are two aspects which has relevance for the project.

These are in the area of agriculture and environmental conservation and management. The undertaking, which qualify under agriculture, are programmes necessitating the resettlement of 20 families or more. In this wise if the village of Gbele in the game reserve is to be relocated and the number of families exceed this number them EIA would be required. In the area of environmental conservation and management activities requiring EIA are:

- wildlife conservation and management
- forest conservation and management
- watershed conservation and management
- commercial exploitation of fauna and flora

Under Schedule 5 of the regulations covering environmentally sensitive areas, any activity, which falls under any of the following areas, EIA would be required:

- areas declared by law as national parks, watershed reserves, wildlife reserves and sanctuaries including sacred groves.
- areas with potential tourist value
areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna)
areas prone to bushfires and
areas of unique historic, archaeological or scientific interests.

**Wild Life Legislation**
The principal legislation governing wildlife conservation is the Wildlife Animals Preservation Act, 1961 (Act 43) under which wildlife protection areas are created. Two regulations have been passed under the Act. These are the Wildlife Conservation Regulations, 1971 (LI 685) subsequently amended LI 1284 of 1983 and LI 1352 of 1988 and the Wildlife Reserves Regulations 1971 (LI 710).

**Wildlife Conservation Regulation**
The Wildlife Conservation Regulations, 1971 (LI 685) provided an instrument for translating new attitudes into legislation. This regulation deals with the system of permits and certificates required for regulating international trade in endangered wildlife species under the convention on International Trade in Endangered species of Wild Fauna and Flora, 1973 (CITES) which Ghana has acceded to. It provides degrees of protection to named wild animal species, thus enabling endangered species to be legally protected, regulate the hunting, capture and destruction of wild animals, and control the export of animals (living or dead) and parts of animals (trophies) in commercial quantities.

**Wildlife Reserves Regulations**
The Wildlife Reserves Regulations, 1971 (LI 710) deals with establishment of Wildlife Reserves by name and boundary description. The establishment of wildlife reserves has involved acquisition by the state with consequent payment of compensation to the land and resource owners. The non-payment of compensation in certain cases has led to some communities still residing in reserves like Gbelle Wildlife Reserve, which is a candidate pilot community under the project. The wildlife law places emphasis on wild animals to the relative neglect of endangered wild plants. This has to be balanced by the project.
**Land Planning and Soil Conservation (Amendment) Act**

The Land Planning and Soil Conservation (Amendment) Act 35, was passed in 1957. This Act has not been repealed but it is not being applied. The purpose of the Act was to improve the utilisation of lands in designated areas through land planning and soil conservation.

The Act has provisions for preservation, reclaiming of land and for the protection of natural resources. The Act was to be implemented through the establishment of committees in designated areas for land planning and soil conservation. These committees were to be established by the Minister of Agriculture.

The committees were to have the power to protect sources of water, control of water, prevention and mitigation of erosion, reclamation of land and utilisation of swampland. They also have powers to transfer any farmer from an area which was exhausted or inadequate. The Minister has power under the Act to regulate grazing uses, watering, livestock uses as well as provisions in relation to burning, clearing and destruction of vegetation.

The Act was for some time implemented in the northern and upper regions in seven towns designated as planning areas; Damongo, Dedoro, Wiaga, Frafra, Selo-Tuni, Bumbugu and Tamne.

In these areas land planning measures included watershed protection, forest reservation, dam construction, sinking of wells, fencing and reseeding of grazing areas, construction of roads, planting of fuelwood lots and development of irrigation systems. One of the main reasons for the failure of the project was attributed to exclusion of the local communities during their implementation. Government departments undertook the projects backed by force.

It seems to have ended abruptly around 1960 when conservation factor was vested in the irrigation authorities. With increased emphasis on irrigation, land planning was over looked.

International Policies
Apart from these national policies, Ghana is signatory to a number of international conventions and agreements related to the environment by the ratification of these conventions, Ghana has endorsed certain international principles. Some of these conventions are the Rio Declaration, the African Convention on Wildlife Conservation, Convention on International Trade in Endangered Species (CITES), Biodiversity, Deserification, Ramsar Sites, Climate Change among other things.

**Rio Declaration**

The Rio Declaration of 1992 is a non-legally binding statement of forest principles. It recognised the need to conserve, manage and sustainably develop all type of forests as well as recognising the sovereign rights of nations to utilise their forest.

