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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
AFD	French Development Agency
ASM	Artisanal and Small-Scale Mining
CAADP	Comprehensive Africa Agriculture Development Programme
CCA	Climate Change Adaptation
CCM	Climate Change Mitigation
CEIA	Centre for Environmental Impact Analysis
CEMC	Community Environmental Management Committee
CEN	Compliance and Enforcement Network
CEP	Country Environmental Profile
CIDA	Canadian International Development Agency
CPA	Community Protected Area
CSO	Civil Society Organisation
CSP	Country Strategy Paper
CWSA	Community Water and Sanitation Agency
DANIDA	Danish International Development Agency
DEMC	District Environmental Management Committee
DFID	(UK) Department for International Development
DMTP	District Medium Term Plan
DP	Development Partner
DRR	Disaster Risk Reduction
EA	Environmental Assessment
ECOWAS	Economic Community of West African States
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ENR	Environmental and Natural Resources
ENRAC	Environmental and Natural Resources Advisory Committee
EPA	Environmental Protection Agency
ERCN	Energy Research Centre of the Netherlands
EU	European Union
EUD	European Union Delegation
EWS	Early Warning Systems
FARA	Forum for Agricultural Research in Africa
FASDEP	Food and Agriculture Sector Development Policy
FCPF	Forest Carbon Partnership Facility
FIP	Forest Investment Programme
FLEGT	Forest Law Enforcement, Governance and Trade
GBS	General Budget Support
GCM	General Circulation Model
GDP	Gross Domestic Product
(G) EITI	Ghana Extractive Industries Transparency Initiative
GERMP	Ghana Environment Resources Management Project
GHG	Greenhouse Gas
GIRAF	Governance Initiative for Rights and Accountability in Forest Management
GMA	Ghana Meteorological Agency
GoG	Government of the Republic of Ghana

GSBA	Globally Significant Biodiversity Area
GSGDA	Ghana Shared Growth and Development Agenda
Ha	Hectare
IFAD	International Fund for Agricultural Development
IIED	International Institute for Environment and Development
INC	Initial National Communication
ISSER	Institute of Statistical, Social and Economic Research
JAR	The EU-Ghana Joint Annual Review
JICA	Japan International Cooperation Agency
KASA	"speak out"
KHFR	Krokosua Hill Forest Reserve
KITE	Kumasi Institute of Technology and Environment
KVIPL	Kumasi Ventilated Improved Pit Latrine
LAP (1 & 2)	Land Administration Project
LCDS	Low Carbon Development Strategy
LCG	Low Carbon Growth
LCO	Light Crude Oil
LEDS	Low Emissions Development Strategy
LULUCF	Land Use, Land Use Change and Forestry
MDA	Ministries, Departments and Agencies
MDBS	Multi-Donor Budgetary Support
MDG	Millennium Development Goal
MEA	Multilateral Environmental Agreement
MEST	Ministry of Environment, Science and Technology
METASIP	Medium Term Agriculture Sector Investment Plan
MIC	Middle Income Country
MLNR	Ministry of Lands and Natural Resources
MMDA	Metropolitan, Municipal and District Assemblies
MoEN	Ministry of Energy
MOFA	Ministry of Food and Agriculture
MOFEP	Ministry of Finance and Economic Planning
MoM	Minutes of Meeting
MRV	Measurement, Reporting and Verification
MSSP	Mining Sector Support Programme
MTDPF	Medium Term Development Policy Framework
MTEF	Medium Term Expenditure Framework
MWRWH	Ministry of Water Resources, Works and Housing
NADMO	National Disaster Management Organisation
NAMA	Nationally Appropriate Mitigation Action
NBSSI	National Board for Small Scale Industries
NCCAS	National Climate Change Adaptation Strategy
NCCC	National Climate Change Committee
NCCPF	National Climate Change Policy Framework
NDPC	National Development Planning Commission
NEA	National Environmental Assessment
NEAP	National Environmental Action Plan
NEEDS	National Environmental, Economic and Development Study
NEP	National Environmental Policy
NEPAD	New Partnership for Africa's Development
NESSAP	National Environmental Sanitation Strategy and Action Plan

NGO	Non-Governmental Organisation
NIP	National Indicative Programme
NORAD	Norwegian Agency for Development Cooperation
NREG	Natural Resources and Environmental Governance
OHCS	Office of the Head of Civil Service
ORA	Off-Reserve Area
PA	Protected Areas
PaMs	Policies and Measures
PADP	Protected Area Development Programme
POP	Persistent Organic Pollutant
PPME	Policy, Planning, Monitoring, and Evaluation
REDD	Reducing Emissions from Deforestation and Forest Degradation
R-PP	Readiness Preparation Plan
SADA	Savannah Accelerated Development Authority
SBS	Sector Budget Support
SDAP	Sustainable Development Action Plan
SMTDP	Sector Medium Term Development Plan
SEA	Strategic Environmental Assessment
SLM	Sustainable Land Management
SLEM	Sustainable Land and Ecosystem Management
SNC	Second National Communication
SNEP	Strategic National Energy Plan
SNRM	Sustainable Natural Resource Management
SPM	Suspended Particulate Matter
SWG	Sector Working Group
SYND	Strategic Youth Network for Development
TAPs	Technical and Administrative Provisions
TEL	Tetra Ethyl Lead
ToR	Terms of Reference
UN	United Nations
UNCSD	UN Commission on Sustainable Development
UNDAF	United Nations Development Assistance Framework
UNDP	UN Development Programme
UNEP	UN Environment Programme
UNFCCC	UN Framework Convention on Climate Change
UNIDO	UN Industrial Development Organisation
USAID	US Agency for International Development
VPA	Voluntary Partnership Agreement
WASH	Water, Sanitation and Health
WFP	World Food Programme
WHO	World Health Organisation
WRC	Water Resources Commission

EXECUTIVE SUMMARY

Ghana's economy has experienced positive growth rate in real gross domestic product (GDP) averaging 5 % during the past 20 years. The economy recorded the highest growth rate of 8.4% in 2008 and annual average of about 6 % from 2006-2010. The growth rate is attributed in part to the change of Ghana's national accounts base year from 1993 to 2006 that led to the revision of Ghana's GDP in 2006 and the classification of Ghana as middle income country (MIC) in accordance with international standards industrial classification (ISIC4).[1] The re-basing included emerging new sectors of economic activities; information communication technologies, and oil and gas following the oil development of the Jubilee oil fields. The average annual GDP contributions of the economic sectors during the period 2006-2010 are Agriculture (30.48%), Services (49.64%) and Industry including mining (19.88%).

The key drivers of economic performance that also have impact on the environment and natural resources are increasing cocoa production which increased 22% from 2006 to 2011 due to expansion drive to meet the one-million tonne target, and increasing crops production (increased 10% in 2009) with 25% rise in crop land use in agriculture to meet the food needs of high population growth (2.4% in 2010); and forest logging (regulated and illegal logging) which grew 10.1% in 2010. In the industry sector, the key activities are increasing; gold, diamonds, bauxite and manganese production in mining and quarrying, which grew at 7.6 % in 2010. Gold production increased by 42.03 % from 2006 reaching 3.33 million ounces in 2010 with about 500,000 estimated people engaged in regulated artisanal and small-scale mining (ASM) and illegal ASM called "*galamsey*". The widespread of ASM is due to the feasibility of gold recovery from very low mineralisation as a result of the high world market price of gold. In the energy sector, fuelwood and charcoal production and consumption is estimated at 65.6 % of total energy needs, and 90% is derived directly from the natural forest. Fuel wood extraction is projected to increase from 18 million tons in 2000 to 25 million tons in 2020 to meet the demand of 80% rural and urban household population, who depend on fuel wood and charcoal for cooking and heating.

The key drivers of Ghana's GDP growth on which Ghana primarily depends to meet the livelihood needs of its population growing at 2.4 % (from 2000-2010) are also the very sources and causal factors of degradation and depletion of natural resources upon which the country's ecological capital is based. Recent country-specific information and activity data collected from the World Bank's project on REDD+ (Reducing Emissions from Deforestation and Forest Degradation) estimate the annual rate of loss of forests due to land use changes at 135 ha per year from 1990-2000 and at 115 ha per year from 2000-2010. Notwithstanding, the reducing trend as a result of policy and development partners (DPs) intervention in the sector, the total cumulative loss from 2000 -2010 amounts to 1.154 million ha representing 19.0 % reduction. The remote sensing data provide details of the major drivers of deforestation and forest degradation: 50% by agricultural

[1] The State of Ghana's Economy (ISSER, 2010)

expansion, 35 % by wood harvesting and charcoal production, 10 % by urban sprawl and infrastructure development and 5 % by mining and exploration.

Water resources are under pressure from widespread unregulated ASM activities including illegal mining as a result of siltation, sediment loading and particularly contamination from the use of mercury for gold recovery. Increasing rural-urban migration and urban sprawl also exert pressure on water and land resources through pollution from poor sanitation practices and deforestation of wetland catchments. Disposal of untreated sewage into wetlands, marine and coastal resources increasing due to limited waste water treatment services. Sand winning on the other hand is driven by the high growth rate of the construction sector, particularly the housing sector, and threaten erosion of coastal resources and severe land degradation. Wildlife populations and biodiversity are equally threatened by the high rate of deforestation, and degradation forest and other natural resources. Public health impacts related to indoor-pollution are mainly due to smoke particulates in the use of charcoal and petroleum products for cooking and lighting, while outdoor air pollution results from vehicular smoke emissions and uncontrolled burning of solid waste.

All the above factors threaten to reduce Ghana's real GDP growth. The World Bank estimates the land degradation and deforestation from the key driver's of Ghana's economic growth to be equivalent to about 2 % GDP in 2010. However, the total cost of environmental degradation is as a high as 10 % of GDP in 2010 considering the impacts of the unsustainable productive base of the economy on human, natural and social capital lost annually through unsustainable use of the country's forests, wildlife, land resources, fisheries and public health-related costs from water supply and sanitation and indoors and out door pollution.[2] While Ghana is commended for making tremendous strides towards the attainment of the five of the Millennium Development Goals (MDGs) by 2015, the negative impacts of the GDP growth drivers threaten Ghana's effort at meeting MDG 7 on environmental sustainability to reverse the loss of environmental resources, reduce biodiversity loss especially number of species facing extinction, the proportion of the population without sustainable access to safe drinking water and basic sanitation.

State, Trends, Pressures of Key Environmental Resources

Land

Land is an essential resource for Ghana's economic growth; the source of agriculture, mining, sand winning, and quarrying, generates the bulk of the country's income and employment, both directly and indirectly. In 2010, the GDP contributions of agriculture was 29.9% averaging 30.5 % from 2006-2010. Cocoa production grew by 22% from 2005/2006 season to 2010/2011 reaching 903 646 tonnes (almost reaching the 1 million tonnes GoG target). It is estimated that land use for crop cultivation has increased by 24.9 % (maize by 25%, and rice 45%) with marginal increases in yields of maize from 12.2 to 15.43 tonnes/ha and rice 13.2 to 15.48 tonnes/ha from 2006 to 2010. The expansion of agricultural lands for crops and cocoa production has been attributed to loss of fertility and low productivity as a result land degradation and non-sustainable land use in subsistence agricultural practices. The factors impacting agriculture include; soil erosion, salinisation,

[2] Ghana Country Environmental Analysis (World Bank, 2006)

acidification, and plinthite formation and natural hazards such as drought, desertification, and bushfires. The major impact on crop yields is limited access to irrigation and a high reliance on rain-fed agriculture without early warning systems in most agro-ecological zones. It is estimated that only about 1% of land under cultivation has irrigation facilities.

Recent country–specific data collected from the World Bank's project on REDD+ estimates annual rate of loss of forests due to land use changes/conversions at 135 ha per year from 1990-2000 and 115 ha per year from 2000-2010. Agricultural land expansion contributes 50 % and 5 % by mining and exploration. For the period 1996-2008, agricultural expansion for cocoa production, loss of fallow areas, and food crop cultivation in the High Forest Zone covered a total of 2.6 million ha of off-reserve areas.

The key issues are of continuing inappropriate management of the land which leads to rapid soil erosion, increasing loss of fertility, and increasing loss of productive capacity. The relatively high air temperature enhances the mineralisation process in the soil, which tends to reduce the organic content, which in turn allows soils to be washed away during the rainy seasons, if not properly managed. Thus, the rural communities are locked into cycles of economic instability.

Key Policy Focus Area

Ghana has identified and committed to sustainable utilisation of the land resources as urgent priority. The Medium Term Development Policy Framework and the Ghana Shared Growth and Development Agenda (MTDPF-GSGDA 2010-2013) Food and Agriculture Sector Development Policy (FASDEP) and its Investment Plan (METASIP) 2010-2015 has integrated sustainable development action plans to improve agricultural productivity by sustainable land and ecosystem management (SLEM). The strategies include mainstreaming SLEM practices in agriculture, promoting irrigation development, increase science and technology research and information communication technology application (e.g. early warning systems) in Research-Extension-Farmer Linkages. The Agricultural Sustainable Land Management Strategy and Action Plan were launched in August 2009 to improve productivity and growth.

Water

Ghana is well endowed with water resources. The total available renewable water resources are estimated to be 53.2 billion m^3 per year. During the rainy season, rainwater harvesting provides a major source of surface water for many rural communities through the implementation of rainwater catchment system[3]. The National Water Policy, 2007 and Ghana's Water Vision, 2025 recognises the potential of rainwater harvesting to contribute to meeting the water demand by households and institutions. There are existing good practices in a few hospitals (e.g. Mampong Akuapim Orthopaedic Hospital and universities (e.g. Ashesi University College, Brekuso). Many of the major river systems for urban water supply analysed have maintained their quality status since 2005 though some (e.g. Weija Lake) have showed some decline in quality.

[3] The state of Ghanaian Economy, (ISSER, 2010)

Water quality monitoring data of the Water Resources Commission (WRC) indicate naturally occurring surface waters and groundwater resources in Ghana can generally be characterised as good except for some cases of localized pollution arising from large scale surface mining operations and illegal artisanal mining ("galamsey"). Also high arsenic levels of between 40.5 to 1,290 mg/L have been observed in the Pra and Tano Basins. Two drilling records of Community Water and Sanitation (CWSA) indicate about 20% of boreholes for domestic water supplies have high concentrations of manganese, iron, or both. For instance, concentrations above the Ghana Standards Board permissible limits of 0 to 0.1 mg/1 (for manganese) and 0 to 0.3mg/1 (for iron) have been reported in the Eastern, Greater-Accra, Central, Northern, Ashanti, Volta and Western Regions. In addition, low pH (water acidity) levels are associated with groundwater in most of the geological formations in these regions. In some mining communities, high levels of arsenic have been recorded in the groundwater (e.g. at Obuasi and Prestea) and high cyanide at Sumang in the Ankobra basin above permissible levels. High concentrations of fluoride have also been observed in the Upper East, Upper West and Northern regions. Studies cited by WRC indicate about 20 to 30% of groundwater sources (boreholes) have fluoride levels higher than 1.5mg/l (WHO/Ghana Standard Boards Permissible Limit), giving rise to the need of borehole water treatment in some localities.

In the urban and peri-urban environment, discharge of untreated domestic waste water and industrial effluent have resulted in serious water pollution of some rivers and lagoons such as the Subin River in Kumasi, Korle and Kpeshi lagoons in Accra, Gao and Chemu lagoons in Tema, and Fosu Lagoon in Cape Coast. The discharges also are major land-based sources of pollution of the Guinea Current large marine ecosystem. Those located near industrial areas such as Korle, Chemu, and Gao Lagoons are dying due to nutrient enrichment and eutrophication, which are also sources of intense odour nuisance.

While water pollution constitutes a major threat, the WRC notes per capita water availability per annum is declining due to high population growth. It is projected that by 2020 the country's per capita water availability will be just over 1000 m^3 per annum which will make Ghana a water-stressed country. This will further be exacerbated by observed and predicted impacts of climate variability and climate change.

Water resources in Ghana are the main sources of the country's power generation. The current installed hydroelectric capacity is 1,072 GWh from Akosombo and Akuse hydro-electric power plants. The Bui hydroelectric power under construction will generate 400MW. The national strategic energy plan projects hydropower production to reach 2500MW 50% of total thermal and hydropower generation by 2015.

The impoundments of water in Ghana are not only for power and potable water supply, but also serve as potential irrigation sources for agriculture. The total water-managed area in the Volta Basin is about 6,400 hectares (ha)[4] though the area actually irrigated may only be 4,000 ha, since a large part of the area theoretically under irrigation is not currently in use. It is estimated that the irrigation potential of Ghana is about 500,000 ha, which could be used effectively for enhancing the national food security system as part of an adaptation strategy to respond to future climate change.

[4] FAO, 1999

The widespread ASM and regulated mining, driven by the high world market prices of gold, do not only contribute to deforestation but also to water pollution and contamination as well as land degradation with the use of mercury for gold recovery. River courses are diverted in many instances because of surface mining and the communities compensated with borehole water supply. Such schemes are not sustainable where the mining operations are short-lived. The cost of maintenance and depreciation cannot be supported by community budgets at the District Assemblies. Similarly, increasing rural-urban migration and urban sprawl do not only lead to deforestation but also exert pressure on water resources through water pollution and land degradation by poor sanitation practices, and encroachment of green belts created for wetland catchment management.

Another major source of water contamination is untreated sewage into wetlands and the marine environment due to non-functional treatment plants, limited infrastructure or lack of it in various local government areas. Water pollution threatens the attainment of MDG-7 on water and sanitation for 50% of the population by 2015 and 75% by 2025. The lack of clean drinking water and sanitation systems is a severe public health concern in Ghana, contributing to 70 % of diseases in the country. Households without access to clean water are forced to use less reliable and hygienic sources, and often pay more. However, the sector benefited from increased EU Investment particularly in community water coverage. Urban water coverage increased from 55% to 62 % from 2006 to 2010, while rural and small towns have risen from 52.86 to 58.97 % in 2010. The increasing national water coverage also improved sanitation coverage from 10% in 2006 to an estimated 13.06% by 2011. Increasing water coverage is being used to improve sanitation and hygiene to achieve public health benefits. For instance, current sanitation interventions programmes for construction of toilet facilities in rural and village schools include borehole water supply to encourage and enforce hand washing to achieve the sanitation and hygiene co-benefits.

The key issues are of water resources increasingly at risk because of climate and non-climate factors: inappropriate management, particularly deforestation within catchments, inappropriate waste disposal, weak agricultural practices, leading to a cycle of poverty especially impacting health.

Key Policy Focus Area

The National Water Policy formulation, which was supported by the EU and other DPs under NREG, is aligned with SDAPs, the MTDPF-GSGDA 2010-2013, the MDGs and the "Africa Water Vision" of the New Partnership for Africa's Development (NEPAD). The key priority is protection of water bodies and ecosystem health by integrated water resources management, particularly water catchment buffer regulation and enforcement, water for energy, food security and transportation, urban, community and small town water coverage. The Rural Water Supply and Sanitation Strategy Strategic Investment Plan of the Ghana Water and Sanitation Policy also aims at maximising health benefits through integration of water, sanitation, and hygiene programmes such as hand-washing promotion. The strategies also address international legal framework for domestic and transboundary water issues with the neighbouring countries to ensure international cooperation in the sustainable management of shared water basins.

Air

The main industrial activities are: mining, agriculture and manufacturing which all contribute towards atmospheric pollution: gaseous contaminants and particulate matter and which have an adverse social and economic effect on human health. In addition, there are localised poor air quality hotspots due to bush fires, (ageing) vehicle exhaust gases and vehicle noise pollution. The current capacity to monitor and enforce comprehensive environmental standards in air quality appears weak. Urban air quality monitoring indicated that the main sources of pollutants are open burning of municipal waste, particularly of used tyres, particulate dust, vehicular emissions, and industrial emissions.

The key issues are of increasing poor particulate quality of urban air, and a continuing poor quality of indoor air quality in rural communities arising from fuel wood burning for cooking and heating hot water.

Climate

The impacts of climate variability and climate change on water resources, coastal resources, and agricultural crops were evaluated in the preparation of Ghana's Initial National Communication (INC) in 2000 and the Second National Communication (SNC) in 2010. Observed evidence revealed increasing temperatures in six ecological zones ranging from 0.4 ^{o}C to 0.9 ^{o}C for the period 1961-2000. The predicted mean daily temperatures range of 0.6^{o}C, 2.0^{o}C and 3.9^{o}C in 2020, 2050 and 2080 respectively with the three regions of the North recording the highest change of 2.1–2.4°C by 2050 compared to the rest ranging 1.3-2.0°C, (World Bank EACC, 2009).

The annual mean rainfall is likely to reduce between 1.1 % and 3.1 % across all the six agro-ecological zones by 2020. The wettest parts of the country are expected to be the Forest Agro-Ecological Zone (Ashanti and Western regions) and Coastal Agro-Ecological Zone (Volta, Eastern, Central, and Greater Accra regions). The northern and southern Savannah zones are expected to be relatively dry.

The vulnerability assessment of three major river basins, namely Pra, Ayensu and the White Volta predicted significant changes of 17-20 % reduction in stream flows by 2020. Ground water recharges also showed reductions of 17 %, 5 % and 22 % for Pra, Ayensu and the White Volta basins, respectively. This will lead to considerable reduction in hydropower output ~ 59 % by 2020 is projected. This is consistent with observed impacts. Frequency of drought has reduced from about 15 years to 7-10 years during the last 60 years. Electricity production from the Akosombo hydropower station in 2007 was 3,104.33 gigawatt hours (GWh), representing only 45.3 % of peak production in 1997 (6851 GWh) while production from 2006-2010 averaged 4970.28 representing 28 % loss of capacity during the period (ISSER, 2010).

Agricultural gross domestic product (GDP) is estimated to decline by 3 to 8 % compared to the baseline projection for 2050s. The impact on cocoa poses serious socio-economic implications in view of cocoa's significant contribution to national income and farmers' livelihoods. Damage to the

coastal zone in the form of flooding, land loss, and forced migration is estimated at € 4.0 million per annum by the 2020s, rising to €4.75 million per annum by the 2030s (EACC, 2009).

Extreme events will include increases in the risk of floods and/or droughts in both rural and urban areas in the Volta basin and warming with temperature increases from about 1^{o}C to more than 3.9°C which will have adverse effects on human well-being, food security, water security, energy security and lead to forced migration to low impact areas. Migration is also expected to occur not only within the country, but also from countries to the north of Ghana, which will also become hotter and drier. The various studies further observe that most of the changes in stream flows will occur in upstream areas outside the territory of Ghana. This is because most of the rivers in Ghana are shared resources, raising the need of international collaboration in their transboundary management, as part of any adaptive response measures.

The key issues are of a mean annual temperature rise by 1.0 to 3.0 °C by the 2060s, and 1.5 to 5.2 °C by the 2090s with the projected rate of warming being most rapid in the northern inland regions of Ghana than the coastal regions. Although projected mean temperature increases most rapidly in the interior regions of Ghana, the projected changes in the daily temperature extremes ('hot' and 'cold' days and nights) in Ghana are largest in the coastal areas, and smaller inland. Projections of mean annual rainfall are unclear.

Key Policy Focus Area

Ghana is committed to protecting its people from climate impacts with adequate adaptation strategy. Ghana has therefore completed the NCCPF and its Programmes of Action for Adaptation and NAMAs and its monitoring, reporting and verification (MRVs) under the Cancun agreements. The key NCCP focus areas are low carbon growth, agriculture and food security, natural resource management, and human health and mainstreaming the focus areas in the National Sectoral Medium Term Expenditure Framework.

Mineral Resources

Ghana is a signatory to the Extractive Industries Transparency Initiative (EITI) which sets a global standard for sectoral transparency. Ghana is a country with extensive mineral resources (second largest producer of gold in Africa, with at least twelve formal gold mines, seven of which are large open-pit operations). It is the third largest producer of bauxite and manganese on the continent. Small amounts of diamonds are also found in Ghana. Small-scale (gold and diamond) mining provides substantial national employment. The oil and gas sector is a new and increasingly important economic sector for the country.

Mining and quarrying contributed 1.8% to GDP in 2010. Gold, diamonds, bauxite and manganese production in the mining and quarrying grew at 7.6 % in 2010. Except diamonds production, which declined during that period, gold, bauxite and manganese has consistently increased. Gold production particularly increased by 42.03 % from 2006 reaching a record level of 3.33 million ounces in 2010. The estimated people engaged in artisanal and small-scale mining (ASM) is estimated at 500,000 in 2010. The expansion of gold production is attributable to the favourable world market prices for bullion gold, which makes low level mineralisation profitable in the short

term without appropriate environmental practices. The price of gold has also precipitated a "gold rush" in ASM in Ghana with high component of non-regulated and illegal mining called "*galamsey*". The scale of unsustainable ASM operation has increased with the infiltration of foreign participation with machinery in illegal mining at the community level, thus increasing the impacts on natural resources. Mining is now estimated to contribute 5% of the annual rate of loss of forests due to land use changes/conversions compared to forestry and logging of 35% and agriculture 50%.

The key issues are of severe land degradation due to uncontrolled and increasing Artisanal and Small-Scale Mining (ASM) activities using inappropriate methods, periodic water pollution from large scale mining operations and potential downstream impacts of oilfield development.

Key Policy Focus Area

The key mining and mineral policy focus area to address the problem of ASM include government undertaking geological survey and designation of areas for sustainable artisanal and small-scale mining, facilitating registration an regularisation of ASMs to make then legal and eligible for environmental management support, capacity building and financial support, and increased decentralisation of the Minerals Commission to strengthen enforcement of mining regulations at the local level.

Forest Resources

Ghana has approximately 2.6 million ha of forest reserves dedicated to production, about 500,000 ha of unreserved forests, as well as an additional 2 million ha of crop land that also produce timber. Ghana's forest and woodland resources provide diverse economic products and environmental services.

Ghana's forest is the main sources of timber production for export and wood for the local domestic market. The forestry and logging (10.1 % in 2010) increased from a negative growth of -4.1% in 2007 and contributed 2.3 % of total foreign exchange earnings from the agriculture[5] sector. The sector is also the dominant supply of fuel wood extraction for firewood and charcoal production, of which 90% is obtained directly from the natural forest. The remaining 10% is from wood waste i.e. logging and sawmill residue, and planted forests. The charcoal and wood fuel consumption is driven by increasing population and the high dependency of rural and urban households (about 80%) for cooking and water heating, as well as demand by commercial, industrial and institutional use. Fuel wood extraction is projected to increase from 18 million tons in 2000 to 25 million tons in 2020.

Recent data based on the World Bank's project on REDD+ estimates the annual rate of loss of forests due to land use changes to be 135 ha per year between1990-2000 and 115ha per year from 2000-2010. The total cumulative loss from 2000-2010 amounts to 1.154 million ha represents 19% reduction. It is estimated wood harvesting contributes 35 %. Wood removal for fuel wood and charcoal production is estimated at 30 million m^3 per year while forest timber logging and

[5] GDP contributions are classified into Agriculture, Industry and Services. Forestry/ logging is a sub-sector of agriculture by ISSER classification. Agriculture comprises crops, livestock, cocoa, forestry/logging, and fisheries (The State of the Ghanaian Economy, ISSER 2010)

harvesting from the regulated sector amounts to 3.72 million m^3 per year for export and 1.8 million m^3/year by predominantly illegal logging for the domestic market. The rate of deforestation is estimated at 2% in 2010.

The condition of Ghana's forests has been in decline for many years, particularly since the 1990s. The forest is degraded with many forest reserves being heavily encroached and the off-reserve carbon stocks being rapidly depleted. Wood for timber, fuel wood and charcoal, wildlife and other non-timber forest products are all being extracted at levels that are above the replenishment level. Ghana formally concluded Forest Law Enforcement, Governance and Trade (FLEGT) Voluntary Partnership Agreement (VPA) with the EU on 20 November 2009. The VPA is a bilateral agreement between the European Union (EU) and wood exporting countries, which aims to improve forest governance and ensure that the wood imported into the EU has complied with the legal requirements of the partner country. The VPA includes commitments and action from both parties to halt trade in illegal timber, notably with a licence scheme to verify the legality of timber exported to the EU. The agreements also promote better enforcement of forest law and promote an inclusive approach involving civil society and the private sector. The VPA has led to the revision of the Forest and Wildlife policy, providing a legal framework and compliance monitoring system aimed at ensuring that all timber imports into the EU from Ghana have been legally acquired, harvested, transported and exported.

The key issues are of increasing degradation of the forest resource with weak institutional capacity in forest resources management, complicated tenure and tree rights, and increasing threats from a growing population's need to use the land space for other productive purposes.

Key Policy Focus Areas

The MTDPF 2010-2013 presents 10 key areas of focus for sustainable natural resource management (SNRM), two of which are key areas under sustainable domestic energy, seven under SNRM and three key areas focusing on climate change adaption and mitigation response actions. The key priority areas for 2010-2020 include sustainable domestic energy supply aimed at promoting sustainable production of wood fuel and efficient charcoal production and use from well managed woodlots, and development of alternative fuel sources through research and capacity building, as well as nationally appropriate mitigation action through REDD+. Ghana is also participating in Forest Improvement Programme (FIP) of the World Bank. The FIP will finance efforts to address the underlying causes of deforestation and forest degradation and to overcome barriers that have hindered past efforts to do so. The Investments is aimed essentially at reducing emissions from deforestation and forest degradation and to protect and enhance forest carbon stocks; The programme strives for maximizing co-benefits of sustainable development, including the conservation of biodiversity, protection of the rights of indigenous peoples and local communities, poverty reduction and rural livelihood enhancements.

Biodiversity

Ghana has a rich stock of biological diversity. The National Biodiversity Strategic Action Plan notes that marine and other aquatic ecosystems reported include about 2,974 indigenous plant species, 504 fishes, 728 birds, 225 mammals, 221 species of amphibians and reptiles have been

recorded. It recognises that biodiversity in Ghana is under severe pressure in all ecological zones in varying degrees. There is declining trends, especially in forest, dry and sub-humid, marine and coastal and inland water biodiversity The major threats to biodiversity include land-use conversions, over exploitation of resources, pollution, invasive alien species, climate change effects, predation, mis-application of chemicals into the environment and wild fires. In rivers and streams fish populations are declining, Marine mammals are all threatened. Generally, fish stocks are declining. There is increasing loss of biodiversity through illegal logging, destruction of natural habitats, charcoal production, poaching, forest governance, declining fisheries, loss of wetland ecosystem services. Habitat degradation results from such activities as pollution, wild fire, over harvesting of genetic resources, misapplication of chemicals. Over exploitation includes excessive cutting of trees in stressed environments for fire wood as energy source, by-catch and use of inappropriate harvesting techniques such as pair trawling and beach seine. Many forest reserves are degraded from excessive extraction of timber and other resources. The Transition zone, formerly a forested area is rapidly turning into savannah and expanding further into the moist forest zone. There is rapid deforestation and loss of watersheds. There is decline in soil fertility. In the Northern savannah, there is high intensity of wild fires, increasing incidents of floods and droughts.

The key issues are of increasing loss of biodiversity through charcoal extraction, illegal logging, destruction of natural habitat, poaching[6], poor forest governance, declining fisheries and loss of wetland ecosystem services.

Key Policy Focus Areas

Sustaining Protected Area systems including building capacity and strengthening data and information management, promotion of proper forest management, avoiding clear cutting of forests, review traditional skills in management of Protected Area systems and incorporate these, where appropriate, into modern technologies; Promote full and active participation of traditional authority, landowners, communities and other stakeholders in protected area management, promote minimal use of agricultural chemicals, and minimise the conversion of forested off-reserve areas (ORA) into non-forest land uses, such as for crop production and grazing, and empowering local level administration structures to enact bye-laws for the management, use and protection of biological resources and biodiversity.

Human Settlement

Population pressure and rural urban migration is increasing pressure on land. The urban population including peri-urban grew from 44 % in 2000 to 51.59%. Recent data based on the World Bank's project on REDD+ estimates annual rate of loss of forests due to land use changes from 2000-2010 as 115 ha per year from 135 ha per year from 1990-2000. The total cumulative loss from 2000 - 2010 amounts to 1.154 million ha representing 19.0 % reduction. The land use and land use change and forestry estimates urban sprawl and infrastructure development contribute about 10 %. Increasing rural-urban migration and urban sprawl do not only lead to deforestation only but also

[6] At the technical meeting it was suggested that "*over-exploitation*" be used instead of poaching, however the latter is illegal whilst the former is not.

exert pressure on resources through water pollution and land degradation as a result of poor sanitation practices. This include disposal of untreated sewage into wetlands and the marine environment due to non-functional treatment plants, limited infrastructure or lack of it in various local government areas. Sand winning is driven by the high growth rate of the construction sector, particularly in the housing sector, and threaten erosion of coastal resources and severe land degradation.

The pollution of watercourses, wetlands, lagoons and rivers from point and non-point sources is threatening the quality of water available for abstraction for potable and other direct productive uses. There are numerous rivers, lakes and lagoons, in the human settlement environment that are polluted by human and industrial waste disposal. They include many lagoons along the coast which serve important ecological and hydrological functions. The main ones are the Kenta and Abu lagoon complex, Songhua lagoon in Ada, Chemo and Sakami lagoons in Tema, Korle and Kipsie lagoons in Accra, Fosu lagoon in Cape Coast, Bunya, Nacka and Jangle lagoons, and Tano-Ehy lagoon complex. The challenges of poor sanitation, land degradation due to erosion, pollution of water bodies due to indiscriminate defecation and refuse disposal, poor waste management, poor air quality and unplanned developments leading to frequent flooding are all due to inadequate environmental sanitation infrastructure and services.

In the rural areas, Ghana is not only experiencing increasing temperature trends and decreasing rainfall, but also unpredictable and unreliable rainfall patterns. This makes it difficult for the indigenous and vulnerable farmers to determine the rainfall seasons for crop production, which affects farmers using indigenous knowledge, with consequences for future food insecurity. The linkage between spatial/land use planning and socio-economic development in the planning and management of cities, towns and communities in the country is weak at all levels. The issue of land ownership poses a major challenge to land use in the country. Problems associated with this include the general indiscipline in the land market; complicated land tenure systems; and cumbersome land title registration procedures all of which impede the efficient use of land for development purposes.

The key issues are of an increasingly inadequate spatial and development planning; inefficient spatial/land use plans; weak plan implementation and weak enforcement of planning and building regulations; lack of integration of climate change adaptation and disaster risk reduction into land use planning; and inadequate human resource capacity for land use planning.

Key Policy Focus Areas

The critical environmental and sanitation services, with potential for job creation while minimising pollution of the environment from poor disposal of refuse, sewage, and discharge of liquid waste identified in the NESSAP include:

- Composting of biodegradable organic fraction of municipal solid waste, which constitutes 60-70% depending on the level of development of the communities;
- Recycling of treated wastewater in urban agriculture to replace polluted water being used for irrigation to support estimated 47 -162 ha of vegetable production and up to 800 ha of maize in Accra;

- Promote Decentralised Treatment, Re-Use and Recovery Systems (DTRRS) for sewage management in digesters and as well as aerobic composting of sewage plants in peri-urban communities, institutions, hospitals, schools and in hotels to address the sanitation and water problems associated with uncontrolled discharge of sewage;
- Promote the bio-digester and bio-filter technologies for uptake by the private sector to provide the sewage treatment services for a large number of people - more than 20,000 households of which 5,200 are in Accra alone - rely on banned pan latrines. Close to 5.2 million people are able to benefit from the environmentally sound technologies to improve household sanitation to meet Ghana's commitment to UN Sanitation for All and MDG 7 by 2015.

Environmental Policy

Implementation of the environmental policy over the years has been largely sectoral. The 1991 National Environment Policy (NEP) was revised and finalised in 2012 under the Natural Resources and Environmental Governance (NREG) system. The revised policy, including climate variability and climate change is integrated within the Ghana's Shared Growth and Development Agenda (GSGDA) 2010-2013 for the sustainable management of natural resources. The GSGDA integrates adaptation measures to make agriculture resilient to climate variability and climate change, supports research into selected crop development suitable for each ecological zone, and promotes SLEM practices in agriculture to achieve food security. It also emphasises integrated watershed management and riparian buffer zone protection for all water bodies to achieve water and energy security, creating awareness of environmental and climate change issues, and environmental standard-setting and enforcement of regulations to sustain progress in these areas.

The NREG system, supported by EU and other DPs since 2008 under sector budget support (SBS), successfully strengthened the institutional and financial capacities of some of the participating key agencies and commissions even though SBS accounts for a limited share of the total budget funding. The strengthening included; building capacity for the sector-specific revision of policies and legislation to reflect the current and emerging realities of environmental issues facing Ghana. The institutions that benefited under the NREG framework are; Environmental Protection Agency (EPA), Mineral Commission, Forestry Commission, the Ministry of Land and Natural Resources and its ministries, departments and agencies (MDAs) under Land Administration. The SBS-approach also revealed strongly how the previous sector-specific financing approach had under-supported the activities of responsible MDAs with the consequences of limiting the development of institutional capacities for compliance and enforcement across relevant agencies. SBS has significantly helped in the formulation of Ghana's National Sustainable Development Action Plan (SDAP) that seeks to integrate sustainable consumption and production within the Strategic Environmental Assessment (SEA) programme to continue mainstreaming environment in policies, plans and projects at the local government level. The process also ensured the consensus to fund the preparation of Sustainable Development Action Plans (SDAP) that formed the basis of the revised National Environment Policy covering 14 identifiable sectors by the relevant agencies and departments, namely; Land, Agriculture, Transport, Industry, Biodiversity Conservation, Forest and Wildlife, Water, Sanitation, Energy, Minerals, Petroleum, Human Settlements, Waste Management, and Pollution Prevention and Control.

The NREG has also funded the development of the National Climate Change Policy Framework (NCCPF) and National Climate Change Policy (NCCP) and Programmes of Actions (PoAs) which was built on climate variability and climate change, country programmes under various enabling activities in climate impacts, vulnerability and adaptation, leading to the preparation of Nationally Appropriate Mitigation Actions (NAMAs) and National Climate Change Adaptation Strategy (NACCAS) supported by the EU and other DPs. The enabling activities include support from multilateral and bilateral donor agencies received for implementation of low emissions-related programmes in the dominant carbon emissions and/or removals sectors and categories. The Energy Sector programmes are renewable energy-based electricity for rural, social and economic development in Ghana, promoting of appliance energy efficiency and transformation of the refrigerating appliances market in Ghana, energy development and access project integration of renewable energy sources into the national energy grid mix to drive penetration, and the Bus Rapid Transit under Ghana Urban Transport. The Forestry and Land Use Change sector involving the Growing Forest Partnership, Forest Resources Use Management Project, Ghana Readiness Preparation Proposal, REDD+, and the Chainsaw Milling Project.

Sectoral Policies and Measures

The key sectoral Policies and Measures (PaMs) are based on the SDAPs and climate change and climate variability integrated in the GSGDA. The approach recognised that national development paths are conceived as not usually resulting from integrated policy programmes, but they emerge from various decision-making processes involving numerous private actors and public agencies within varied institutional governance frameworks of state, markets, and civil society. Consequently, the sectoral PaMs have been developed using participatory consultative approaches based on the Strategic Environmental Assessment process of capacity building at all levels of government decision-making and adequate participation of relevant stakeholders.

The sectoral policies and programmes emerging also seek to address key environmental issues that exacerbate environmental degradation and deforestation. They include the continuous challenge of unregulated/illegal small scale activities such as gold rush popularly called "*galamsey*", chainsaw logging, sand winning, settlements and encroachment in water catchment areas, which are occurring at unprecedented levels and defy the existing capacity of enforcement actions. The root cause identified includes access and property rights of the local people who own the land. The constitution and the mining and mineral laws in Ghana vests all industrial mineral in the GoG, which makes every level of mineral extraction, without the requite registration, a regularisation in accordance with the Mining and Mineral Act for small scale mining illegal.

The need to regularise artisanal and small scale mining has been acknowledged and needs to address property owners' access rights and also the basis of ensuring provision of extension services in sustainable mining, cooperative approach to access financial and other services, and adequate capacity building. These response actions including environmental monitoring, compliance and enforcement can only be effectively implemented when mechanisms are in place to regularise and regulate the activities. The regularisation also holds the key to minimising complicity and bribery in the enforcement of the mining and mineral laws. The need of involvement of chiefs and the people

in the design and implementation of the emerging programmes would be essential to the success of the compliance and enforcement in the future.

The sectoral programmes and projects that offer potential funding opportunities identified for energy security, water security, food security based on SDAPs towards attainment of MDG 7 and NCCPF addressing adaptation for climate resilient economy and Nationally Appropriate Mitigation Actions for low carbon growth mandated in the Ghana's Shared Growth and Development Agenda (GSGDA 2010-2013).

Legislative Framework

The GSGDA requires the Environmental Protection Agency (EPA) to enforce environmental standards and endorses sufficient monitoring and control for effective enforcement and compliance of sector specific laws and regulations particularly activities outlawed in fisheries, forestry, and mining. For instance, compliance of reclamation of degraded and deforested land by timber and mining companies is a precondition to renewal of licences. The GSGDA further recognises that decentralising environmental management should include enforcement of relevant laws on waste/illegal mining/chainsaw logging at the local level. On the emerging oil and gas sector, GoG is committed to enforcing a culture of compliance within a sustained regulatory framework. This will require persistent and stringent monitoring of reporting verification, building capacity of the judiciary in enforcing compliance, effective integration and mainstreaming of multilateral environmental agreements and international protocols into national laws for enforcement of compliance, and promote mechanisms to reduce bureaucratic interference in enforcement of laws and regulations for effective compliance and enforcement. The GSGDA therefore demonstrates strong willingness to enforce legislation.

GoG has demonstrated its commitment to enforcement of environmental legislation through the enactment of the Environmental Protection Agency, 1994 (Act 490). The Act makes environmental offences criminal and enforceable in the court of law. The subsidiary legislation, the Environmental Assessment Regulations, 1999 (LI 1652) made environmental assessment mandatory for all new developments and environmental management plans (EMP) mandatory for identifiable existing polluting operations. The EPA Act 490 thus became the lead legislation. All development permits are subject to the EA Regulations (LI 1652) and the EPA environmental permit system. The EPA Act and regulations define and develop national environmental quality standards for permissible levels of environmental indicators to determine non-compliance for appropriate enforcement actions under the Act and the subsidiary Regulations.

The general consensus of consultative meeting and interviews of DPs, selected ministries, departments and agencies (MDAs) and civil society organisations strongly indicate the weakest link in the policy and legislation cycle is compliance, monitoring and enforcement regime of environmental legislation, which undermined implementation and realisation of policy objectives especially in the area of illegal mining, logging and sand winning due to complicity of land owners and the unresolved question of access rights under the current constitution that vets all land and mineral resources in the government of Ghana.

Institutional Framework

The sector ministry for environment, currently Ministry of Environment, Science and Technology (MEST) is responsible for the coordination of the National Environmental Policy (NEP). The EPA is the lead institution. The National Development Planning Commission (NDPC) shall ensure the continued mainstreaming of the environment in the MTDPF and the Medium Term Expenditure Framework (MTEF). The national policy empowers the MEST, EPA and NDPC to integrate and coordinate all environmental management functions within and between all MDAs. The MEST and EPA are to be responsible for the development of subsidiary policies within the framework of the national policy and will also have the role of review and harmonising existing legislation and enact new ones to deal with emerging environmental challenges. The institutional framework, under the previous sector-specific MTEF approach, was generally weak, under-staffed, lacking logistics for effective discharge of legislative functions.