As a signatory to the Convention on Biodiversity of 1993, Ghana has accepted that biotic wealth is the basis of life and livelihood and that greater efforts are required to protect, understand and wisely use the earth's biodiversity. Under the terms of the Convention, each country is responsible for developing a strategy for the conservation of its natural biological diversity. A central requirement is the strengthening of protected areas and calls upon nations to "identify national and international priorities for strengthening protected areas and enhancing their role in biodiversity conservation." Ghana in fulfilment of the requirements of the convention, has prepared a National Biodiversity and Action Plan to determine the future direction of biodiversity management in the country. The plan focuses on improving the scientific knowledge in Ghana, and the identification of potential threats and how these could be controlled.

**Convention on Desertification**

Ghana is also signatory to the Convention on Desertification. A National Committee on Desertification has been constituted and a National Action Plan (NAP) on Desertification is under preparation. The NAP is to transform the provisions of the convention on desertification into concrete actions and measures to combat desertification and mitigate the effects of drought.
**Ramsar Site Convention**

The Ramsar Site Convention is intended to identify and protect wetlands of international importance, particularly those that are required habitat for migrating bird species. Ghana is a signatory to the Convention. To date Ghana has designated six wetland protected areas, five on the coastal zone, one in the high forest zone and none in the northern guinea savanna.
### APPENDIX IV

**THREATENED WILDLIFE SPECIES OF GHANA**

<table>
<thead>
<tr>
<th>THREATENED SPECIES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Large Mammals</strong></td>
<td></td>
</tr>
<tr>
<td>Elephant</td>
<td>Ghana's elephant population is generally classified as Vulnerable, though elephants within the forest zone are classified as Endangered. An estimated for both species together has ranged between 1,500 and 3,500</td>
</tr>
<tr>
<td>Leopard</td>
<td>The leopard is widely distributed in Ghana occurring in all vegetation zones and has been recorded in 12 of the 15 GWD protected areas.</td>
</tr>
<tr>
<td>Manatee</td>
<td>The West African manatee is considered to be Vulnerable. The species is threatened by hunting and incidental capture in fishing nets.</td>
</tr>
<tr>
<td>Ogilby’s duiker</td>
<td>The species is listed Vulnerable and has a restricted recorded distribution in Ghana.</td>
</tr>
<tr>
<td>Red-fronted gazelle</td>
<td>The species is Vulnerable and has been recorded in northern Ghana which is the southern limit of the species range.</td>
</tr>
<tr>
<td>Bongo</td>
<td>The species is globally endangered. The Nini-Suhien national Park and Ankasa Resource Reserve support strong population.</td>
</tr>
<tr>
<td><strong>Primates</strong></td>
<td></td>
</tr>
<tr>
<td>Diana Monkey</td>
<td>This species is listed as Vulnerable but is considered to be one of the most threatened in Africa.</td>
</tr>
<tr>
<td>Red Colobus</td>
<td>The species is listed as Vulnerable and threatened by habitat loss, logging and intensive hunting.</td>
</tr>
<tr>
<td>Olive Colobus</td>
<td>The species is listed as Rare throughout its entire</td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Chimpanzee</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Mangabey</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
</tr>
<tr>
<td>White-breasted Guineafowl</td>
<td>Endangered</td>
</tr>
<tr>
<td>Yellow-footed Honeyguide</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Olive Greenbul</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>White-Necked Picathartes</td>
<td>Vulnerable</td>
</tr>
<tr>
<td>Fishing owl</td>
<td>Rare</td>
</tr>
</tbody>
</table>
four records from Ghana. It likely occurs along the large rivers in the Western Regions.

<table>
<thead>
<tr>
<th>Reptiles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marine turtles</strong></td>
</tr>
<tr>
<td>Five species of marine turtles are known from Ghana’s coastal waters. These include: loggerheads turtle, green turtle, Atlantic ridley, hawksbill turtle and leatherback turtle. There is very little reliable information on the status of these species.</td>
</tr>
<tr>
<td>SITE</td>
</tr>
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<tr>
<td>Keni - Goni</td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Nuale</td>
</tr>
<tr>
<td>Naha</td>
</tr>
<tr>
<td>Ambala</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Kulpaw Tributaries</td>
</tr>
<tr>
<td>Kulpaw</td>
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<tr>
<td></td>
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<tr>
<td>Mawbia</td>
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<tr>
<td></td>
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<tr>
<td>Sisili</td>
</tr>
<tr>
<td>Central</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Location</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Red Volta East/West</td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Morago Bawku East</td>
</tr>
</tbody>
</table>