Climate Change Implications

Ghana is a Developing Country Party to the United Nations Framework Convention on Climate Change (UNFCCC). In response to its obligation under the Convention, Ghana has prepared and submitted its *Initial National Communication* (INC) and the *Second National Communication* (SNC) to the Conference of Parties in 2000 and 2011 respectively. The climate variability and climate change impacts analysis reveal evidence of increasing surface air temperature in six ecological zones ranging from 0.4 ^{o}C to 0.9 ^{o}C for the period 1961-2000. Adopting the 40-year temperature trends as the baseline scenario, the Global Circulation Model (GCM) scenarios that have been developed indicate that the mean daily temperatures are generally expected to change by 0.6^{o}C, 2.0^{o}C and 3.9^{o}C in 2020, 2050 and 2080 respectively (SNC, 2011).

The GCM scenarios also indicate annual mean rainfall is likely to reduce between 1.1 % and 3.1 % across all the six agro-ecological zones by 2020, with the highest reduction occurring in the rainforest and the coastal savannah zones. The changes in annual mean rainfall by 2080 is expected to be between 13 % and 21 % reduction of the observed baseline values. The forecast for precipitation indicate a cyclical pattern during the period 2010–50 for all regions, with high rainfall levels followed by a drought every decade.

Ghana's water resources, agriculture, fish production, and coastal zone infrastructure are all predicted to be at risk. It is however noted that the high annual runoff will have non-climate drivers such as deforestation of the watershed that also contribute to significant rate of evapo-transpiration in the three basins. Thus any future adaptation programme will need to consider addressing not only climate factors but also non-climate drivers to increase the resilience of the water resources. The various studies further observe that most of the changes in stream flows will occur in upstream areas outside the territory of Ghana. This is because most of the rivers in Ghana are shared resources. Ghana is a riparian state that shares a number of basins with neighbouring countries. The Volta River basin is shared with Cote d'lvoire, Burkina Faso, Togo, Benin and Mali. The Bia is shared with Cote d'lvoire, while the lower reaches of the Tano River also form part of the boundary with Cote d'lvoire. The need for international collaboration in their transboundary management is clear.

The implications of the wide fluctuations in runoff and stream flows, with the Volta basin experiencing significant reductions in runoff, are far reaching. There will be an increase in the risk of floods and/or droughts in both rural and urban areas in the Volta basin, which will be exacerbated by lack of awareness on climate change and its impact, high dependence of the economy on water for hydropower generation, low penetration of irrigation in agriculture that is predominantly rain-fed, weak and inadequate infrastructure to cope with the high intensity of rain and floods, limited human resource capacity, weak sub-regional network and inadequate financial resources or low budgetary allocation. The predicted warming with temperature increases from about 1^{o}C to over 3.9^{o}C will have adverse effects on human well-being and activities, food security, and water availability. In response to this climate change, people will migrate in search of better land and environment. Migration of population from rural to urban areas due to climate impacts in the long term will raise demand and put pressure on municipal services—including water supply and sanitation, public health, energy, transportation, and housing services. Migration is also expected to occur not only within the country, but also from countries to the north of Ghana, which will also become hotter and drier. This rural to urban drift in population will worsen water and sanitation problems in peri-urban communities, particularly those of Accra, Takoradi, Kumasi, and Tema.

GoG integrated climate variability and climate change as well as sustainable development action plans into its development framework, 2010-2013 *Ghana Shared Growth and Development Agenda* (GSGDA) in 2010, and began the process of mainstreaming climate change and environment into the Ghana's Medium Term Expenditure Framework (MTEF) through the budgetary process at all levels of government (national, metropolitan, municipal and district) within the decentralised governance structure of Ghana.

Environmental degradation is caused mainly by mining operations, sand winning, natural disasters and weak land management. In three regions, Western, Eastern and Ashanti, declining soil fertility has led to lower crop yields while rangeland depletion and deterioration in water quality has adversely affected the fish catch. Non-existent property rights, limited access to financial and other services, inadequate safety nets in time of stress or disaster, and lack of participation in decision-making may result in adoption of short term activities which tend to lower longer term resilience. This may make the most vulnerable even more vulnerable to environmental degradation, including degradation exacerbated by climate change. Where livelihoods are already marginal, due to soil loss, low fertility or areas affected by mining, future climate variability in the form of extreme rainfall or recurring drought periods will exacerbate future prospects. A key to this may be secure tenure and access to markets as this tends to encourage investment and reduces resource-degrading strategies. Faced with growing land scarcity, diminishing agricultural productivity and a reduced access to traditional products from forests and other natural resources, rural communities may turn to other activities that do not build longer term resilience.

The total national emissions in 2006 indicate Ghana contributes marginally to the global greenhouse gas emissions. The emissions in 2006 were 18.370Mt (without LULUCF) representing 0.06% of the global carbon emissions of about 29,190Mt[7]. The emission trends from 2000-2006 show annual

[7] World CO_2 emission by country, 2006

growth rate of 3.7 % per year (without LULUCF) and an overall increase by 24.6 % during the same period. The dominant categories of economic activities driving the increasing carbon emissions from 1990-2000 are energy generation, agriculture and waste sector. Accounting for LULUCF carbon emissions and removals, Ghana has become a net emitter from -8.416Mt (1993) net removals to 23.984 (2006) net emissions as a result of increasing deforestation (forest and grassland conversion) and forest degradation through abandonment of managed lands.

The emissions from energy industries have substantially increased over the period as a result of increasing thermal power generation in Ghana's energy mix and rising domestic and residential diesel power generators to compensate for declining hydropower production and frequent power outages.

The emission trends of Ghana and its emerging oil and gas sector development pose challenges to policy choices to manage an economy with potential to grow double digit GDP without growing carbon emissions. The major challenges are increasing emissions trends from energy industries, emerging oil and gas industry, deforestation and forest degradation in land use and land use change and forestry, and waste sectors. The challenges will be compounded by predicted double digit gross domestic product (GDP) growth rates with the transition of Ghana to oil producing and exporting economy. Ghana historic emissions profile shows increasing trend and has started to be influenced by thermal power generation to supplement hydropower sources, which are vulnerable to climate impacts. The projections of Ghana's carbon emissions under a BAU scenario in indicate that CO_2 equivalent emissions could increase significantly in the dominant source categories to very significant levels by 2020 and 2050. Energy sector is projected to increase from 5.8 (2000) to 73.2Mt (2020), while total national emissions are expected to increase from 23.98Mt in 2006) to 519.8Mt by 2050. The analysis implies that the economic growth and development of Ghana could lead to significant increase in emissions of greenhouse gases, however low carbon emissions growth path choices could limit the scale of change.

Integration of Environmental Concerns into the Main Policies and Sectors

The *Medium-Term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA) 2010-2013* provides the context for the identification of links between the main government policies (overall development policy, poverty and sector policies) and sustainable natural resource management and environment protection policies, programmes, and projects of ministries, departments and agencies.

Efforts continued to be made to address environmental issues, including ratification of a number of international conventions related to environment and the integration of the principles of sustainable development into country policies and programmes in order to achieve the target under the Millennium Development Goals (MDG 7 specifically) of reversing the loss of natural resources by 2015.

The GSGDA 2010-2013 adopted and mandated strategic environmental assessment (SEA) as a well-established model of an consultative and participatory approach to mainstreaming environment into sector-specific development plans and programmes at all levels of government (national, metropolitan, municipal, and district). The SEA process involves thorough public discussions by

relevant stakeholders to identify key issues and develop a road map. The application of SEA procedures provides the platform for the evaluation of environmental effects and social dimensions of sectoral development policies, programmes and projects. It also assists the MDAs and MMDAs to integrate the outcomes into the MTEF for budgetary allocation and implementation. Sustainable indicators are also developed for monitoring and evaluation of the impact of the environment on development outcomes.

The sector budget support approach, such as NREG SBS, is a relatively new aid modality and accounts for a limited share of the total budget funding. There is a particular interest from development partners, including donors, NGOs etc., in assessing how the implementation of the identified reforms move forward and how the programme affects women, the poor and marginalised rural communities. As such, long-term civil society support mechanism was envisaged as a component to the NREG SBS. Currently, CARE and SNV, through funding from CARE Denmark and the Royal Netherlands Embassy, have implemented a pilot civil society support mechanism called "Kasa" from 2008-2010. The experiences and lessons learned from Kasa will inform the longer term mechanism planned to support civil society engagement in the NRE sector.

"*Kasa*", a word in a local dialect meaning "*talk*" seeks to increase transparency, accountability and broad engagement in NRE governance in Ghana. Kasa supports civil society organisations (CSO) and the media in research and evidence-based advocacy with the view of improving NRE governance in Ghana. The Kasa programme provides a platform through 1) capacity building 2) information and awareness rising about NREG and facilitating engagement between relevant state and non-state stakeholders 3) drawing lessons learned from Kasa and other CSOs.

The links between the main government policies and sustainable natural resource management seem well-integrated and, in particular, SEAs have been undertaken to cover the main sectors. Given that the main EC intervention concerns the support to the NREG programme it would seem that this should be effective in promoting environmental mainstreaming given that the primary government actors in the above policy areas (Ministry of Environment, Science and Technology/Environmental Protection Agency, Ministry of Lands and Natural Resources, Minerals Commission and the Forestry Commission) are all supported through the NREG process.

The NREG SBS by EU and other development partners was the main driver for the success of mainstreaming environmental sustainability into key sectoral policies, plan and programmes even though SBS accounts for a limited share of the total budget funding. Sector specific programmes and projects in power generation, renewable energy, integrated water resource management, agriculture, forestry and waste management that offer funding opportunities in the future EDF are listed in the GSGDA 2010-2013 and sector policies and measures, action plans, strategic investment plans developed by ministries, departments and agencies for funding. They include particularly: energy security projects in low carbon intensity and low emissions power generation (e.g. natural gas infrastructure and substitution of light crude oil in power generation and natural gas combined cycle technology transfer); emission avoidance or reduction in renewable energy (mini-hydro, wind, solar, geothermal, biomass), emission reduction in end-use energy efficiency improvement in residential, commercial, and industrial applications), integrated water resources management, sustainable agriculture and livelihood, SLEM in forestry and mining and land administration, and

water, sanitation and waste treatment technology diffusion. The projects identified address nationally appropriate mitigations actions and adaptation in climate change policy framework, and/or sustainable development action plans integrated in the national medium term expenditure framework for monitoring and evaluation to track Ghana's commitment to low carbon growth and low emissions development agenda within its aspiration for high and sustained economic growth as a growing low middle income economy.

At this stage it is not clear how the Compact will be used to deliver EU cooperation, via what mix of modalities (different modalities could be used at different levels) the above recommendations deliberately are not prescriptive and leave flexibility to negotiate specifics with the GoG.

It is suggested that the recommendations are aligned with the relevant, GoG approved activities within the GSGDA, the Sustainable Development Action Plan (see Technical Annex 8.2.2) the NAMAs and the MDG7 programme.

1 STATE OF THE ENVIRONMENT, TRENDS AND PRESSURES

1.1 Land

1. Land is an essential resource for Ghana's economic growth generating the bulk of the country's income and employment, both directly and indirectly. The total land area of Ghana is 23,853,900 hectares (ha) with 57.6 % under cultivation, 4.6 % under inland waters, and 38.3 % as other land uses (forests, savannah, and woodland etc).[8]

2. There are six major ecological-climatic zones in Ghana: Guinea Savanna, Forest Savanna Transition, Semi-Deciduous Rainforest, High Rainforest, and Coastal Savanna. The land use patterns reported indicate the distribution as; Forest Reserves (7%), Wildlife Reserves (5%), unreserved forest (2%), savannah woodland (26 %), bush fallow and others (19 %), tree crops (16 %), annual crops (14 %), unimproved pasture (11 %) and others (12 %)[9].

3. The local classification system of soil in Ghana is based on characteristics that are the result of the major climatic differences that in turn have given rise to two major distinct vegetation belts, namely; Forest and Savannah. The soils of the Forest belts of Ghana are easily distinguished from those of the Savannah belts by the greater accumulation of organic matter in the surface horizon due to the greater leaf-fall and slower rate at which humus is oxidised. The soils of the Savannah belts are generally lower in organic matter within the surface horizon due to the predominance of grasses and subject to less influence of rainfall.

4. The eco-climatic zones and the soil types underpin the agricultural sector which provides substantial employment and contributed 29-31% of the country GDP from 2006-2010. The total agricultural land area is estimated at 13.6 million ha 57.1 % of total country land area of 23.853 million hectares. Of the total agricultural lands, only 42.4% is under cultivation. Ghana produced 95.3 % of its key stable food needs in 2010. Wheat and rice imports were 2.5% and 2, 2% of total staple food requirements of 27,559,000 million tonnes in 2010. The production of food crops has steadily increased (38.9 %) from 2000 to 2010 to meet the needs the population increase of 23.3% during the same period. The corresponding area of land-use cultivated increased from 2.0808 million ha to 3.396 million ha representing 24.9% expansion. The largest increase in area of cultivation was recorded in maize (42.7%), rice (57.4%), yam (47.5%) and plantain (34.4%). The increasing land area to achieve increase in production has been attributed to lower productivity of cultivated soils. This implies that increasing land conversion without change of agricultural practices will exacerbate deforestation and degradation and undermine the growth rate of 6% [10] projected for the period 2010-2015. The World Bank (2006) estimated that the total land degradation from

[8] Ministry of Food and Agriculture, Statistics, Research, and Information Directorate, May 2011
[9] Ministry of Food and Agriculture, Statistics, Research and Information Directorate, May 2011
[10] Medium Term Agriculture Sector Investment Plan (METASIP), 2010-2015 (MOFA, 2010)

various economic activities (including agriculture, mining, logging, charcoal production, fuel wood extraction) is worth about 2 % of GDP.

5. Sustainable utilisation of the land resources (e.g. increasing agricultural productivity without increasing the land area using sustainable land management methods) is therefore an obvious and urgent priority captured in the GSGDA, 2010-2013 and in the METASIP, 2011-2015. The usual forms of land degradation are evident and are mostly driven by soil erosion, desertification, salinisation, acidification, and plinthite formation. The most widespread natural hazards are drought, soil erosion and bushfires. Droughts of varying duration have affected Ghana in the past. The most recent occurrences reported are those of 1981-1985 and 1998-2000 which affected power generation and resulted in load shedding as well as. The northern savannah areas are most at risk. Bush fires are an annual occurrence in the drier areas of the country. The impact is widespread and severe during drought years. Line squalls[11] occur during the start of the rains between March and May each year. Floods are localised and limited to low-lying areas during wet periods.

6. About 57.6 % of the total population is engaged in agriculture. The area under irrigation is estimated at less than 0.6% (30,269 ha) of total agricultural land of 13,628,000 ha in 2010[12]. There is limited access to irrigation and a high reliance on favourable climatic conditions. As a result of this economic instability, rural communities tend to be characterised by: relatively higher incidence and depth of poverty; higher fertility rates; higher biomass usage; lower infrastructure facilities; lower educational status and lower health status. The interaction of these aspects has made rural communities disproportionately vulnerable, with little resilience to hazards such as bush fires, flooding, and poor harvests.

7. There are four main land tenure systems in Ghana, namely, individual, family, communal and Government or State lands. Most of the agricultural land is under communal ownership which is controlled by lineage, or clan-based land-owning groups and allocated to individuals or households on a usufructuary[13] basis. Legally, both men and women can access land as long as they are recognised members of the local community. In practice, men tend to have access to larger, more fertile plots. They also have greater security of land tenure, particularly in the northern regions of the country. This situation has been amplified in recent years as pressure on the land has grown due to population growth and deterioration of the quality of the land.

8. The ***general trend*** of continuing unsustainable land use leads to rapid soil erosion, increasing loss of soil fertility and degradation, and results in low agricultural productivity. The relatively high air temperature enhances the mineralisation process in the soil, which tends to reduce the organic content, which in turn allows soils to be washed away during the rainy seasons, if not properly managed. As a result, the rural communities are locked into cycles of economic instability.

[11] A squall line is a line of severe thunderstorms that form along or ahead of a cold front
[12] Agriculture in Ghana, Facts and Figures, 2010 (SRID/MOFA, 2011)
[13] Having a right of enjoyment enabling a holder to derive profit or benefit

9. The key non-climate pressures of unsustainable land use management are soil erosion, soil degradation and loss of soil quality, all of which affect food security. The others are deforestation that lead to loss of biodiversity and increased carbon emissions. The key land-related economic activities in Ghana include large-scale charcoal production, mining, logging, agriculture and infrastructure development. Subsistence agricultural practice of slash and burn, shifting cultivation and mechanisation all result in declining soil quality and land degradation estimated to affect about 150,000 km^2 of agricultural land representing 63% of total area of Ghana[14]. Desertification is an increasing problem with an estimated percentage of total land area of Ghana prone to desertification being 64.97 %, equivalent to about 165,000 km^2. The Upper East and eastern part of the Northern Region face the greatest hazard with an area with about 78,718 km^2 prone to desertification. Total wood fuel, comprising charcoal and firewood, account for about 70 % of total primary energy supply of Ghana. 90% is obtained directly from the natural forest. The transition and savannah zones of Ghana; mainly the Kintampo, Nkoranza, Wenchi, Afram Plains, Damongo districts provide the bulk of dense wood resources for wood fuels.

10. The climate factors that exert pressure on land use are increasing temperature and reducing precipitation across all six ecological zones together with extreme events of flood and drought. The climate factors that exert pressure on land use are increasing temperature and reducing precipitation across all six ecological zones together with extreme events of flood and drought. The other pressures on land use and land sue changes identified in the national development plan include forest logging by chainsaw operators, over-reliance on timber-earning foreign exchange, over-reliance on species such as mahogany, odum, and sapele, land degradation through activities by illegal miners, surface mining by registered companies, indiscriminate sand winning (inland and coastal areas), intensification of charcoal trade to meet urban energy demands, reduced fallow periods in response to population pressures, cultivation along steep slopes, inappropriate use of agrochemicals, and general lack of awareness on climate change and its impact.

11. In summary, the ***pressures*** of inappropriate land use and management include:

- Increasing soil erosion, degradation and biodiversity loss due to increasing scarcity and over exploitation of hardwood species such as mahogany, odum, and sapele;
- Increasing desertification is attributed to exacerbation from increasing temperatures and reducing precipitation across all six ecological zones together with extreme events of flood and drought as a result of climate variability and climate change;
- Decreasing ecosystem services and food security is driven by reduced fallow periods in response to population pressures as well as ineffective cultural practices among smallholder farmers leading to comparatively lower yields;

[14] 2011-2015 Medium Term Agricultural Investment Plan, September 2010

- Increasing artisanal and small-scale /illegal mining is the result of the current high gold prices on the world market at € 1000-11200 that gives very high return on investment, a trigger for asserting resource access rights by the chiefs and the people who own the lands; and,

- Intensification of charcoal production driven by the increasing crude oil prices and liquefied petroleum gas (LPG) that leads to scarcity of LPG and obvious rise in demand for charcoal. There is also a traditional market based on cultural preference of smoking fish and meat on fuel wood fire.

1.2 Water

12. Ghana is well endowed with water resources: the Volta River system basin (consisting of the Oti, Daka, Pru, Sene, Afram and the White and Black Volta rivers) covers 70 % of the country area. Another 22 % of Ghana is covered by the south-western river system watershed comprising the following rivers; Bia, Tano, Ankobra and Pra. The coastal river system watershed, comprising the Ochi-Nawuka, Ochi Amissah, Ayensu, Densu and Tordzie rivers, covers the remaining 8 % of the country.

13. Groundwater is available in sedimentary formations underlying the Volta basin. The Volta Lake with a surface of 8,500 km² is one of the world's largest artificial lakes. In all, the total annual run-off is estimated to be 53.2 billion m³ per year, with the Volta River accounting for 40 billion m³ per year. The average renewable water is estimated to be 39.4 billion m³ per year[15]. Ground water is increasingly being used to meet the water demand in rural areas to provide potable water to communities through Community water and Sanitation Agency programmes. In 2010, the total boreholes and hand dug wells provided were 265 and 5 respectively bringing the total of the boreholes and hand dug wells from 1994 to 13,219 and 1,489 respectively. Rainwater harvesting is a source of surface water for many rural communities, particularly in the Northern Savannah. The National Water Policy, 2007 recognises that rainwater harvesting has the potential to contribute significantly to water needs of households and institutions. Indeed there are national good practices in some hospitals (Manpong Orthopaedic hospital) and in some universities e.g. Ashesi University Campus at Brekuso in the Eastern Region.

14. Water quality assessments of the south-western and coastal river systems for urban water supply have been carried out since 2005 by the Water Resources Commission. Many of the river systems analysed have maintained their quality status since 2005 though some have showed some decline in quality. For example the Weija Lake, which supplies the western part of Accra with treated water, has declined in quality from 2005. Generally, rural water quality are increasingly being impacted by artisanal and small scale mining operations and

[15] National Water Policy , Ministry of Water Resources, Works and Housing, June 2007

large scale mining operations as well large scale surface mining. As a result, rural water supply is increasingly being provided by boreholes and hand dug wells.

15. Water quality monitoring data of the Water Resources Commission (WRC) indicate naturally occurring surface waters and groundwater resources in Ghana can generally be characterised as good except for some cases of localized pollution arising from large scale surface mining operations and illegal artisanal mining ("galamsey"). Also high arsenic levels of between 40.5 to 1,290 mg/L have been observed in the Pra and Tano Basins. Two drilling records of Community Water and Sanitation (CWSA) indicate about 20% of boreholes for domestic water supplies have high concentrations of manganese, iron, or both. For instance, concentrations above the Ghana Standards Board permissible limits of 0 to 0.1 mg/1 (for manganese) and 0 to 0.3mg/1 (for iron) have been reported in the Eastern, Greater-Accra, Central, Northern, Ashanti, Volta and Western Regions. In addition, low pH (water acidity) levels are associated with groundwater in most of the geological formations in these regions. In some mining communities, high levels of arsenic have been recorded in the groundwater (e.g. at Obuasi and Prestea) and high cyanide at Sumang in the Ankobra basin above permissible levels. High concentrations of fluoride have also been observed in the Upper East, Upper West and Northern regions. Studies cited by WRC indicate about 20 to 30% of groundwater sources (boreholes) have fluoride levels higher than 1.5mg/l (WHO/Ghana Standard Boards Permissible Limit), giving rise to the need of borehole water treatment in some localities.