F, L, T = Subsistence farming: - cultivation of yam, maize, millet, sorghum, cotton, livestock raising, and trading.
(Compiled from Ghana 1984 Population Census by applying the regional growth rates of the 2000 Population and Housing Census-Northern Region 2.9, Upper East 1.1 and Upper West 1.7).
APPENDIX VI. IMPACT ANALYSIS MATRIX

Impact Analysis Matrix for Formulation of a Policy Framework Component

<table>
<thead>
<tr>
<th>Environmental Parameters</th>
<th>Policy for Northern Savanna Biodiversity Conservation and Management</th>
<th>Intellectual Property Rights (IPR) Policy and Guidelines for sharing indigenous knowledge</th>
<th>Strengthening Institutional Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Potential Ecological Implications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Effect on ecological integrity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ii. Effect on productive systems</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iii. Effect on conservation areas</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iv. Effect on biodiversity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>B. Potential Implication for Natural Resource</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Management of natural resources</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ii. Maintenance of natural resources base</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iii. Wise use of natural resources</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iv. Enhanced plant/animal disease situation</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>v. Compatibility with defined environmental goals</td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>C. Potential Socio-economic/Health Implications</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>i. Resettlement of people/communities</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ii. Traditional agricultural values and practices</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>iii. Social conflict</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>iv. Social values/acceptability</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>v. Effect on essential life support systems</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>vi. Effect on quality of life</td>
<td>0</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>vii. Effect on public health and safety</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>viii. Improvement of price of agric products</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>ix. Enhancement of community benefits</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>x. Reasonable apportionment of cost and benefits</td>
<td>0</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>xi. Reasonable apportionment of inter-generational equity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>xii. Gender sensitivity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

+ Perceived impact beneficial | - Perceived significant adverse impact | 0 No perceived significant impact or impact largely residual
## Impact Matrix for Capacity Building Component

<table>
<thead>
<tr>
<th>Environmental Parameters</th>
<th>Review of Existing Organisational, Operational Policies &amp; management Systems</th>
<th>Professional Development Leadership &amp; Range Training</th>
<th>Development of Data, Inventory and Monitoring Information Systems to support Natural Resources Management</th>
<th>Development of People - Sensitive participatory Protected Areas Management Planning Guidelines</th>
<th>Public Awareness &amp; Education Programmes related to Park Management</th>
<th>Animating the formation of village - based conservation &amp; Management Committees</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Potential Ecological Implications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Effect on ecological integrity</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ii. Effect on productive systems</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iii. Effect on conservation areas</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iv. Effect on biodiversity</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>B. Potential Implication for Natural Resource</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Management of natural resources</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>ii. Maintenance of natural resources base</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iii. Wise use of natural resources</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>iv. Enhanced plant/animal disease situation</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>v. Compatibility with defined environmental goals</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>C. Potential Socio-economic/Health Implications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Resettlement of</td>
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Perceived impact beneficial - Perceived significant adverse impact 0 No perceived significant impact or impact largely residual
### Impact Analysis Matrix for Biodiversity conservation, Research and Development

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<tr>
<th>Environmental Parameters</th>
<th>Developing Systems for Resources Management</th>
<th>Protected Area and Boundary Demarcation and Conservation</th>
<th>Improved Land Management</th>
<th>Sustaining Biodiversity</th>
<th>Sustaining Medicinal Plant Resources</th>
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<td><strong>B. Potential Implication for Natural Resource</strong></td>
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<td>ii. Maintenance of natural resources base</td>
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<td><strong>C. Potential Socio-economic/Health Implications</strong></td>
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<td><strong>+ Perceived impact beneficial</strong></td>
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Impact Analysis Matrix for Community-Based Management Actions

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<tr>
<th>Environmental Parameters</th>
<th>Field Genebanks and Sustainable Production of threatened agro-biodiversity &amp; Medicinal Species</th>
<th>Guidelines for Community Based Resource Management Activities for Sustainable use of Savanna Resources</th>
<th>Pilot Cultivation trials of threatened Medicinal Plants for Human &amp; Livestock Healthcare</th>
<th>Education and mass Awareness Campaigns on Conservation, and Sustainable use Management</th>
<th>Gender &amp; Socio-economic</th>
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5. Analysis Matrix for Project Management, Monitoring and Evaluation

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<th>Biodiversity Project Monitoring &amp; Evaluation System</th>
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