16. In the urban and peri-urban environment, discharge of untreated domestic waste water and industrial effluent have resulted in serious water pollution of some rivers and lagoons such as the Subin River in Kumasi, Korle and Kpeshi lagoons in Accra, Gao and Chemu lagoons in Tema, and Fosu Lagoon in Cape Coast. The discharges also are major land-based sources of pollution of the Guinea Current large marine ecosystem. Those located near industrial areas such as Korle, Chemu, and Gao Lagoons are dying due to nutrient enrichment and eutrophication, which are also sources of intense odour nuisance.

17. While water pollution constitutes a major threat, the WRC notes per capita water availability per annum is declining due to high population growth. It is projected that by 2020 the country's per capita water availability will be just over 1000 m^3 per annum which will make Ghana a water stressed country. This will further be exacerbated by observed and predicted impacts of climate variability and climate change.

18. Fluoride is one of the most reactive non-metal compounds that is common in groundwater in Ghana. The most affected parts of Ghana are the Upper East, Upper West and Northern regions. Studies indicate that the proportion of water sources (boreholes) with fluoride levels higher than 1.5mg/l (WHO/Ghana Standard Boards Permissible Limit) is in the range 20-30% posing public health-related hazards. Fluoride is also one of few chemicals known to cause significant health effects through drinking water. While fluoride is important for the protection of teeth and bones at the some concentrations, increasing levels beyond WHO maximum permissible levels enhances decay and causes a condition called fluorosis. In children, the fluoride attacks the developing tooth enamel and at higher levels causes severe

discoloration and pitting, increases the risks of crippling when levels exceed 10mg/l due to incidence of bone fracture at levels below 0.34mg/l and above 4.32mg/l. Various actions have been considered by the Community Water and Sanitation Agency that require financial support towards finding acceptable and efficient methods for dealing with the threat that high fluoride burden places on the rural water sector in Ghana.

19. Water resources in Ghana are the main sources of the country's power generation. The current installed hydroelectric capacity of 1,072 GWh comprises Akosombo (912 MW) and the Kpong (160 MW). The Bui hydroelectric project, currently under construction and located on the Black Volta, is expected to have a generation capacity of 400 MW. In addition to increasing the domestic electricity supply, power generated from Bui could boost exports to neighbouring countries. Another potential facility, located on the Pra River, would have a total generating capacity of 125 MW.

20. The impoundments of water in Ghana are not only for power and potable water supply, but also serve as potential irrigation sources for agriculture. The total water-managed area in the Volta Basin is about 6,400 hectares (ha) [16] though the area actually irrigated may only be 4,000 ha, since a large part of the area under irrigation is not currently in use. It is estimated that the irrigation potential of Ghana is about 500,000 ha, which could be used effectively for enhancing the national food security system as part of an adaptation strategy to respond to future climate change.

21. The lack of clean drinking water and sanitation systems is a severe public health concern in Ghana, contributing to 70 % of diseases in the country. Households without access to clean water are forced to use less reliable and hygienic sources, and often pay more.

22. The ***general trend*** is that water resources are increasingly at risk because of climate and non-climate factors: climate factors include; increasing temperature and warming and high evapo-transpiration of lakes and lagoons, decreasing precipitation and declining underground recharge rate and stream flows of major water basins, unpredictable rainfall patterns across all agro-ecological zones, and high frequency of extreme events of drought and floods; and, the non-climate activities include deforestation within catchments, inappropriate waste disposal of solid waste, and domestic, commercial and industrial wastewaters, poor agricultural practices especially unsustainable farming practices with agrochemical application in the water catchment , population pressures leading to watershed land conversion from forest to other land uses (e.g. settlements), deforestation through fuel wood harvesting, and charcoal production, surface and alluvial mining that affect water quality and quantity through sedimentation, sediment loading, and chemical contamination.

23. Health, nutrition and food production, are dependent on availability of water in adequate quantities and of good quality. Lack of potable water, occurrence of drought or floods expose people, especially women and children, to water-borne and sanitation-related diseases. Water is also used for hydropower generation, transport services and tourism.

[16] FAO, 1999

Population growth and concentration, rapid urbanisation and industrialisation have resulted in increasing water scarcity and often of low or reduced quality.

24. Since 2006, urban water coverage has increased from 55% to 62% in 2010, while rural communities and small towns increased from 46.7% in 2003 to 62% in 2010 and 63.35 % (2011) towards the attainment of MDG 7 target for water and sanitation[17]. The contribution of development partners (DPs) in financing water and sanitation service and investment activities in the sector has been consistently high over the years. In the 2006, the DPs contributed 88 % of investment funding, the Go 11.5 % and beneficiary communities and District Assemblies provided about 0.5 %. Applying the national average cost of delivering facilities, the estimated cost for achieving 76 % water coverage for rural populations and small towns under community management is approximately US$ 125.1 million as at 2007.

25. The increasing national water coverage also improved sanitation coverage from 10% in 2006 to an estimated 13.06% by 2011. The Community Water and Sanitation Agency facilitates the provision of demonstration latrines, hygiene promotion and the disposal of faucal matter as it affects the usage of water. Domestic wastewater (sewage) is treated predominantly in septic tanks in the urban areas, while the rural and small towns rely on the Kumasi Ventilated Improved Pit Latrines (KVIPL). The total household and institutional latrines increased by 4,217 and 234 respectively in 2011 reaching a total of 69,304 for the period 1994-2011.

26. Solid waste generation is estimated at about 0.45 kg per person per day based on urban population (IPCC default value for Africa is 0.75). Based on the 2010 population and housing census, the urban population increased from 44% (8.878 million) to 51.50% (12.562 million). Solid waste generation in 2010 stood at 5650 metric tonnes. The low collection efficiency estimated at 60-65% (IPCC default for Africa 69%) leads to solid waste accumulation at solid waste disposal sites and associated public health implications. The high organic content results in degradation and foul odour nuisance generation. The disposal in un-engineered dump sites results in the production of leachate which can potentially contaminate ground water.

27. The Integrated Water Resources Management Plan, while recognising that Ghana is endowed with adequate fresh water resources, acknowledges the risk of contamination, degradation and depletion from uncontrolled land-based water catchment pollution due to poor agricultural practices (essentially farming with agrochemicals and deforestation along the river banks), as well as population pressure leading to land conversion from forest to other land uses: crop land and settlements.

28. It is estimated that unimproved sanitation is 13%, the shared latrines about 54% and others 20%. This translates into 16 million Ghanaians using unsanitary or shared latrines and 4.8 million with no latrines. It is estimated that open defecation could cost Ghana US$79 million per year, while eliminating the practice would require less than 1 million latrines.

[17] The State of Ghanaian Economy, ISSER, 2010

According to WHO, 88% of diarrhoea cases are attributable to poor environmental factors, particularly arising from poor sanitation. Scientific evidence indicates that basic sanitation interventions could avert 36% of diarrhoea cases and sanitation and hygiene combined could avert 45% cases. The total cost of poor sanitation in Ghana is estimated at $290 million representing 1.6% of the Ghana's GDP.

29. The most important priority of the Water Resources Commission is the need to protect and manage the water catchment buffer zones. Currently, the Commission has no jurisdiction over the buffer zones. The land in the watersheds and water impoundments for water supply must be acquired and appropriate compensation paid to the land owners. A Riparian Watershed Management bill is therefore being promulgated to acquire the lands and facilitate comprehensive watershed management. The lack of the legislation has led to severe encroachment of the watersheds, deforestation, farming, and soil erosion, and silting of impoundments.

30. The key driver and pressures identified for national policy response measures include: increasing conversion of wetlands to other forms of land use; weak regulation of water supply through impoundments; salt water intrusion in the coastal areas resulting from reduction in upstream water input; degradation of wetlands soils due to increasing exposure, sediment and nutrient diversion by impoundments; pollution of wetlands due to indiscriminate waste disposal, and over exploitation of wetlands. The others are deforestation in wetlands catchments; invasion of water weeds; and inadequacy of water to restore and preserve the natural character and functions of ecosystems.

1.3 Air

31. The main industrial activities are: mining, agriculture and manufacturing which all contribute towards atmospheric pollution: gaseous contaminants and particulate matter and which have an adverse social and economic effect on human health. In addition, there are localised poor quality hotspots due to bush fires and vehicle exhaust gases. The current capacity to monitor and enforce comprehensive environmental standards in air quality appears weak.

32. Urban air quality is monitored and reported by the Environmental Protection Agency (EPA). The main sources of pollutants are open municipal burning of waste, particularly of used tyres, particulate dust, (ageing) vehicular emissions, and industrial emissions. There has been a noticeable improvement since the Lead Phase Out initiative, before which air quality was generally higher than World Health Organisation (WHO) recommended levels.

33. The results showed that before the phase-out of lead in 2000-2003, the levels of PM_{10} were; 150 μ g/m^3 for residential areas, 198 μ g/m^3 for commercial and industrial areas and 445 μ g/m^3 for road sides. These values were all above the recommended WHO levels of 50 μ g/m^3. The corresponding values, after the switch to unleaded petrol by the removal of tetra

ethyl lead (TEL) were below 1.97 parts per billion. The urban air quality monitoring, reported and verified the benefits of the lead phase-out programme. Lead and manganese levels are well below WHO levels.

34. Urban centres and residential are being increasingly subject to noise pollution.

35. The ***general trend*** is of improved lead levels below health hazard with phase out of tetra ethyl lead in petrol, increasing poor particulate quality of urban air (which could be improved with the paving of roads) and a continuing poor quality of indoor air quality in rural communities arising from fuel wood burning for cooking and heating hot water.

36. Monitoring of urban air quality and indoor air quality by the EPA indicates high levels of hazardous pollutants (excluding lead and manganese), particularly suspended particulate matter (SPM and PM_{10}). Lead levels have consistently met WHO health standards since the implementation of the lead phase-out project in 2005 that eliminated Tetra Ethyl Lead (TEL) in the production of petrol. Ghana also banned the import of leaded fuel. The major point sources of pollutants are industrial facilities, agriculture, and human settlements with the major contribution from mobile sources being vehicular emissions. Vehicular congestion in urban areas, especially Accra, Tema and Kumasi, produce high emissions, notably from poorly-maintained old vehicles with deteriorating engine performance and fuel efficiency, as well as noise pollution.

37. In summary, the pressures and drivers of increasing non-GHG atmospheric emissions arise from deteriorating urban air quality driven by weak enforcement of EPA National Air Quality Guidelines and no regulations on vehicle emissions standards except the applicable criminal law on nuisance without quantified limits.

1.4 Climate

38. Ghana is located in the tropical region of West Africa between latitudes 11.5^{o}N and 4.5^{o} S and longitude 3.5^{o} W and 1.3^{o} E. The climate is dominated by two major air masses: the dry and warm north-east trade winds and the moist south-westerly or the monsoons. The moist maritime monsoons are associated with rainfall while the dry trade winds bring dry conditions. Thus the country has distinct dry and wet seasons depending upon the dominant wind in the area.

39. The country is spanned by three hydro-climatic zones; the Volta Basin System, the South-Western Basin System and the Coastal Basin System. The South-Western System is the most humid part of the country with a mean annual rainfall between 1500 mm and 2000 mm. The Volta Basin System covering the northern part of the country has mean annual rainfall of about 1000 mm in the savannah area and about 1500 mm to 2000 mm in the forest area. The Coastal Basin System is the driest with mean annual rainfall of about 900 mm.

40. The mean annual temperatures monitored and reported by the Ghana Meteorological Agency (GMA) for the period 1960-2000 for six major ecological zones provides evidence of increasing surface air temperature in Ghana. During the 40-year period (1960-2000) the Sudan Savanna increased by 0.9 ^{o}C from 28.1 ^{o}C in 1960 to 29.0 ^{o}C in 2000, and the Coastal Savanna by 0.7 ^{o}C from 27.0 ^{o}C in 1960 to 27.7 ^{o}C in 2000. The changes in rainforest mean temperature however were relatively low, and increased by 0.4 ^{o}C from 26.5 ^{o}C to 26.9 ^{o}C during the same period (Second National Communication, SNC). The GMA data for corresponding annual rainfall totals within all six ecological zones showed decline.

41. The ***general trend*** is of a mean annual temperature rise by 1.0 to 3.0 °C by the 2060s (USAID, 2011) and 1.5 to 5.2 °C by the 2090s with the projected rate of warming being most rapid in the northern inland regions of Ghana than the coastal regions. Although the projected mean temperature increases most rapidly in the interior regions of Ghana, the projected changes in the daily temperature extremes ('hot' and 'cold' days and nights) in Ghana are largest in the coastal areas, and smaller inland. Projections of mean annual rainfall are unclear with around half the climate models projecting increases and half projecting decreases.

42. Climate change will affect different regions of Ghana differently. For instance, northern Ghana has the highest poverty levels in the country and is also where temperatures are hottest, rainfall is low and there is only one rainy season. The predicted and observed situation is one is of decreasing rainfall and increasing temperatures which combine to make the north the most vulnerable region of Ghana to adverse effects from climate change. Projections indicate sea-surface temperatures will increase in Ghana's waters with potential negative implications for the dynamic and critical link between timing and intensity of the coastal upwelling and fishery productivity. Underlying all the predicted vulnerability of natural resources to global climate impacts on Ghana's natural resources and the people, resource issues and agricultural development is the difficulty posed by the complexity of land rights (access to and tenure of land, tree tenure, and benefit sharing) associated with both customary and statutory systems.

43. In summary, the ***pressures and drivers*** of increasing climate variability and change will affect rural development with potentially enhanced rural to urban migration, agricultural development and food security, water security, energy security, increase disaster risks and extreme events.

1.5 Geology, Seismicity and Mineral Resources

44. Though Ghana is far away from the major earthquake zones of the world, it is prone to some earthquake disaster. Ghana has records of damaging earthquakes dating as far back as 1615 with the last three major events occurred in 1862, 1906 and 1939. Historical earthquakes of

magnitude greater than 6.0 and current local tremors with magnitudes ranging from 1.0 to 4.8 on the Richter scale have been recorded since the establishment of the seismograph observatory equipped with a Worldwide Standard Seismograph Network (WWSSN) system was established at Kukurantumi in Eastern Ghana. On 11 March 1964 and 9 February 1969 earth tremors of magnitudes (*ML*) 4.5 and 4.7 were recorded respectively (Quaah, 1980). Both events were felt in Accra. The 1964 event was located not far from the multi-million dollar hydroelectric dam in Akosombo. The latest tremors, which were felt in all the regional capitals, occurred on 8 January 1997, 14 February 1997 and 6 March 1997. The National Earthquake Information Centre in the USA located the 6 March event at 5.518N, 0.313W, body magnitude (*MB*) at 4.4 and at a depth of 10km. The local magnitude was 4.8 on the Richter scale. Many minor tremors were recorded from 1998 to 2002 with magnitudes ranging from 1.0 to 3.0 on the Richter scale with intensities ranging from I to IV

45. Gold, diamonds, manganese, bauxite have been mined in Ghana for several years. Diamonds, manganese, and bauxite are open cut mining operations. Large-scale gold mining has been predominantly underground mining operations in Ghana until the early 1980s. Gold recovery technology innovation led to the economic recovery of low grade ores that made the surface ore mineralisation rich enough for surface mining. Indeed, the efficiency of the technologies made the processing and recovery of gold from tailings dams of old mines very profitable, and sustained the gold industries when gold prices slumped to record lows below € 150 per ounce of gold.

46. The current gold prices, greater than € 1200 per ounce of gold, is driving the gold rush in Ghana. Gold winning has increased from 2,457,152 ounces to 3,332,806 ounces representing a 36% increase from 2000 to 2006, with a doubling over 1996 production. During the same period, diamond extraction has decreased by 65%, bauxite increased by 18% and manganese increased by 75%. In 2010, it is estimated that the mining sector employed 20,000 Ghanaians directly in large scale mines, 6,000 in mine support services, and about 500,000 in small-scale gold, diamonds and quarry production. The sector recorded a growth rate of 7.6% and contributed 1.8% of real GDP growth of 5.9%. While gold production increased by 36%, the revenue rose from US $702.0 million in 2000 to US $3,803.52 million in 2010 representing more than a fivefold increase. The increasing gold price keeps driving the economic value of gold ores and makes the operations of ASMs very lucrative, without counting the cost of mitigation because it is not internalised in their operations. The rationale for such reclamation exercise is to demonstrate to communities that mined out areas can be reclaimed for economic use.

47. Large scale mining operations result in socio-economic conflicts usually arise as a result of land-use conflicts with other economic activities; land being the main source of livelihood for these communities. Alternative Livelihood Projects (ALP) in mining communities is being considered. The projects will not be limited to reclaimed lands by large scale mining operations under the reclamation bond regulations, but will be expanded to include the reclamation of degraded land by illegal artisanal and small scale miners by the government and conversion of the lands to plantations of economic trees such as oil palm and citrus. The Ministry has also been working with the National Board for Small Scale Industries (NBSSI),

to develop non-mining skills such as fish farming, snail rearing, livestock and poultry farming, soap making, batik and dye, in mining communities.

48. Ghana is a country with extensive mineral resources (second largest producer of gold in Africa, with at least twelve formal gold mines, seven of which are large open-pit operations). It is the third largest producer of bauxite and manganese on the continent. Small amounts of diamonds are also found in Ghana. Small-scale (gold and diamond) mining provides substantial national employment.

49. There are no major phosphate deposits or economic gypsum deposits, though there are several large and many small limestone and dolomite deposits in Ghana. Most of the limestone deposits have been investigated for their potential use in the cement industry.

50. Ghana has a long history of mining exploration, but the oil and gas sector is a new and increasingly important economic sector for the country. The oil find areas in Ghana include: Nzema East Municipal, Secondi Takoradi Metropolitan, Ellembelle, Ahanta West, Jomoro, Agona West District Assemblies and their surrounding communities, as well as offshore. The local economic activities in the oil and gas exploration and production areas are cocoa production and export, timber and other forest products export, fishing and agricultural. Advocacy groups such Oil Watch have undertaken independent socio-economic and environmental baseline studies. The findings indicate the productivity of ecosystems is at risk and impact negatively on the livelihood income sources and possible dislocation of other trade opportunities if not managed properly.

51. The survey of the communities identified communities the key pressures on the environment include: grabbing of farmlands for petroleum production and its auxiliary services by potential investors and local business operations and its potential relocation and socio-cultural challenges.; land degradation, marine water pollution, gas flaring effects like increased green house emissions, poor public health and safety; increase prevalence of infectious diseases like, HIV, malaria, tuberculosis and other oil extraction and pollution related problems and diseases such as skin rashes, eye inflammatory diseases, respiratory tract infections and others, social conflict and increasing harassment and intimidation of inhabitants by oil company personnel and state security, increasing unemployment of the local people, widening poverty gap and underdeveloped infrastructure within affected communities.

52. The key drivers of the pressures would include: increasing activities that constitute threat to the environment, marine and coastal resources that would affect fish stocks and the local fishing industry, fresh water and local agriculture, increased land degradation and deforestation due to the exposure of protected lands and rapid growth in population of satellite villages. Gas flaring which is normally done during exploration releases gases such as nitrogen dioxide, sulphur dioxide, volatile organic compounds like benzene, toluene, xylene and hydrogen sulphide. The flares, depending on the intensity, will coat nearby lands with soot and can damage adjacent vegetation and soils, affect soil quality crop yield.

53. It is also anticipated that the construction of the gas infrastructure through pristine areas will expose the protected forests areas to loggers, ranchers and displaced people which may lead

to deforestation, land degradation and biodiversity loss. Lessons from other oil and gas developments indicate local fishing productivity inshore and shallow waters into deep-sea can be affected. The impact on agriculture productivity and food security, and livelihood of the subsistence families can potentially be threatened and be a source of conflict.

54. The ***general trend*** is one of severe land degradation due to uncontrolled and increasing ASM activities particularly the operations that are non- registered or non-regularised under the small scale mining regulations, named locally as "*galamsey"* meaning *" get them and sell"* and associated surface water pollution; mercury pollution, as well as increasing large scale mining operations that impacts local populations livelihood, and emerging potential impacts of oilfield operations and future natural gas infrastructure development under the GoG policy of no flaring.

55. The Extractive Industries Transparency Initiative (EITI) sets a global standard for transparency in oil, gas and mining. To achieve EITI-compliant status, a country must complete an EITI Validation. Validation is an essential element of the EITI global standard and provides an independent assessment of the progress achieved and identifies what measures are needed to strengthen the EITI process. Ghana signed this initiative in 2003 and has since been implementing activities to enhance transparency in the mining sector. As part of the process of developing the reporting templates for the oil and gas sector following the extension of the EITI to oil and gas sector in September 2010, the National Steering Committee organised a technical round table workshop in May, 2011 to discuss the way forward with respect to the preparation and finalisation of the EITI templates which will be used to capture the revenue streams for the oil and gas sector.

56. Gold, diamonds, manganese, bauxite have been mined in Ghana for several years. Diamonds, manganese, and bauxite are open cut mining operations. Large-scale gold mining has been predominantly underground mining operations in Ghana until the early 1980s. Gold recovery technology innovation led to the economic recovery of low grade ores that made the surface ore mineralisation rich enough for surface mining. Indeed, the efficiency of the technologies made the processing and recovery of gold from tailings dams of old mines very profitable, and sustained the gold industries when gold prices slumped to record lows below € 150 per ounce of gold.

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economic value of gold ores and makes the operations of ASMs very lucrative, without counting the cost of mitigation because it is not internalised in their operations.

58. The pressures on the environment from mining associated with excavation, and transportation of ore, processing, and recovery of gold, handling of process and wastewater have been studied in 61 sites[18] under the Mining Sector Support Project of NREG. The impacts identified the key impacts on landscape include destruction of flora and fauna, the discharge of metals including mercury, process chemicals, suspended solids in water and suspended particulates in air, instability and collapse of tailings dams and waste rock dumps, lack of non-compliance of companies with legislation and monitoring and non-compliance with legislation, deficient handling of mining waste and waste dumps and socio-economic concerns of the communities. The study also identified high levels of arsenic in community water sources above WHO guidelines, traces of cyanide in drainage water sources, and mercury impregnation mainly in areas where ASMs were concentrated, and elevated concentrations of suspended solids in surface waters.

59. Large-scale mining is subject to environmental and social impact assessment with mitigation measures enforceable by EA Regulations LI 1652. They are also regulated by reclamation bonds which are deposited upfront against sustainable implementation of reclamation plans. There is an enforcement mechanism that drives large mining operations to address the environmental issues. The ASM are very different. There are few regulated small-scale mining operations. Generally, they do not have the capacity and knowledge for regularisation. Operating as illegal mines, the non-permitted ASMs do not have the capacity and the know how to integrate sustainable land and mining practice in their operations.

60. In summary, the key drivers of the ***pressures and drivers*** from the extraction, transport, treatment and recovery of precious metals and stones are:

    - Increasing short term rural wealth from gold rush as a result of the high gold prices in the world market that gives very high rate of return on investment, since the cost of environment is not internalised in their accounts;
    - Increasing land degradation due the large number of operators because of the wide area of coverage in the northern, Ashanti, Eastern and Western regions of Ghana;
    - Decreasing water quality due to direct discharge of process water into the wetlands, or direct panning of alluvial gold in the water bodies;
    - Increasing compromise of potential land space as a result of inability to use geological survey to determine mineralisation;
    - Unregistered ASMs operate illegally and make their activities criminal and do not qualify for technical assistance and extension service to build capacities for sustainable operations;
    - Inadequate capacity of Mineral Commission and the EPA at the local level for compliance monitoring and enforcement of Environmental Impact Assessment (EIA) mitigation commitment; and,

[18] EU Framework Contract Report, 2010

- The new method of non-mercury recovery of gold is not fully embraced due to lack of continued promotion and awareness.

61. The local economic activities are cocoa production and export, timber and other forest products export, fishing and agricultural. Oil and gas development threatens the productivity of these livelihood income sources and possible dislocation of other trade opportunities if not managed properly. A survey[19] of the communities that would potentially be affected identified The Nzema East Municipal, Sekondi Takoradi Metropolitan, Ellembelle (The Constituency of the First President, Osagyefo Kwame Nkrumah), Ahanta West, Jomoro, Agona West District Assemblies and their surrounding communities like Cape Three Points, Half Assini, Ellembelle, Princes Town, Axim, Discove, Busua, Miamia, Akwidae,Wotera, Sekonde, Eziama, Nkroful and Secondi-Takoradi.

62. Whilst oil and gas development will bring many benefits, the more obvious, potential environmental and social impacts are well-known and could be minimised with careful attention to management and regulation:

- Land grab of agricultural land for production and its auxiliary services by potential investors and local business operations with potential adverse relocation issues;
- Potential land degradation, water pollution, and air quality impacts from gas flaring;
- Increased prevalence of infectious diseases such as, HIV, malaria, and tuberculosis;
- Social conflict and tensions between local communities and oil and gas companies;
- Unemployment of local people, widening the poverty gap and leading to underdeveloped infrastructure within affected communities; and,
- Development of satellite communities that can potentially become slums if not supported adequately.

63. In summary, the ***pressures and drivers*** from oil and gas exploration and production are increasing activities that potentially constitute a threat to the environment, the marine and coastal resources and affect fish stocks, local fishing industry, fresh water and local agriculture; and increased land degradation and deforestation due to the exposure of protected lands and rapid growth in population of satellite villages.

1.6 Forest, Vegetation, Ecosystems and Biodiversity

64. Ghana has approximately 2.6 million ha of forest reserves dedicated to production, about 500,000 ha of unreserved forests, as well as an additional 2 million ha of crop land that also

[19] Effect of Oil and Gas Exploration at the Jubilee Field on Water Quality in Oil Rich Coastal Communities in Western Region of Ghana (CEIA)

produce timber. Ghana's forest and woodland resources provide diverse economic products and environmental services. The condition of Ghana's forests has been in decline for many years, particularly since the 1990s. Since then, total stocks have decreased and the forest is degraded with many forest reserves being heavily encroached and the off-reserve carbon stocks being rapidly depleted. Wood for timber, fuel wood and charcoal, wildlife and other non-timber forest products are all being extracted at levels that are above the replenishment level. Annual timber production of Ghana is estimated to be about 3.5 million m^3 of round wood, half of which is destined for export markets. The other half is destined for the domestic market which is often not in full compliance with Ghanaian laws and regulations.

65. Ghana has a strong reputation for innovation in wood processing and value addition, making products particularly suited for the European market. Consequently, the EU is a valuable market for Ghana, accounting for 43% of the value of total exports and 33% of total volume. The Forest Law Enforcement, Governance and Trade (FLEGT) Voluntary Partnership Agreement (VPA) is a bilateral agreement between the European Union (EU) and wood-exporting countries, which aims to improve forest governance and ensure that the wood imported into the EU has complied with the legal requirements of the partner country.

66. The VPA will provide a legal framework and compliance monitoring system aimed at ensuring that all timber imports into the EU from Ghana have been legally acquired, harvested, transported and exported. Ghana expects that the VPA will help further its governance reforms of the forestry sector, contribute to sustainable forest management, provide conditions that encourage investment in forest restoration and thus improve the resource base, realise the full economic value of forests and ensure that the forest sector contributes to poverty alleviation.

67. Many forest reserves are degraded from excessive extraction of timber and other resources. Some forest reserves have undergone replanting with exotic species such as Teak (*Tectona grandis).* The *Transition zone*, formerly a forested area is rapidly turning into savannah and expanding further into the moist forest zone. There is rapid deforestation and loss of watersheds. Charcoal burning is severe in the zone relying heavily on trees. Incessant charcoal burning in certain parts of the country leads to a decrease in tree numbers and ultimately affects biodiversity. In the *Northern Savannah*, the situation is not different from the coastal savannah with rapid deforestation.

68. The challenges of illegal logging are widely known and documented, the development and implementation of sound and effective responses has proved intractable. In particular, existing arrangements of land ownership and administration, tree ownership and user and access rights, have made it difficult to retain and manage trees on a long term basis. Illegal logging has increased. In addition, the increasing population places demands on land for agricultural land, and other economic uses of the land space, particularly illegal artisanal mining "*galamsey*" and unsustainable, small-scale mining) which are considered to be of a higher, short-term, benefit than those provided by the forest resources.

69. It is estimated that 60% of all wood taken from forests globally is burnt as fuel -either directly or by first converting it into charcoal. In 2009, Ghana's fuelwood consumption was estimated

at 20 million metric tonnes; consumption of industrial round wood is 1.35 million m^3 and sawn wood is 0.48 million m^3. Wood fuel provides 65-70% % of Ghana's total annual energy demand. Imported petroleum and electricity make up the remainder. Wood for fuel supports most informal enterprises including bread-baking, processing oil-palm, local brews, traditional textiles, traditional soap making, fish smoking and traditional food services. More than 80% of households use firewood or charcoal for cooking and perhaps as much as 60% in urban areas, even when there is an alternative energy source (e.g. electricity or gas). 90% of fuel wood is derived from the forest. The demand for wood-fuel has for the past years been on the increase. It is estimated the consumption will reach more than 25 million tonnes by the year 2020[20]. Most of the wood-fuel supply will be obtained from standing stocks i.e. about 15 million tonnes from standing stock and the rest 10 million tonnes from regeneration or yield. The implication is a direct depletion of standing stocks and consequent increase in the rate of deforestation. Wood-fuel resources are depleting at a faster rate as a result of unsustainable practices in the production and marketing of the product that incurs high levels of waste. According to the UN Food and Agriculture Organisation (FAO), the rate of deforestation in Ghana is 3% per annum (FAO, 2002).

70. The ***general trend*** is of increasing degradation of the forest resource with weak institutional capacity in forest resources management, complicated tenure and tree rights, and increasing threats from a growing population need to use the land space for other productive purposes. Other factors that contribute to forest degradation are: high timber demand of depleted hard wood and illegal logging by chainsaw operators, lack of regulatory enforcement and corruption, increasing regulated mining in productive forest, large scale illegal artisanal mining ("galamsey") driven by current high global gold prices and illegal foreign participation at the community level, fuel wood and charcoal production.

71. Ghana has a rich stock of biological diversity; it lies within the three main bio-geographical zones, namely: the south western portion within the Guineo-Congolian, the middle belt within the Guineo-Congolian/Sudanian transition zone, while the northern-tip of the country falls within the Sudanian zone. Despite the lack of information on the full coverage of the biological resources of the country, particularly for marine and other aquatic ecosystems, so far about 2,974 indigenous plant species, 504 fishes, 728 birds, 225 mammals, 221 species of amphibians and reptiles have been recorded. Three species of frogs, 1 lizard, and 23 species of butterflies have been reported to be endemic[21].

72. Biodiversity in Ghana is under severe pressure in all ecological zones in varying degrees. The forest and dry and sub-humid (savannah) biodiversity in protected areas are assessed to be of very good condition, while those in some reserves and off-reserve areas are considered as good through fair to bad conditions. The National Biodiversity Strategies Action Plan notes declining trends, especially in forest, dry and sub-humid, marine and coastal and inland water biodiversity as well as the special species composition, numbers, density, dispersion and distribution. The major threats to biodiversity include land-use conversions, over exploitation

[20] Ghana Action Plan for Sustainable Energy for All, 2030 (Energy Commission, 2012)
[21] restricted or peculiar to a locality or region

of resources, pollution, invasive alien species, climate change effects, predation, mis-application of chemicals into the environment and wild fires.

73. There is erosion of biodiversity of crops. Some yam species have completely disappeared from the system. For livestock, some cattle breeds are on the decline. The West African short horn cattle which used to constitute about 80% of the national cattle population in the 1990s now constitutes about 47% of the national cattle herd. In the coastal savannah, there is severe reduction in the production of ecosystems goods and services through loss of fishing grounds, housing materials, grazing lands, farmlands and productivity, wildlife habitats, energy sources, local displacement of species and scarcity of water sources.

74. Threatened species are also noted. These rivers and streams fish populations are declining, while molluscs and aquatic plants increase e.g. invasive aquatic weeds (such as water hyacinth). Lakes/reservoirs, lagoons/estuaries and wetlands are all declining. Marine mammals are all threatened. Fifteen species of water birds with some species increasing, a few stable, others decreasing. Three species of marine turtles confirmed (Leatherback, Olive Ridley and Green). Generally, fish stocks are declining three species of plants in mangroves are prominent, namely *Avicenia sp., Rhizophora sp*. and *Laguncularia sp*. There is rapid decline in extent of all three; *Laguncularia* is the most threatened.

75. The ***general trend*** is of increasing loss of biodiversity through illegal logging, destruction of natural habitats, charcoal production, poaching, forest governance, declining fisheries, loss of wetland ecosystem services.

76. The conversions of forest to other land uses are attributed to large scale farming, mono-cultural plantations e.g. for teak, settlement sitting, traditional farming practices with the use of fire. Habitat degradation results from such activities as pollution, misuse of fire, over harvesting of genetic resources, misapplication of chemicals. Over-exploitation includes excessive cutting of trees in stressed environments for fire wood as energy source, by-catch and use of inappropriate harvesting techniques such as pair trawling and beach seine. Climate variability and climate change and extreme events of flood and increased drought frequency also impacts negatively on biodiversity.

77. Many forest reserves are degraded from excessive extraction of timber and other resources. Some forest reserves have undergone replanting with exotic species such as Teak (*Tectona grandis*). There is erosion of biodiversity of crops. Some yam species have completely disappeared from the system. For livestock, some cattle breeds are on the decline. The West African short horn cattle which used to constitute about 80% of the national cattle population in the 1990s now constitutes about 47% of the national cattle herd. In the coastal savannah, there is severe reduction in the production of ecosystems goods and services through loss of fishing grounds, housing materials, grazing lands, farmlands and productivity, wildlife habitats, energy sources, local displacement of species and scarcity of water sources.

78. The Transition zone, formerly a forested area is rapidly turning into savannah and expanding further into the moist forest zone. There is rapid deforestation and loss of watersheds. There is decline in soil fertility. Charcoal burning is severe in the zone relying heavily on trees.

Incessant charcoal burning in certain parts of the country leads to a decrease in tree numbers and ultimately affects biodiversity. In the Northern savannah, the situation is not different from the coastal savannah with rapid deforestation. There is high intensity of wild fires and human migration into the forest zone. There are also the increasing incidents of floods and droughts (leading to land degradation and desertification). The trend leads to food insecurity, water scarcity, disruption of social structure (emigration) as the young ones desert home leaving the old people behind, loss of cultural heritage e.g. totems, loss of energy sources, loss of lives and property.

79. There are opportunities for reducing deforestation and minimising the negative environmental, economic and social impacts through the FLEGT/VPA and Forest Investment Plan (FIP) initiatives. The FIP is attempting to address some of the more intractable problems. The medium to long term strategy is to reduce emissions from deforestation and degradation, while strengthening institutional capacity in forest resources management, expanding and diversifying management options, improving governance, strengthening the regulatory mechanisms, streamlining tenure and tree rights, improving local livelihoods and supporting mitigation and adaptation to climate change.

80. In summary, the ***pressures and drivers*** of inappropriate management of forestry, wildlife and other biodiversity arise from Inadequate enforcement of laws and regulations of forest product extraction (timber and non-timber), inappropriate forest and fisheries practices, increasing use of fuel wood and charcoal by 80% of the population, increased poaching, use of non-timber forest products frequency of fires, introduction of alien species, unregulated fisheries and wetland conversion to other forms of land uses

1.7 Human Settlements

81. In the rural areas, Ghana is not only experiencing increasing temperature trends and decreasing rainfall, but also unpredictable and unreliable rainfall patterns. This makes it difficult for the indigenous and vulnerable farmers to determine the rainfall seasons for crop production, which affects farmers using indigenous knowledge, with consequences for future food insecurity.

82. The increased drought frequency between floods has affected the stream flows of many rivers such as the Volta Pra, Ayensu and other water river basins. The declining recharge of the Volta reservoir for instance has significantly affected hydropower production from the Akosombo dam, which has resulted in a number of shut downs and start ups of the country's aluminium smelter operations in Tema. Since the viability of the smelter was modelled on the use of hydropower production at relatively low cost, the smelter remains closed down or operates at very limited capacity due to the increasing component of thermal power generation with light crude oil, which is a more expensive fuel source.

83. The 1982/83 drought is reported to have had very severe consequences in the Sahelian belt (Mali, Chad, Burkina Faso, Mauritania) and in the northern part of Ghana where an estimated 250,000 people and millions of wild and domestic animals died. In Ghana, the frequency and the magnitude of effects of floods have become annual events felt mostly in Accra. Minor flooding events have been recorded in Kumasi, Tamale and Sekondi-Takoradi. In 2010 and 2011 for example, there was very intensive rainfall in Accra that resulted in the flooding of several parts of the city; more than twenty four people died and several properties were destroyed.

84. The linkage between spatial/land use planning and socio-economic development in the planning and management of cities, towns and communities in the country is weak at all levels. The issue of land ownership poses a major challenge to land use in the country. Problems associated with this include the general indiscipline in the land market; complicated land tenure system; and cumbersome land title registration procedures all of which impede the efficient use of land for development purposes.

85. The ***general trend*** is of an increasingly inadequate spatial and development planning; inefficient spatial/land use plans; weak plan implementation and weak enforcement of planning and building regulations; lack of integration of climate change adaptation and disaster risk reduction into land use planning; and inadequate human resource capacity for land use planning.

86. More than 50 % of the population is engaged in agricultural activities namely; farming, forestry, fishing and hunting while the 48.4 % in non-agriculture made up of mining, manufacturing and services. Agriculture grew 7% in 2010 while industry 6%. The agriculture contributed 29.9% to the total real GDP growth in 2010. The country produces a variety of crops in various climatic zones which range from dry savannah to wet forest and which run in east-west bands across the country. Agricultural crops, including yams, grains, cocoa, oil palms, kola nuts, and timber, form the base of Ghana's economy.

87. Agriculture is predominantly on a smallholder basis in Ghana. About 90% of farm holdings are less than 2 ha in size, although there are some large farms and plantations, particularly for rubber, oil palm and coconut and to a lesser extent, rice, maize and pineapples. The main system of farming is traditional with the hoe and cutlass being the main farming tools. There is little mechanised farming, but bullock farming is practiced in some places, especially in the North. Agricultural production varies with the amount and distribution of rainfall. Soil factors are also important. Most food crop farms are intercropped. Mono cropping is mostly associated with larger-scale commercial farms.

88. Livestock in Ghana plays a major economic, social and cultural role in the lives and livelihoods of smallholder farmers, processors and traders. It is a source of protein hence contributes to balanced human nutrition. It acts as a bank and insurance in times of urgent financial needs, since it generates cash income. It also helps to maintain soil fertility and structure through manure. Livestock also provides draught power particularly in the northern regions, which enables bullock-owning households to cultivate 60% more land than those

who do not. Women benefit from livestock, since they are able to own pigs and small ruminants, and are able to control income generated from these livestock.

89. In summary, the pressures and drivers of inappropriate agriculture and livestock management arise from, Unauthorised extension of agricultural land, increased shifting cultivation intensification of land use due to low yields, mis-use of irrigation and water use, reduced pest control, overgrazing, ineffective rangeland management (use of fire and water), and inappropriate livestock waste handling pollution management

1.8 Energy Production

90. Ghana's energy sector can be classified into three main categories; biomass (fuel wood and charcoal) petroleum and power. Biomass constitutes 65-70 % of the total energy supply of Ghana[22]. The other 30 % is made up hydropower and petroleum. 90% of the biomass is obtained directly from the natural forest, and the remaining 10 % is from wood waste generated from logging and sawmill. Generally, 60 % of the world's total wood is used for energy purposes. Charcoal production constitutes a key driver of land degradation in the energy sector. UN Food and Agriculture Organisation (FAO) estimated the rate of deforestation in Ghana at 3% per year in 2000. Based on 2000 consumption, the projected consumption by 2020 will reach 25 million tonnes of fuel wood.

91. Ghana's petroleum industry is divided into the upstream and downstream sector. The upstream activities include the procurement and refining of crude oil by the nation's only petroleum refinery, the Tema Oil Refinery. The downstream activities include the marketing and distribution of petroleum products by oil marketing companies and the pre-mixing of petroleum products for other industrial uses. The petroleum sector has, since 2003, experienced significant growth, particularly since the discovery of oil in commercial quantities in the Jubilee fields in 2007.

92. Hydroelectricity is the primary source of Ghana's power and is generated by largely by the Volta River. In 2010, hydropower accounted for 68.8% and thermal power 31.2%.[23]. A relatively small percentage of power is generated from thermal sources. Population growth, rural electrification and expansion in industries have led to an increase in thermal power. In attempt to satisfy this need GoG has completed the Takoradi thermal plant which now supplies about 650 MW of power. Ghana exports power to neighbouring Togo and has an agreement to export or import power to Cote D'Ivoire as the situation demands.

93. In summary, the pressures and drivers of the energy sector arise from the high population growth of 2.4% with doubling potential of every 25 years, which drives the use and

[22] Wood Fuel Use in Ghana: An Outlook for the Future (Energy Commission)
[23] The State of Ghanaian Economy (ISSER,2010)

production of charcoal by about 80% of the people for household energy, increasing thermal generation compensates for reducing hydropower due to increased droughts frequency and water use by neighbouring countries for irrigation, efficient end use of energy.

1.9 Urbanisation, Infrastructure and Industry

94. Rising trend in urbanisation has been driven by rural-urban migration, a natural increase in towns and cities; and a re-classification as villages grow into towns once they attain the threshold population of 5000 or more persons. The growth in large number of urban places in recent years would seem to suggest that re-classification has been quite significant even though the two dominant elements driving the urbanisation process have been rural-urban migration and the natural increase within the towns and cities themselves. Ghana's most pressing infrastructural challenge lies in the power sector, where rapid demand growth and periodic hydrological shocks leave Ghana increasingly reliant on oil-based generation.

95. Although there is increasing access to infrastructure services, the quality of service provision remains low, particularly in the water sector, where exceptionally high losses divert more than half of water produced, leaving little to reach end customers, who are thus exposed to intermittent supplies. As industrialisation of Ghana proceeds, there is a need to develop appropriate spatial development plans and enforce planning and building regulations. Good practice management of energy, water use and disposal, solid waste (including e-waste) and hazardous materials should be encouraged.

96. In summary, the pressures and drivers of inappropriate urbanisation, infrastructure and industrial development arise from peri-urban and urban, growth and sprawl, inability of urban planning to cope, development of polluting industries, weak regulation of persistent organic pollutants.

1.10 Waste Management

97. Rapid growth in the country's urban population requires considerable efforts to reduce, reuse, recycle, or recover as much waste as possible before burning it or otherwise disposing of it. Waste disposal constitutes one of the major environmental sanitation challenges to city authorities in Ghana. Thousands of tonnes of solid waste are generated daily, most of which are dumped at disposal sites, some ending up in drains exacerbating other environmental threats such as flooding. Ghana lacks capacity and personnel for effective and efficient control of handling and disposal of electronic waste. There are no comprehensive mechanisms to regulate import, storage, transportation, and disposal of used electronic goods and e-waste.

98. The increasing solid waste generation and management problems are being driven by the increasing urban population and urban sprawling of new suburbs. The problem is compounded by low capacity of the MMDAs and the private sector to collect the total waste generated daily. No segregation at source makes sorting and recycling activities difficult. The waste that gets to the landfill constitute only about 65-70%. Sprawling new suburbs with no access roads and social infrastructure as well as provision for waste collection services compound the situation. It is estimated that only 2% of the total urban municipal solid waste is recovered for recycle. Disposal of solid waste to land with relatively deeper depth and to sanitary landfill sites is increasingly common in urban waste management.

99. Domestic wastewater (sewage) is treated predominantly in septic tanks in the urban areas, while the rural and small towns rely on KVIPLs. The challenge of the septic tanks is the lack of downstream central treatment plants to treat sewage dislodged for off-site treatment. Consequently, sewage is disposed off in wetlands or the international water –the Gulf of Guinea Large Marine Ecosystem. The use of and increasing penetration of on-site aerobic composting, and bio-digester plants with biogas recovery technologies and effluent recycle are currently being deployed for institutional latrines to reduce off-site inappropriate discharge of sewage in wetlands and minimise the public-related health hazards. The use of these technologies will also reduce the methane emissions from sewage treatment in septic tanks and contribute to climate change mitigation. The USAID is currently deploying the composting system for its rural water and sanitation programme for public schools.

100. In summary, the ***pressures and drivers*** of inappropriate waste management arise from inappropriate waste handling practices, increasing volumes of municipal solid waste due to population pressures, weak enforcement of effluent discharge quality standards, and no regulations on emerging electronic waste (e-waste).

101. Graphical information on trends is provided in Technical Appendix 8.1.8

1.11 Millennium Development Goal 7

102. The status of Ghana for the Millennium Development Goal 7: *Ensure environmental sustainability* is provided in Table 1.1.

Table 1.1 Millennium Development Goal 7: Ensure environmental sustainability

	Status in Ghana (2012)
Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	
7.1 Proportion of land area covered by forest	*Declined from about 35 % to 22%*
7.2 CO_2 emissions, total, per capita and per $1 GDP	*Increased by about 30%*
7.3 Consumption of ozone-depleting substances	*Increased by 42 %*
7.4 Proportion of fish stocks within safe biological limits	*Not reported*
7.5 Proportion of total water resources used	*Not reported*
Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	
7.6 Proportion of terrestrial and marine areas protected	*No progress since 1990*

Table 1.1 Millennium Development Goal 7: Ensure environmental sustainability	
7.7 Proportion of species threatened with extinction	*Not reported*
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	
7.8 Proportion of population using an improved drinking water source	*Improved from 50 % to about 82 %*
7.9 Proportion of population using an improved sanitation facility	*Improved from about 7 % to about 15 %*
Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	
7.10 Proportion of urban population living in slums	Not reported

103. Acknowledging Ghana's weak performance, the National Development Planning Commission (NDPC) stated (June 2012)[24]:

> "*...There are a number of existing provisions and legislations sufficient to deal with natural resources management, environmental degradation, and sustainability of growth issues, but enforcement has been a major problem. Some of the constraints for effective policing of the environment include weak policy environment, weak coordination among partner organisations; inadequate knowledge management system; and poor staff remuneration. The attendant effects are poor service quality, low implementation of programmes, and inadequate mainstreaming environmental issues in sector programmes...*"

[24] Achieving the MDGs with Equity in Ghana: Unmasking the issues behind the averages

2 ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

2.1 Policy Framework

104. Ghana's first National Environmental Policy (NEP) was formulated in 1991. The implementation of the environmental policy over the years has been largely sectoral. Ghana has revised NEP 1991 and it has been finalised in 2012 under the NREG system. The revised policy, including climate variability and climate change is integrated within the development framework for the sustainable management of natural resources.

105. The Government of Ghana (GoG), recognising the vulnerability of agriculture and predicted reduction of productivity by 30% in Africa and the effect of lower rainfall, has endorsed Ghana's active participation in international efforts to protect the environment and to adapt to climate variability and climate change. The GSGDA therefore integrates adaptation measures to make agriculture resilient to climate variability and climate change, supports research into selected crop development suitable for each ecological zone, and promotes SLEM practices in agriculture to achieve food security. It also emphasises integrated watershed management and riparian buffer zone protection to achieve water and energy security, creating awareness of environmental and climate change issues, and environmental standard-setting and enforcement of regulations to sustain progress in water resources monitoring.

106. The NREG system, supported by EU and other DPs since 2008 under sector budget support (SBS) successfully strengthened the institutional and financial capacities of some of the participating key institutions. This strengthening included; building capacity for the sector-specific revision of policies and legislation to reflect the current and emerging realities of environmental issues facing Ghana. The institutions that benefited under the NREG framework are; Ministry of Environment, Science and Technology (MEST), EPA, Mineral Commission, Forestry Commission, the Ministry of Land and Natural Resources (MLNR) and its MDAs under Land Administration. The SBS approach also revealed strongly how the previous sector-specific financing approach had under-supported the activities of responsible MDAs with the consequences of limiting the development of institutional capacities for compliance and enforcement across relevant agencies.

107. SBS has significantly helped in the formulation of the Ghana's Sustainable Development Action Plan (SDAP) that seeks to integrate sustainable consumption and production within

the Strategic Environmental Assessment (SEA[25]) programme to continue mainstreaming environment in polices, plans and projects at the local government level (e.g. metropolitan, municipal, and district assemblies, MMDAs). One key element of the SDAP is the on-going capacity development within the EPA to coordinate the collection and collation of data for the determination of sustainable development indicators for continual assessment of sectoral environmental performance as well as the cost of environmental degradation to guide informed decision-making in environmental regulation of emerging economic development activities, such as in ASM activities and the strongly emerging oil and gas sector.

108. The process also ensured the consensus to fund the preparation of a policy framework for 14 identifiable sectors by the collaborating agencies and departments. The 14 sectors are: Land, Agriculture, Transport, Industry, Biodiversity Conservation, Forest and Wildlife, Water, Sanitation, Energy, Minerals, Petroleum, Human Settlements, Waste Management, and Pollution Prevention and Control.

109. The limited NREG-SBS funding is decreasing and will eventually be phased out and may be replaced with SBS but through programmatic approach. The basis for the programmes and project identification has been well established through the development of sector policies, programmes and projects and strategic implementation plans with projections for 2015 and some cases 2020 under NREG-SBS. These have integrated SDAPs mandated in the GSGDA 2011-2013. Further, Ghana is concluding the National Climate Change Policy Framework (NCCPF) and has begun developing the Low Emissions Development Strategy (LEDS) under the national climate change activities. The outcome has identified potential projects under nationally appropriate mitigations actions (NAMAs) towards the realisation of long-term low carbon growth commitment as well as adaptation projects, and cross cutting issues on capacity building, training and public awareness under the Cancun Agreements on Long-term Cooperation Agreement (LCA) of the UNFCCC. The projects will be suitable for funding through SBS-programmatic approach.

National Environmental Assessment (SEA & EIA)

110. In its NEP, GoG endorsed the SEA process as a tool for mainstreaming environment into all GoG policies, programmes and projects. Accordingly, the NDPC, in close collaboration with EPA, the Sector Ministry and relevant government and NGOs have been made responsible to ensure all spatial and economic development planning processes are subject to SEA and EIA[26].

111. The EIA process is legislated by the Environmental Assessment Regulations, 1999 (LI 1652) under the Environmental Protection Agency Act, 1994 (Act 490). The SEA has evolved and is being applied as an effective tool for integrating environment into government policies, plans and programmes. The need to make SEA mandatory, as EIA is, has been recognised in the GSGDA. Accordingly, a Legislative Instrument (LI) is being

[25] DHV Environment and Infrastructure BV (1994) Existing Strategic Environmental Assessment Methodology, for European Commission DGXI, Brussels.
[26] See the Environmental Protection Matrix under the Sustainable Development Action Plan

prepared under LI 1652 to institutionalise and consolidate the National Environmental Assessment (NEA) system for SEA and EIA. The LI is to mandate the development and enforcement of standards, appropriate key performance indicators and procedures for measurement, reporting and verification (MRV) under the existing national guidelines for monitoring and evaluation (M&E) of the GoG for mainstreaming SDAPs in the national Medium Term Development Expenditure Framework (MTEF). The capacity of the national system for MRV will also work for the MRV as a long-term cooperation agreement under the UNFCCC.

112. The GSGDA 2010-2013 adopted and mandated strategic environmental assessment (SEA) as a well established model of consultative and participatory approach to mainstreaming environment into sector-specific development plans and programmes at all levels of government (national, metropolitan, municipal, and district). The SEA process involves thorough public discussions by relevant stakeholders to identify key issues and develop a road map. The application of SEA procedures provides the platform for the evaluation of environmental effects and social dimensions of sectoral development policies, programmes and projects. It also assists the MDAs and MMDAs to integrate the outcomes into the medium term expenditure framework for budgetary allocation and implementation. Sustainable indicators are also developed for monitoring and evaluation of the impact of the environment on development outcomes.

113. The Natural Resource Environmental Governance (NREG) SBS by EU and other development partners (DPs) was the main driver for the success of mainstreaming environmental sustainability into key sectoral policies, plan and programmes. The key sector specific projects in power generation, renewable energy, integrated water resource management (IWRM), agriculture, waste management offer EU funding opportunities in the future. They are LEDS or low carbon growth projects, which also address adaptation and could lead to high and sustained economic growth.

114. Under the NEA governance structure, MEST and the EPA are the lead institutions responsible for the process, and the coordination between government administrative sectors and the involvement of State institutions, NGOs, CBOs, traditional authorities and local unions in the planning and implementation of environmental programmes and projects. The institutional arrangement of SEA is sector-specific and is developed after the scoping and stakeholder consultation process to determine the road map. Currently the scoping exercise for the emerging oil and gas sector has been completed and the road map is being developed for implementation with technical assistance from the Netherlands Environmental Assessment Agency and the Norwegian Oil for Development Programme. The continued support of SEA should sustain the mainstreaming of environment into national, metropolitan, municipal and district level plans, programmes and projects.

115. The environmental policy framework has been developed under the SDAP by which the various policies developed are to be coordinated for an integrated approach to environmental MRV.

The Environmental Policy framework is evaluated in Tables 2.1 and 2.2.

Table 2.1 National Policies, Strategies and Action Plans for the Environment		
Policy Response Actions		**Comment/Assessment of Intervention**
National Policies, Strategies and Action Plans for Environment pre-2006		
1991 1991 1994 1996 1998 1999 1999 2002 2004	National Environmental Policy National Environmental Action Plan (NEAP) Forest and Wildlife Policy Accelerated Agricultural Growth and Development Strategy Soil Fertility Management Plan National Wildfire Policy Environmental Sanitation Policy Land Policy of Ghana (1999) rev 2002 National Action Programme to Combat Drought and Desertification	NEP and NEAP were formulated and adopted in 1991. Following Rio 1992 which set the broad framework for policies and measures to integrate environment into development, NEAP led to the development of various policies and institutions. Analysis of sectoral policies in the development of the revised NEP indicated that for any specific environmental pressure(s), a number of institutions address the same/similar pressures but from different institutional strengths or disciplines in an uncoordinated manner. The analysis also indicated conflicting mandates and ineffective institutional coordination [27]
National Policies, Strategies and Action Plans for Environment 2006-2012		
2009-2015 2010-2013 2007 2010 2011 2012	Medium Term Energy Sector Strategy Ghana Shared Growth and Development Agenda/PRSP II National Water Policy Second National Communication Bio-energy Policy for Ghana Strategic National Energy Policy Revised National Environmental Policy Sustainable Development Action Plan	MEST, EPA, NDPC given the responsibility to coordinate the policies under the country's Sustainable Development Action Plan (SDAP). The key development within this period 2006-2012 is the revision of sectoral policies to reflect the integrated approach to environment protection, particularly the institutions participating in NREG system under SBS GoG integrated SDAP, climate variability and climate change into the GSGDA (2010-2013) which forms the basis of COMPACT and EU Joint Programming
Policy Response to Global Issues, Sustainability Issues, and Depletion of Natural Resources		
Global Issues		
Completed and submitted Ghana's Second National Communication to UNFCCC Secretariat The National Greenhouse Gas Inventory of the SNC estimated Ghana's total direct GHG emissions (including those from Land Use, Land Use Change and Forestry, LULUCF) in Ghana for 1990-2006. The 2006 levels were estimated at 23.9MtCO_2e including LULUCF and 18.4MtCO_2e if emissions from LULUCF are excluded. The key outcome shows that Ghana became net emitter as a result of increase in emissions from deforestation and degradation of forest resources		Though Ghana's emissions are lower than other major developing economies, the BAU trends clearly indicated a potentially strong increase due the emerging oil and gas sector development and increasing thermal power generation to compensate for declining water resources for hydropower generation in the long term due to climate impacts. .

[27] National Environmental Policy Matrix , 2012

Table 2.1 National Policies, Strategies and Action Plans for the Environment	
Policy Response Actions	**Comment/Assessment of Intervention**
Climate change mainstreamed into the national development framework (GSGDA)	Integration in GSGDA paved the way for the mainstreaming into policies, plans of MDAs and MMDAs through SEA as mandated in the NDPC planning guidelines
Climate Change is among various thematic areas receiving support under the "Natural Resources and Environment Governance" initiative (NREG) among key development partners and World Bank	MEST is the lead institution and the host of a functional National Committee on Climate Change. EPA coordinates implementation of climate change issues on behalf of MEST
Capacity building of NADMO to mainstream climate change and disaster risk reduction into national development at all planning levels (e.g. national, regional, district and across sectors) being implemented is being piloted in ten District Assemblies	The programme has a TA support from the UNDP NDPC in collaboration with the EPA
Ghana is developing a National Climate Change Policy Framework (NCCPF) with three objectives: • Low carbon growth • Effective adaptation to climate change • Social development	MEST is coordinating a UNDP project supporting the preparation of the national climate change policy and Low Emissions Strategy capacity development for the preparation of Low Carbon Growth Strategy, and the Green Economy
National Climate Change (NCCAS) adaptation assessment has being done for the vulnerable and sensitive sectors of the economy including human health, land use, agriculture (cocoa production, tuber crop production) fisheries, women, and poverty linkages with climate change	GSGDA incorporated the adaption strategies in for mainstreaming into plans, projects and programmes of MDAs and MMDAs (e.g. SLEM in agricultural practices). There is need for capacity support to translate adaptation measures and cost in plans, projects and programmes of MDAs and MMDAs
NAMAs which will drive low carbon growth have been adopted as one of the major pillars of the National Climate Change Policy Framework. Ghana has subsequently submitted a list of 55 NAMAs to UNFCCC Secretariat	Use of low carbon growth as specific approach to respond to Ghana's contribution to climate change mitigation is integrated in GSGDA e.g. to drive opportunities in management of the oil and gas infrastructure, and effective use of gas in thermal power generation to reduce emissions
With support from the Dutch government through Energy Research Centre of the Netherlands, Ghana is also setting up a methodology for designing a Low Carbon Development Strategy (LCDS). This project involves a) assessing the institutional and technical capacity needs b) step-by-step building the necessary database and c) creating awareness and developing capacity within the different ministries and sector representations	The project will include capacity needs assessment for Low Carbon Development Strategy (LCDS) and data collection and management to support the data capacity needs of MDAs in the implementation of NAMAs
As REDD+ nation, Ghana is participating in the Forest Carbon Partnership Facility (FCPF) with support from the World Bank. Ghana has prepared its REDD+ Readiness Preparation Plan (R-PP) and been selected to participate in FIP	The programme will assist Ghana carry out its forest carbon accounting and develop data on deforestation rates and degradation. Support for comprehensive land use and land use changes inventory is recommended.
Ghana participated in the assessment of the implementation of Article 6 under the New Delhi work programme. The outcomes of the survey indicate access and availability of information on climate change in Ghana is very limited	Stakeholder participation is crucial to achieve success in implementation of Article 6 programmes. NGOs, CBOs should be supported to create awareness particularly in deforestation and degradation impacts in forestry, mining, agriculture, energy and transfer knowledge in SLEM in small-scale activities.

Natural Resources Management	
Land use, tenure and access management capacity building in Land Administration Projects (LAP 1 and 2) • Reducing land processing time, provision of information on land to investors, reducing land transaction • Reviewing the statutes on land • Carrying out institutional reforms and undertaking pilot Customary Boundary Demarcation • Establishment of Customary Lands Secretariats, digitising land records, establishment of Land Courts, Systematic Title Registration and so on • Preparation of land use and land cover plans • Mapping and environmental information systems of Natural Resources Management Programme	The successful implementation of the LAP 1 paved the way for LAP 2 funded by the World Bank, and the German Government (KfW) complementing with hard infrastructure to build the national head quarters and improve working environment and house the new architecture for sustainability. Main weakness expressed is the capacity of the regional office. The major need is the office facilities which were burned down this year. Need to complement the national support to the National Headquarters. Specialised Land Courts have been established to facilitate conflict resolution to establish ownerships. Support of the Land Courts will facilitate the process of validation and give credible land information.
Water Resources and Water Security	
• Awareness creation campaigns for protection of watersheds by government agencies and NGOs • Impoundments to improve water availability for different uses • The Community Water and Sanitation Agency (CWSA) is assisting communities in the provision of water and sanitation facilities • The African Development Bank (AfDB) has sponsored the Rural Water Supply and Sanitation Project • Provision of safe water in guinea worm endemic communities	WRC has developed integrated water resource monitoring and evaluation for data-based and information decision making in water security. However, WRC do not control of buffer zone and land-based activities. The lands in buffer zones are currently owned by the local people and therefore use it for activities such as housing and agriculture that increase deforestation and land degradation. The need to acquire the land and pay adequate compensation to land owners is recognised by GoG. A bill on riparian buffer zone management is being considered, The passage of the bill will require capacity support to WRC to implement. An integrated approach with collaborating institutions will increase water quality and availability. The project will involve communities in water and sanitation towards the attainment of MG7 and ensure sustainability.
Forestry and Wildlife and Biodiversity	
• Activities under National Biodiversity Strategy and Action Plan were prepared and costed, and implementing institutions identified • Under the Cocoa Partnership arrangement an environmental strategy, extensive environmental baseline study, was developed • MLNR is encouraging development of ecotourism • MLNR promotes the use of bamboo and rattan as an alternative to the wood deficit • About 30 areas (121,156 ha) of protected forests re-designated as Globally Significant Biodiversity Areas (GSBAs) • Community-protected areas (CPAs) also called "sacred groves" are available in many communities. EPA has recorded 145 CPAs in Ghana. • Forest and Wildlife Policy (1994) encourages	Information obtained during the field trip to a protected forest indicated that non-permitted timber logging by chain saw operators (illegal logging) and poaching have reduced as a result of the employment of the local people in the community-protected areas. The success emphasises the need to reduce illegality by providing alternative livelihood and alternative income sources in protected areas. Support for replication of CPAs strategy could address poverty and increase compliance. The success also emphasised the need of promoting compliance (building capacity to comply) to facilitate enforcement. The root causes of illegal exploitation of natural resources for the local person is the economic value of the resource and the question of

community involvement in protecting forest resources	resource access rights.
Mining and Minerals	
• A new method of gold extraction from concentrates without the use of mercury to reduce soil contamination and occupational risks and hazard • Acquisition of airborne geophysical data to cover the entire country for discovery of other non-traditional minerals • Minerals Commission has facilitated formation of multi-agency Mining Revenue Taskforce under NREG Mining Sector Support Project • Comprehensive human resource development plan has been prepared for mining sector agencies to enable them perform their statutory functions • Exploration of mining areas for demarcation to small-scale miners for regularise and sustainable operation • Regulations has been prepared to enable effective implementation of the Minerals and Mining Act (Act 703) • SEA and EIA integrated in Mining Guidelines and Procedures • Reclamation Bonds enforced • Performance Disclosure Rating System - AKOBEN[28] published as information tool to drive proactive compliance to environmental regulations and continuous environmental improvement.	There is need of support for adequate promotion, dissemination, and facilitation of the innovation to drive adoption and uptake by ASMs The main weakness is the enforcement of the mining and mineral law in artisanal and small scale mining which continues to be as major threat to water security, deforestation, land degradation and pollution of watershed. The increasing number of "illegal" mining activities regardless of the high financial support to enforcement is a concern. The root causes of failure of enforcement include resource access rights issues where communities wanting to benefit from mineral resource as land owners for livelihood do not have the capabilities to acquire concessions as prescribed by law. The other strong drivers are very high current gold prices, population increase (doubling every 25 years), and high unemployment rate. Influx of foreigners with machinery yet operating as ASM with the local people to increase their recovery. Strong support needed for geological investigation to demarcate concessions, for registration and regularising ASM, qualify them for requisite technical support extension services, and financial support that cannot be provided when they remain illegal. GoG has started to regularise sector.
Water Resources and Energy Security	
• Renewable Energy Law passed aimed at 10% renewable penetration by 2015 • Strategic National Energy Policy (SNEP) developed with specific projected interventions • Water Policy and water security to ensure adaptive response to climate change • EPA guidelines on petroleum exploration (EIA, ESIA, SEA) on "Strengthening Environmental Governance of the Oil and Gas Sector in Ghana" • Parliament has passed the oil and gas revenue bill for judicious use of oil revenues and mandated local participation/local content of the operations. • Ghana has become a member of Oil for Development programme (Norway) • Jubilee Field EIA monitoring and enforcement commenced. • SEA of Petroleum Sector completed.	Renewable energy target (solar, wind, hydro, geothermal) aims at 10% penetration by 2020. Sustainable energy generation target is 5000 MW (2015) based on national growth and supply opportunities in the sub-region. Ghana has always been a net exporter of power and would maintain the edge. Jubilee Field natural gas infrastructure to complement West Africa Gas Pipeline for total fuel switch from light crude oil to low carbon natural gas use Implementing adopted integrated water shed management for water and energy security to reduce non-climate impacts and increase resilience of water resources to vulnerability to climate change. Support watershed programme as climate change adaptation and sustainable development action programme to achieve MDG7 goals.

[28] The name of the environmental rating programme – AKOBEN – has its roots in Ghana's tradition of ADINKRA symbols, and it stands for *vigilance* and *wariness* – a set of behaviour that is pertinent for environmental conservation. AKOBEN also signifies *alertness* and *readiness to serve a good cause*.

	Opportunity for substitution of light crude oil thermal generation with natural gas infrastructure to limit carbon emissions from power generation and contribute to a green economy; support feasibility of implementing NAMAs and adaptation commitments under UNFCCC as LCG and LES and attract Green Climate Finance for technology and financial support Support SEA in the oil and gas sector.
Land-Based Sources of Pollution and Sanitation	
• Established National Cleaner Production Centre to drive Africa's Sustainable Consumption and Production 10-Year Framework Programme under SDAP • Implemented EPA environmental management and proactive compliance promotion and enforcement programme in mining and industry • Publication of AKOBEN under NREG	Mining and manufacturing industries proactively reporting environmental performance to the EPA. Continued support to expand the programme of public disclosure of industry and mining companies under AKOBEN rating. Threat of uncontrolled discharge of untreated domestic waste water into wetlands, watersheds, and the marine environment due to broken down wastewater treatment plants or lack of it in most communities. Support need to mainstream innovative sewage management technologies and practices in Ghana (on-site biogas plant facilities and on-site bio-filtration and composting systems). Systems currently being used for sewage treatment in peri-urban areas to improve sanitation. Support to EPA and WRC needed for effective compliance monitoring programme to produce evidence based water quality performance assessment for any sustainable intervention.
Consistency between policies	
Policies and plans for: • Land use, tenure and access • Water resources • Forests and trees resources • Wetlands, Wildlife, Fisheries, Biodiversity • Energy and minerals • Pollution (water, air, soil)	Apparent inconsistency, overlaps, conflicting mandates in various sector policies is being addressed by the formulation of SDAP Under the SDAP implementation, MEST, EPA and NDPC have been assigned the new role of coordination to ensure revised policies are reinforcing and consistent with GSGDA assigned collaborative roles Coordination will also increase collaboration in integrated approach to natural resources management Support for developing and operationalising a national MRV for all relevant PPME of MDAs for accurate and transparent reporting to build a consistent database for trend data and analysis for informed decision making.
Environmental integration in sectoral and macro-economic policies	
The NEA process is legislated by the Environmental Assessment Regulations, 1999 (LI 1652) under the Environmental Protection Agency Act, 1994 (Act 490). SEA has evolved and applied as a major and effective tool for integrating environment and sustainability into GoG policies, plans and programmes at national, regional and district levels under NREG.	Weakness reported in the evaluation of the process is on non-integration of practices, procedures and appropriate technologies to provide practical solutions to challenging environmental issues identified during SEA. Ethnology and technical capacity support is advocated to identify technology and good practice need during scoping and integrated in the programme delivery (e.g. water and sanitation practices, sustainable land management practices) Support for LI being prepared under LI 1652 to institutionalise and consolidate all environmental

Currently, SEA does not integrate climate change education and awareness. The CC capacity building to mainstream in PPPs is being developed under the NCCPF.	assessment, SEA, EMP, and ESIA into a NEA. The compliance promotion character of SEA should be maintained to mainstream sustainability. The current sectoral demand driven character is essential for relevance.
Table 2.2 GoG Environmental Measures	
Important measures taken by the Government to address environmental concerns	
Policies, programmes and projects implemented in 2010 were aimed at achieving appropriate outcomes in the following key areas: • Mineral Exploration and Extraction (including oil and gas) • Biodiversity • Protected Areas • Restoration of Degraded Forest and Land Management • Marine and Coastal Ecosystems • Wetlands and Water Resources • Waste, Pollution and Noise • Community Participation • Natural Disasters, Risks and Vulnerability • Climate Variability and Climate Change	Generally, the main weakness identified in the SDAP are: • Ineffective enforcement and compliance of existing regulations or permits • Regulations not in place (e.g. lacking for dam safety and sewage outfalls) • Lack of adequate data and information on resources to establish trends as performance-based evidence The EPA has developed the SDAP Indicators and would need this capacity built to effectively undertake the coordination of the data collection and estimations. For instance, there is a current programme to estimate the cost of environmental degradation as percentage of GDP growth to ascertain the sustainability of mining, charcoal production, and agricultural deforestation.
Effectiveness in achieving targets	
• Stabilisation of the macroeconomic situation; • Improvement of public financial management; • All NREG work plans were integrated into the annual budget and the MTEF 2010-2012; and, • Most donor-funded projects which were not formerly captured are now reflected in the national budget.	2011 NREG performance tranche triggers were considered satisfied by Joint Review of the MDBS Performance Assessment Framework.
Institutional strengthening and environmental governance Indicators	
Dissemination of the latest information (up to 2010) by the Forestry Commission on royalty payment at local level; A comprehensive strategy prepared by the Forestry Commission for addressing the domestic market wood supply; Implementation plans for the local conflict tracking tool by the Mineral Commission; Strategy for the use of the guidelines on sub-national mining revenues by the Minerals Commission; MEST and EPA to formally submit the discussion document on the NCCPF to inform Cabinet on developments and intent;	Satisfactory progress achieved on all the six key targets and indicators of NREG for institutional strengthening and environmental governance under the Forest, Mining, and Environment matrices Generally all the NREG participating MDAs (MLNR and its MDAs), MC, EPA, and MEST achieved significant outcomes of the interventions. Targets were not met in enforcement of regulations and reduction in non-compliance to existing national laws (due to illegal mining and logging). The indicators need to be long term. Following the above outcomes, the EC is considering further financial support of €7.0 million for the next two years.

MEST and EPA to prepare a dedicated document setting out their institutional functions and structure.	The JAR identified six key challenges and opportunities relevant to the CEP

2.2 Legislative Framework

116. The GoG acknowledges that encouragement and facilitation of environmental sustainability is fundamental to the success of Ghana's development and access to global markets. The GSGDA therefore requires the EPA to enforce environmental standards and therefore endorses sufficient monitoring and control for effective enforcement and compliance of sector specific laws and regulations, particularly activities outlawed in fisheries, forestry, and mining. For instance, compliance of reclamation of degraded and deforested land by timber and mining companies is a precondition to renewal of licences.

117. The GoG endorses the improvement of environmental monitoring and reporting for effective enforcement of compliance with environmental management in the EA processes. The GSGDA further recognises decentralising environmental management should include enforcement of relevant laws on waste/illegal mining/chainsaw logging at the local level. On the emerging oil and gas sector, GoG is committed to enforcing culture of compliance within a sustained regulatory framework. This will require persistent and stringent monitoring of reporting verification, building the capacity of judiciary in enforcing compliance, effective integration and mainstreaming multilateral environmental agreements (MEAs) and international protocols into national laws for enforcement of compliance, strengthening national capacity to enforce regulations and discipline of non-compliance and lack of enforcement of rules, and promote mechanisms to reduce bureaucratic interference in enforcement of laws and regulations for effective compliance and enforcement system. The GSGDA therefore demonstrates strong willingness to enforce legislation.

118. The GoG demonstrated its commitment to enforcement of environmental legislation through the enactment of the Environmental Protection Agency, 1994 (Act 490). The Act makes environmental offences criminal and enforceable in the court of law. The subsidiary legislation, the Environmental Assessment Regulations, 1999 (LI 1652) made environmental assessment mandatory for all new developments and environmental management plan (EMP) for identifiable existing polluting operations. The EPA Act 490 thus became the lead legislation. All development permits are subject to the EA Regulations (LI 1652) and the EPA environmental permit system. The pieces of legislation that existed before the enactment of the EPA Act remain in force. The EPA Act and regulations define and develop national environmental quality standards for permissible levels of environmental indicators to determine non-compliance.

119. In addition to the EPA Act, the National Criminal Code has pieces of legislation that can be used by the courts to prosecute various environmental crimes. The need for amendments to reflect environmental crimes and specialised environmental courts is crucial and should be

supported to increase enforcement actions and reduce non-compliance at the local level. There are also a number of laws and regulations that have relevance to various natural resources governance. The need for harmonising these laws must be supported to justify the establishment of environmental courts at the metropolitan, municipal, and district levels to deal with the enormity of existing non-compliance or illegal operations. The list of relevant laws is provided in Technical Annexe 8.3.

120. Whilst this body of laws and regulations is a robust basis for environment protection, much of the implementation relies on under-resourced and poorly-funded institutions.

121. Ghana is signatory to a number of international laws, protocols, agreements and declarations that place obligations on GoG in the management of natural resources and the environment. Some of the international laws, protocols and agreements signed and ratified by Ghana include the following:

- United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa – Paris 14/10/1994 Signature 15/10/1994
- United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa – Paris 14/10/1994 Ratification 27/12/1996
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade –Rotterdam 10/09/1998 Ratification 30/05/2003
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade - Rotterdam 10.09/1998 Signature 13/10/1998
- Stockholm Convention on Persistent Organic Pollutants – Stockholm 22/05/2001 Signature 23/05/2001
- Stockholm Convention on Persistent Organic Pollutants – Stockholm 22/05/2001 Ratification 30/05/2003
- Vienna Convention for the Protection of the Ozone Layer – Vienna 22/03/1985 Accession 24/07/1989
- Vienna Convention for the Protection of the Ozone Layer – Vienna 22/03/1985 Accession 14/07/1992
- Montreal Protocol on Substances that Deplete the Ozone Layer – Montreal 16/09/1987 Ratification 24/07/1989
- Montreal Protocol on substances that Deplete the Ozone Layer – Montreal 16/09/1987 Ratification 14/07/1992

- Montreal Protocol on Substances that Deplete the Ozone Layer – Montreal 16/09/1987 Signature 01/01/1989
- Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer – London 29/06/1990 Ratification 24/07/1992 234. Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer –Copenhagen 25/11/1992 Ratification 09/04/2001
- Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer adopted by the Ninth Meeting of the Parties – Montreal 17/09/1997 Accession 08/08/2005236. Amendment to the Montreal Protocol on Substances that Deplete the ozone Layer - Beijing 03/12/1999 Accession 08/08/2005
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal –Basel 22/03/1989 Accession 30/05/2003
- Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal – Geneva 22/09/1995 Ratification 09/06/2005
- Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal – Basel 10/12/1999 Accession 09/06/2005
- United Nations Framework Convention on Climate Change - New York 09/05/1992 Signature 12/06/1992 241. United Nations Framework Convention on Climate Change -New York 09/05/1992 Ratification 06/09/1995
- Kyoto Protocol to the United Nations Framework Convention on Climate Change – Kyoto 11/12/1997 Accession 30/05/2003 243. Convention on Biological Diversity - Rio de Janeiro 05/06/1992 Signature 12/06/1992
- Convention on Biological Diversity - Rio de Janeiro 05/06/1992 Ratification 29/08/1994
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity – Montreal 29/01/2000 Accession 30/05/2003

122. As a result of the above agreements, Ghana has played an active part in regional environmental management as shown in Table 2.3.

Table 2.3 Ghana and Regional Agreements and Understandings
• The Ouagadougou Ministerial Statement on IWRM *March 1998* • Ghana –Burkina Faso Joint Declaration on improved management of the natural resources of the Volta Basin, *April 2004* • Resolution for the establishment of a Volta Basin Technical Committee, *July 2004* • Convention setting up the Volta Basin Authority, *August 2009*

123. Below is an overview of the adequacy of current legislation and those in preparation.

Table 2.4 Adequacy of (current and in preparation) environmental legislation	
Land tenure and access is provided for under Land Title Registration Act, 1986	Concerns include: • GoG recognises that land management regime is characterised by several constraints including land-related conflicts before the courts, haphazard development, weak institutional capacity, corruption and inadequate legislative framework, which is complicated by the systems of property ownership, chieftaincy, and lineage are all inextricably linked to land • Thus the efficiency with which land is managed determines the level of social harmony and economic progress. On the basis of that GoG initiated a long term Land Administration Project for 2003-2020. The project is ongoing.
Management of natural resources is provided for under a number of legislative instruments or programmes (see above)	Concerns include: • Weak enforcement of existing regulations or permits • Regulations not yet passed (dam safety and control of discharge and sewage outfalls) • Lack of, or insufficient data and information on natural resources for trend analysis and evidence-based conclusions and decision-making • Climate variability and climate change impacts on water and other natural resources not adequately described and integrated in sectoral strategies for implementation of adaptation strategies • Low awareness, education, and training programmes being funded under Article 6 of the convention (UNFCCC) • Lack of capacity to implement the coordinated programmes for natural resources management identified under NREG
Requirements for environmental assessment such as for EIA and SEA The EIA process is legislated by the Environmental Assessment Regulations, 1999 (LI 1652) under the Environmental Protection Agency Act, 1994 (Act 490). SEA is mandated in the GSGDA	SEA procedures are well-established for mainstreaming environment in MMDAs as well policies of MDAs. It has been applied to many sectors of the economy and currently being rolled out for the oil and gas sector. The mechanism for legislating SEA is under the existing EA Regulations, 1999 and an instrument is being prepared to do this
Pollution Control Responsibilities The EPA has Environmental Quality Division for air quality and water quality monitoring ***Water*** Effluent quality guidelines has been developed under the EPA Act for compliance monitoring and enforcement commercial and industrial effluent discharge ***Air*** Air quality guidelines exist. Periodically urban air quality is	Environmental quality monitoring has been supported by various projects. Scheduled effluent quality monitoring of industrial and mining sites is under taken by the EPA. Currently, capacity is being developed for oil and gas sector monitoring. The challenge is high cost of compliance monitoring. Industries are required under the legislated environmental management plan to report the trend of their monitoring annually. Enforcement monitoring is undertaken where discharges are reported or detected. Support for urban air quality and noise monitoring for the rapid

Table 2.4 Adequacy of (current and in preparation) environmental legislation	
monitored and reported as evidence-base for specific national programmes such as the lead phase out programme, and the rapid bus mass transit. **Soil** Monitored and reported by the Soil Research Institute and Crop Research Institute.	bus transit would be critical during the project implementation phase. Compliance monitoring of industrial operations could be periodically supported to sustain industry proactive compliance.
Spatial Planning GoG is implementing a long term Ghana Land Administration Project under 15-25 year reform in the Lands Sector. The components of the second phase are a) Strengthening the Policy b) Legal and Regulatory Framework for Land Administration c) Decentralising and Improving Business and Service Delivery Processes d) Improved Maps and Spatial Data for Land Administration e) Human Resource Development and Project Management.	LAP-1 has been completed and LAP-2 has been approved. The higher level objective is to contribute to the GSGDA 2010-2013 and its Food and Agriculture Sector Development Policy (FASDEP II) both of which identify access, use and security of land as a major development issue The long term challenge is to sustain the reform. The German government is funding the national headquarters. The Regional Head quarters should also be reformed to be interlinked effectively with the National Headquarters. Support for the Greater Accra Regional Office and the Western Region are the most pressing needs; Greater Accra because of the size of spatial planning and Western because of the pressure on oil and gas sector development.
Provision and procedures for public participation in environmental issues	
NREG system in Ghana provides effective channels for public consultation in natural resources management. The policy to facilitate participation and coordination in environmental governance led to the co-opting of CSOs representation onto NREG. The CSOs are funded to hold policy annual review of NREG meetings where key MDAs make presentations on key performance in the sectors.	The strength of the system lies in the number of sector-specific coalitions in the various platforms. The system is very vulnerable because it is heavily dependent on the NREG project support that has depended on SBS mechanism. Each coalition has several NGOs and CBOs that undertake community education an awareness and projects. The mechanism has been sustained by the NREG project mechanism for its effectiveness since 2009. Kasa is made up eight sector-specific coalitions on land, water and sanitation, climate change and environment, forest, mining, land, oil and gas. When the NREG project ends, there need to be an exit strategy with effective support to maintain the very active members engaged in evidence-based performance monitoring and assessment.
Effectiveness of legislation enforcement	
GoG acknowledges need to embed and sustain environmental sustainability and that this is key to the success of Ghana's development and access to global markets. GSGDA requires EPA and other	The effectiveness of enforcement is low regardless of the support to the sector from NREG. Indeed, the level of degradation and deforestation is said to be increasing due to population pressure, unemployment, the high gold prices, high demand and limited availability of hard wood and low capacity of enforcement at the district level. The major threat and weaknesses in enforcement of regulations

Table 2.4 Adequacy of (current and in preparation) environmental legislation	
relevant agencies to set and enforce environmental standards. GSGDA endorses sufficient monitoring and control for effective enforcement and compliance of sector specific laws and regulations particularly activities outlawed in fisheries, forestry, mining and agriculture by both private and public sector institutions.	include: • Land ownership: Chiefs and families who own the land want to have direct benefit from the land resources, which are currently vested in GoG. The need to increase revenue to the communities, provide alternative livelihood and income generation activities have been recognised. The GoG is in the process of enacting one of such bills, the Mineral Development Fund Bill, which will help address the concerns of communities, District Assemblies, and Traditional Authorities to reduce illegal operations. • Regularisation of ASM: GoG has recognised the need to regularise the small-scale activities as the solution to the increasing trend of non-compliance with the existing laws. Regularising them will reduce the number of non-compliance and also afford MDAs the opportunity to provide the extension services required to make them less degrading and destructive to the environment. To reduce non-sustainable small-scale mining, GoG is undertaking geological exploration of seven areas totalling 349 km^2 in various parts of the country. When proven viable, ASM will be registered and given financial and technical assistance and appropriate technology for their operations. GoG is also expanding the number of regulatory offices in the mining areas to facilitate registration and regularisation processes for the local people and increase enforcement. It has been noted that the success of any enforcement will depend more on assisting the people with alternative income sources or build their capacity to organise and undertake ASM in sustainable manner. • Integrating environmental laws in other regulations: Various regulatory institutions monitor and enforce various standards on conservation with different emphasis other than environment protection. Such regulations can be amended to include environmental offences to increase the collaboration of enforcement with the EPA. The EPA has the mandate to prosecute environmental offences, but needs to build capacity for investigation and prosecution at the local level to support the District Environmental Management Committees (DEMCs) and the Community Environmental Management Committees (CEMCs) to increase capacity to meet the challenges of increasing illegal operations and environmental degradation. Support for development of inspectorate divisions of the EPA and MC at the District Level and support the DEMCs and CEMCs at the local level is crucial for effectiveness of future success of enforcement activities. • Compliance and Enforcement Networks: The strategy of mainstreaming environment into the various operations of MDAs has been the adoption of SEA. Support for SEA and follow-up capacity development in key institutions on environmental monitoring would effectively institutionalise coordinated compliance and enforcement network. The idea of compliance and enforcement network was

Table 2.4 Adequacy of (current and in preparation) environmental legislation	
	developed and operated in the 1990s under the Ghana Environmental Resource Management Project (GERMP)t. There was no exit strategy for continued support, so the net work could not function after GERMP. Support for this network could potentially be the way forward for increasing effectiveness of enforcement across sectors. Support for training and capacity development of the existing DEMCs and CEMCs is seen as a better approach to increase compliance monitoring and enforcement. The NEP matrix of the SDAP provides policy focus and strategy for strengthening the legislative framework. The distinctive characteristics of the Compliance and Enforcement Network completely eliminated bribery because the enforcement team was made up of collaborating institutions, supported by plain clothed military or police when it was judged necessary.
Use of other (non legislative) instruments, e.g. market-based mechanisms, voluntary schemes (environmental management systems, environmental labelling, industry-government agreements)	
Environmental Management Plans (EMP) which is a co-regulation tool. Industry's capacity is built in reporting and monitoring through Cleaner Production Approach of the UNIDO/UNEP to promote energy efficiency, water use efficiency, waste reduction, recycle, recovery and re-use, and compliance to ISO standards Information tools for co-regulation of industry. The system involves Performance Rating and Disclosure for the mining and industry sectors. The EPA undertakes compliance assessment annually and publishes the performance according agreed criteria with industry associations.	The strength is the on-going process to support the Ghana Cleaner Production Centre to be functional and actively participate as centre of excellence and a driver of SDAP. Another area of support is the expansion of the AKOBEN to cover other areas and indicators developed under the SDAP and compliance verification in the industry. The importance of corporate image drives pro-active compliance of the participating industries under the AKOBEN programme. The programme recognises and awards continual environmental performance improvement.
Potential impact of non-environmental legislation	
The Environmental Protection Agency Act 1994 (Act 490) mandates several subsidiary regulations in polluter pay principles, pollution fees, economic instrument etc which have not been implemented.	The lack of the development of the recommended regulations also weakens enforcement. For instance, discharge of pollution load in industrial effluents does not attract fees as long as it meets environmental quality guidelines. This piece of regulations encourages dilution which defeats water conservation measures. The cost of water however allows the practice to be cheaper than not meeting quality guidelines. There is the need to support the development of capacities to formulate pollution charges and legislation to minimise discharge of high pollution loads and encourage primary treatment plants by private sector as well as public sector utilities.

2.3 Institutional Framework

124. The sector ministry for environment, currently Ministry of Environment, Science and Technology (MEST) is responsible for the coordination of the National Environmental Policy (NEP). The Environmental Protection Agency (EPA) is the lead institution. The NDPC ensures the continued mainstreaming of the environment in the MTDPF and the MTEF. The national policy empowers the MEST, EPA and NDPC to integrate and coordinate all environmental management functions within and between all MDAs, The MEST and EPA are to be responsible for the development of subsidiary policies within the framework of the national policy and will also have the role of review and harmonising existing legislation and enact new ones to deal with emerging environmental challenges. The institutional framework, under the previous sector-specific MTEF approach, was generally weak, under-staffed, lacking logistics for effective discharge of legislative functions.

Natural Resources and Environmental Governance

125. NREG is designed to provide annual Sector Budget Support and to sustain the implementation of broad programme of natural resources governance and environmental reforms and innovation for GoG. The programme has been developed and is fully owned by Ghana's relevant governmental Agencies: - MLNR, MEST, FC, MC and EPA. The programme focuses on a set of policies and reforms in the inter-related sectors of forestry and wildlife, mining and environmental protection.

126. The broad focus of the NREG programme is to address issues as regard to natural resources and environment with the overall aim of ensuring sustainable economic growth, poverty alleviation, increasing revenues and improving environmental protection. The NREG draws on the Framework Memorandum of Understanding that has been developed under the leadership of GoG with five participating Development Partners (DPs):

- Agency Français de Development
- United Kingdom's Department for International Development
- European Commission
- Royal Netherlands Government
- International Development Association

127. NREG coordination meetings are chaired by the Vice President of the Republic of Ghana. NREG also is mandated to have annual sector review meetings and to communicate their outcomes to civil society. The CSOs, comprising sector-specific coalitions including Water, Mining, Land, Oil and Gas, Fisheries, Forest, Water and Sanitation, and Traditional Authorities should be involved.

Role of traditional authorities in natural resources and environmental governance

128. The role of traditional authorities in natural resources and environmental governance is recognised in the 1992 constitution. The role of traditional authorities (chiefs and community leaders) is emphasised in the revised National Environmental Policy, 2010. The review consultative process observed that traditional authorities are currently poorly involved in policy and legislation (formulation, dissemination, education and awareness creation) as well as integration of environmental legislation in indigenous methods and customs to protect sensitive environmental resources. The review therefore recommended the strengthening of the institution in its collaboration with national regulatory agencies (EPA, Minerals Commission, forestry Commission, Wildlife) and the District Assemblies' Environmental Committees on Environment. Particularly in the enforcement of regulations on natural resource exploitation, especially in the areas of unregulated activities regarded as illegal due to conflicts in the interpretation of ownership and resources access rights of artisanal and small scale gold mining (*galamsey*); sand winning, chain saw logging, hunting and the antecedent mineral and mining laws and regulations.

129. The Institute of Democratic Governance has initiated a national dialogue to define the role of the Chieftaincy Institution in the democratic governance and development of Ghana such as in natural resources and environmental governance. A report on "*Ghana's Traditional Authorities in Governance and Development*" was been launched in August 2011. The President of The Ghana Houses of Chiefs, Naa Professor Nabila noted, "*...it is time the nation critically examined and defined the role of Chieftaincy Institution in the modern democratic governance structure of Ghana*". This is against the backdrop that the position and role of Chieftaincy Institution is not clearly defined, making it difficult to integrate the institution into the mainstream formal governance structures such as environmental governance.

130. For instance, currently, the traditional authorities are classified as Invited Guests in the Kasa Participatory Framework for CSO annual reviews. At the local decentralised administration of District Assemblies, the institution is not involved directly in the political decision-making process because their role in the Constitution is designated strictly as non-political.

131. It is argued that the integration of the institution in the mainstream formal governance structure could subject chiefs to transparency, accountability, equity and justice as it has been for public office holders. The emerging discussion will be critical in charting the role of the Chiefs in natural resources governance and enforcement of environmental legislation at the local level, especially in the area of unregulated resources exploitation (artisanal and small scale mining; sand winning in inland and beaches, chain saw logging, and hunting and poaching of wildlife).

132. The role of Chiefs is critical with regard to apparent differential understanding and interpretation of land ownership and resources access rights under the Constitution and the mining and mineral legislation of the country. The involvement of Chiefs in unregulated mining of natural resources could be viewed as a conflict with land ownership by chiefs and the local people, namely, their resources access rights under the Constitution and the mining

and mineral laws. While the exploitation by a Chief and the local people who traditionally own the lands are interpreted strictly as illegal, the Chiefs and the people consider that ownership of the land and the access right is an overriding factor to use the resources for poverty alleviation.

133. That the Chiefs and the local people do not acquire the concessions they perceive as belonging to them under the existing laws and regulations, has been attributed to the cost and the processes of registration and acquisition being beyond their technical and financial capabilities. A position which has been recognised recently and shaping the new policy aimed at establishing local level registration and regularisation centres by the respective regulatory agencies to facilitate the acquisition process under the Small Scale Mining Law.

134. The need for the regulation is being pursued to make these artisanal and small scale operations legal and, more importantly, afford them the opportunity to have access to technical extension services, financial support and environmental management support. The regularisation of the operations of the Chief in particular will strengthen their involvement in compliance and enforcement of the regulations will ensure responsible environmental behaviour by Chiefs and their subjects at the local level and facilitate the conversion of these operations as business entities to contribute meaningfully in addressing poverty and GDP growth of the country.

135. The key institutions and roles in the national environment policy implementation are as follows (Table 2.5):

Table 2.5 Institutional Roles and Responsibilities
Ministry of Environment, Science and Technology is responsible for policy-making including the National Climate Change Policy, the National Climate Change Adaptation Strategy and the Low Carbon Emissions Strategy. The Director of the Environment is responsible for the institutional coordination
Environmental Protection Agency is a regulatory agency responsible for compliance monitoring and enforcement. The Agency collaborates with MEST in the coordination of MDAs under the Sustainable Development Action Plan (SDAP) EPA is also responsible for building capacity to mainstreaming SDAP and climate change in policies, plans, and programmes of government at all levels (national, regional and district)
Ministry of Lands and Natural Resources has the oversight responsibility for mining, land administration, and forestry
Ministry of Energy is responsible for sustainable development and management of the country's energy resources for energy security
Ministry of Food and Agriculture responsible for integrating SLEM practices in agriculture for food security
Ministry of Finance and Economic Planning is responsible for integrating environmental accounting into the national budgetary process - the Medium Term Expenditure Framework, which is being piloted under the NREG programme
Ministry of Water Resources, Works and Housing responsible for sustainable management

Table 2.5 Institutional Roles and Responsibilities
water resources for water security as well as infrastructure development
National Development Planning Commission is responsible to ensure integration of environment, sustainable development action plans and climate change in the MTDPF at all levels of government (national, regional, and districts)
National Climate Change Committee is made up working groups on climate change namely GHG Inventories, Sectoral Reps (Energy, Industry, Agriculture, LULUCF, and Waste), and Research. Headed by MEST, they are responsible to guide the decision making in nationally appropriate mitigation actions (NAMAs) and adaptation strategies to protect Ghana from climate change impacts
Minerals Commission is responsible for sustainable mining of the countries mineral resources and responsible to integrate sustainable development action plans in the large-scale as well artisanal and small scale mining
Forestry Commission is responsible for managing the country's forest resources and integrate sustainable harvesting and utilisation of the forest resources particularly protecting the biodiversity and conserving forest carbon stocks: currently participating in forest carbon accounting project to reduce emissions from deforestation and degradation (REDD+)
Metropolitan, Municipal, District and Community Environmental Management Committees are responsible to implement the SDAP and climate change adaptation and NAMAs at the regional, District and Community levels of government.

ENR-Sector Working Group

136. The ENR Sector Working Group is made of institutions participating in NREG (EPA, MEST, FC, MC, MLNR) and civil society coalitions (Civil Societies Working Group on Climate and Environment, Water and Sanitation, CSOs Alliance on Fisheries, CSOs Platform on Oil and Gas, Coalition on Land, National Coalition on Mining, CSOs coalition - Forest Watch Ghana). The working Group is coordinated by KASA of Care International. ENR thus constitutes the public communication and awareness group. They constitute functional partnership and public participation in environmental management. ENR is responsible for organising the CSO forum to make an input into the NREG Annual Summit.

Environmental Budgeting and Environmental Budget Analysis

137. The NDPC integrates SDAP into the MTDPF. The sectoral budgets are determined by the Medium Term Development Expenditure Framework (MTEF). The Ministry of Finance and Economic Planning disburses the sector-wide budget support based on approved SDAPs in the MTEF of all national, regional and district MDAs, and MMDAs. The process of accounting and monitoring the budget for environment mainstreamed in national plan and expenditure constitute this innovative approach to environmental governance.

Opportunities for Environmental Governance and Mainstreaming

138. The NREG process has demonstrated the benefits of coordinated efforts in delivering environmental management. The SEA mandated in the NDP integrates SDAPs in the sectoral development, policies, plans and programmes and mainstreams sectoral SDAPs in government policies, plans and programmes. The awareness and capacity built at all levels of government results in a more transparent and participatory planning. SDAP can ensure the use of indicators in the decision-making process of environmental governance and mainstreaming in national development.

Table 2.6 Institutions with Environmental Responsibilities	
General strengths and weaknesses	In 2010 the SDAP generally identified weakness in the then institutional framework for environmental management, and compliance monitoring and enforcement of environmental laws in a NEP matrix. The problem, which was highlighted in CEP 2006, was basically lack of coordination, overlapping roles, and sometimes conflicting responsibilities. The NDP resolved the issue by identifying collaborating institutions for the sectoral SDAPs enshrined in the GSGDA. The collaborating institutions were guided to develop and coordinate actions to achieve specific sustainability indicators. From the quality of natural resource policies, plans and programmes developed by various MDAs under NREG, capacities have been built or exist for policy-making, legislation and planning. The need now is support to implement monitoring and enforcement programmes at the MMDA level. There may be the need to expand the capacity development under NREG to other collaborating institutions identified in the NDP for various monitoring and enforcement activities to realise an integrated approach to enforcement. The NEP matrix of the SDAP provides policy focus and strategy for institutional strengthening that would require support. The integration of environment in the respective natural resource policies require that the regulations of such institutions be amended to include enforceable laws on the environment in addition to existing resource conservation laws, which may not be relevant to environment protection.
Level of coordination and decentralisation	Generally, the level of coordination of environment protection activities across MDAs and the MMDAs before NREG was very low or not existent. The monitoring and enforcement have been largely sector specific The NDP and the SDAP policies and measures developed under NREG are addressing the institutional coordination and decentralisation. The institutional strengthening and governance programme achieved an integrated approach to compliance and enforcement. For instance, the NREG review noted Minerals Commission and Forestry achieved institutional collaboration as follows: MC: Better collaboration between sectors, evidenced by the joint work of EPA and MC to strengthen environmental guidelines for the mining sector. Substantial progress has been made toward a solution to unregulated illegal mining by identifying areas to be set aside for formalised small-scale mining under organised cooperatives. Under the NREG programme, about 61 areas which had been blocked out countrywide for demarcation to small scale miners are now under a process of being explored. So far seven of these areas are under exploration and eight more will be added next year subject to availability of funds

Table 2.6 Institutions with Environmental Responsibilities	
	Forestry: Notwithstanding the challenges encountered during implementation, the NREG programme has significantly improved the business processes within the forestry sector including the following: Revision of Forest and Wildlife Policy, Improved systems for securing forest boundaries, Increased revenue collection rates and improved disbursement mechanisms, and Enhanced dialogued processes between major stakeholders (private sector, civil society organisations, resource owners and forest fringe communities) Capacities developed should be supported especially the capacity of MEST, EPA, NDPC to implement the coordination programme effectively. MEST and EPA have reflected the continued capacity needs in the 2012 MTEF for support
Strength and capacity of individual institutions	Capacities of institution supported directly or indirectly through the SEA process have markedly improved. Support for the institutions involved in the SDAP implementation should be targeted for further strengthening. Capacity needs assessment should be conducted to determine the level of need for the key institutions such as energy, water, and agriculture
Influence on other institutions	NREG supported SEA mainstreaming programmes for some relevant sector, thus enabling the NDP to mainstream SEA in all MDAs and MMDAs. SEA activities have resulted in more transparent and participatory planning, training of more than 100 central Government and more than 440 district officials, more funding for environmental activities in sector plans, SEA tools have been incorporated into NDPC planning guidelines and mainstreaming of environment in government planning as evidenced by (i) strengthening of line agency and district environmental units and new budget lines for environmental activities and (ii) environmental issues incorporated into medium-term development plans of all 170 District Assemblies and into 10 sector policies/plans. The EPA is now giving training to other African countries on how Ghana achieved so much success in mainstreaming environment into their planning system.
Good governance practices	The NREG process is a typical good practice for Ghana. The formation of the Environmental and Natural Resources Advisory Committee (ENRAC) to bring together key ministers for senior policy coordination and guidance attempts to increase the involvement of CSOs, especially in the VPA process and in the review and formulation of a new Forest and Wildlife Policy The establishment of the AKOBEN system by EPA for environmental rating and public disclosure of large private sector developments, including mining operations The general effectiveness of the NREG Programme for highlighting issues and promoting policy reform, transparency and engagement was recognised in the request that additional sectors be included including fisheries and land degradation/desertification issues. The NDP matrix of the SDAP provides policy focus and strategy for ensuring good environmental governance. Support for implementation of SDAP for realisation of the objectives.
Capabilities, means, functioning of environmental services	NREG has funded and built capacities and continue to build capacities in participating institutions in NREG. There is the need to expand to the other relevant MDAs after proper needs assessment. The NDP matrix of the SDAP provides policy focus and strategy for institutional and legislative framework development. The programme will need support to realise the needed targets

Table 2.6 Institutions with Environmental Responsibilities	
Major NGOs, institutes or other organisations involved in environmental management or policy	There are a number of NGOs involved in the NREG. They are well organised into major coalitions on environmental governance which are coordinated by a national NGO, KASA[29]. 1. Civil Societies working Group on Climate and Environment 2. CSOs Coalition of NGOs in Water and Sanitation (CONIWAS) 3. CSOs Alliance on Fisheries 4. CSOs Platform on Oil and Gas 5. CSOs Coalition on Land (CICOL) 6. National Coalition on Mining (NCOM) 7. CSOs coalition on Forest Watch Ghana
Public Participation	
Transparency and access	The CSO coalitions and KASA are supported to prepare annual reviews of natural resources and environmental governance reports and make inputs to the NREG annual summits. The Forum is a major platform for public participation in NREG. The key objectives are: • Information sharing and learning from stakeholders in NRE sector • Review progress in the NRE sector noting any achievements, gaps, and challenges • Review the extent of issues raised in previous meetings are addressed • Issue communiqué on consensus of civil society on key issues and make recommendations for priority actions as part of CSOs inputs for the Government-led Annual NRE Review Summits
Effective participation	NREG process provided effective participation. (see above) In the 2011 the 2nd CSO Annual Review, there were 100 participants representing state and non- state actors in the NRE sector. The 3rd ENR Stakeholder Summit held in July 2011 involved 112 participants resenting GoG, CEOs of MEST, EPA, FC, MC,, NGOs, DPs, and private sector The NEP matrix of the SDAP provides policy focus and strategy for participation and coordination. The programme needs continued support to maintain the needed impact
Access to justice in environmental matters	The weak environmental compliance regime has affected justice in environmental matters. For instance, a group of private sector hotels suffering from sand winning has not been able to get justice because the sand winners are organised by a prominent chief who owns the land and ignores the law that invest the sand resources in the State (GoG). There is also a beach ordinance which could be used to effect justice but it is just not being done due the weakness of the environmental compliance and enforcement system. There is the need to support the establishment of Specialised Court for Environment under the Chief Justice's programme of expanding specialised courts for specific needs, considering the magnitude of the problem of illegal mining and logging with foreign influence.

[29] KASA is the word of a local language meaning "speak now"

Table 2.7 Environmental Services and Infrastructures	
Sanitation and waste treatment infrastructure	The National Environmental Sanitation Strategy and Action Plan NESSAP presents the state of the environmental sanitation infrastructure and services and resources required and implementation packages covering all the components of environmental sanitation. It provides a Strategic Environmental Sanitation Investment Plan of funding requirements and the framework for allocating estimated funding-gaps for projected improvements by 2015. The NESSAP therefore provides the basis for MMDAs to commence incremental improvements for all aspects of environmental sanitation that can be measured and tracked towards GoG attainment of MDG 7 by 2015. The critical environmental and sanitation services, with potential for job creation while minimising pollution of the environment from poor disposal of refuse, sewage, and discharge of liquid waste identified in the NESSAP include: • Composting of biodegradable organic fraction of municipal solid waste, which constitutes 60-70% depending on the level of development of the communities; Recycling of treated wastewater in urban agriculture to replace polluted water being used for irrigation to support estimated 47 -162 ha of vegetable production and up to 800 ha of maize in Accra. • Decentralised treatment, re-use and recovery systems (DTRRS)for sewage management in digesters and as well as aerobic composting of sewage developed in Ghana and currently being piloted in peri-urban communities, have high potential for on-site treatment and yield biogas for cooking and heating as potential substitute for charcoal use, generate hi-plant ammonia nutrient wastewater for irrigation. The technology is already being promoted in Ghana. Installed in institutions, hospitals, schools and in hotels to address the sanitation and water problems associated with uncontrolled discharge of sewage and faecal sludge is polluting beaches, rivers and water courses – a main cause of cholera and typhoid outbreak. • DTRRS are able to provide the solution to improve tourism along beaches and the coast by providing sewage treatment for a large number of people - more than 20,000 households of which 5,200 are in Accra alone - rely on banned pan latrines. Close to 5.2 million people are able to benefit from the environmentally sound technologies to improve household sanitation to meet Ghana's commitment to UN Sanitation for All and MDG 7 by 2015.
Disaster prevention systems Natural or anthropogenically-induced disasters e.g. • floods • drought • ecological dynamics	• Anti-bush fire campaign was undertaken • Various television and radio fire management education programmes organised to create the necessary awareness of fire hazards • National Platform on Disaster Risk and Climate Change Adaption put in place measures to prepare for the 2010 rainy season, including identifying the causes of flooding, alerting the communities likely to be affected, and to plan for their timely and effective search and rescue, evacuation, and relief operations during flood emergencies • National Disaster Management Organisation (NADMO) co-ordinated the emergency response/search and rescue and evacuation of victims of the 20th June floods (2012) • Routine monitoring of seismic (earthquake) activities continued to

Table 2.7 Environmental Services and Infrastructures	
• wars and conflicts • HIV/AIDS	be undertaken
Emergency response mechanisms	With support from the UNDP, the NDPC in collaboration with the EPA and NADMO are facilitating initiatives to mainstream climate change and disaster risk reduction into national development at all planning levels (e.g. national, regional, district and across sectors). The implementation of the mainstreaming process is being piloted in ten District Assemblies in Ghana

Table 2.8 Environmental Monitoring System	
The environment indicators to be pursued for the implementation of the SDAP in response to Rio+20	**EPA:** • ODS monitoring in imported equipment • Hazardous material and chemicals monitoring at entry points • Periodic urban air quality monitoring • Periodic industrial wastewater discharge quality monitoring in selected wetlands **WRC:** • Potable water quality monitoring in the water basins and impoundments for urban water supply • MG7 goals monitoring with regard to water supply **CWSA:** • MDG7 goals for rural water supply and sanitation

Role of private sector in mainstreaming environment management

139. The private sector is essentially involved in socio-economic activities (energy, mining and industry, agriculture, forestry and waste sector) as two sub-sectors; the formal sector and the informal sector. The formal sector is generally organised into industry and mining associations. The key associations include the Association of Ghana Industries, Ghana Chamber of Mines, Ghana Chamber Commerce and Industry, Ghana National Association Farmers and Fishermen, Ghana Timber Association, Ghana timber Millers Association and the National Board of Small Scale Industries.

140. The registered and regulated formal sector constitutes a low percentage in all the economic sectors. For example, the formal mineral resources mining sector (gold, manganese, bauxite, diamonds) employment in 2010 is reported as 15,86130 and the informal, unregulated artisanal and small-scale mineral and mining (including quarrying and sand winning) is estimated at about 500,00031 across the country. In the manufacturing industry sector, the Association of Ghana Industries reports registration of 1200 members of whom 20% are medium and large scale enterprises and 80% small and medium enterprises. In agriculture, 1546 farmers are registered with Ghana National Association Farmers and Fishermen. The registration is generally encouraged by the participation in the National Farmers' Day

[30] The Ghana Chamber of Mines Factoid III, 2010
[31] The State of Ghanaian Economy, ISSER, 2010

celebration. The informal Forestry sector comprises largely the bush meat and illegal chain saw industry.

141. The very large informal sector including high percentage of unregulated or illegal operations, contribute significantly to the national GDP. For instance, it is estimated that the bush meat industry which affects forest biodiversity is estimated to have contributed about US $ 275 million while the chain saw industry also impacting biodiversity and contribute to forest degradation and deforestation, about US $50 million[32].

142. The Environmental Assessment Regulations, 1999 (LI 1652) under the Environmental Protection Agency Act, 1994 (Act 490) is designed to regulate all levels of industry, micro, small, medium and large scale enterprises. The Regulations mandate that the EPA should notify all operations that existed before the promulgation of the Regulation, considered to be potentially polluting to seek registration and obtain a permit. The Regulation mandated environmental assessment of all new development. Thus, the Regulations sought to have all enterprises (new and existing) to be regularised by the EA process.

143. The role of the organised private sector under the country's environmental legislation has been principally one of registration of development under the EA permitting system of the EPA. The Environmental Permit is a prerequisite for obtaining all other permits even though the processing of other permits could be concurrent. The compliance in the registering and obtaining of environmental permits by the formal sector is relatively good.

144. The onus is on the private sector to implement the environment and social impact mitigation plan during the construction and the operational phase. The weakest link of the process is the enforcement of the environmental permit conditions to ensure environmentally responsible implementation of projects.

145. The commitment of industry to their roles and responsibilities has been observed to be largely dependent on promotion of compliance programmes that create sufficient awareness, especially to the sectors that existed before the promulgation of the EA regulations. The EPA has provided programmes to assist industries in sustainable consumption and production activates to reduce waste generation, improve energy efficiency, and material resource use efficiency.

146. The Mining and the Manufacturing sector are also participating in the EPA's AKOBEN programme of environmental performance rating and disclosure to assist the industry to implement measures to be proactively compliant with environmental regulations. The level of participation has been very encouraging.

147. The problem of environmental monitoring and apparent lack of enforcement in informal sector continues to be a challenge for all regulatory agencies in natural resource and environment governance due to the share size of the industry estimated at about 90% micro and small scale operations. The sector is it not responsive to regularisation principally due to

[32] Growing Forest Partnership Monitoring, Forestry Commission, 2010

the very micro and small scale nature of the operations which lack technical and financial capacity to regularise and also to integrate environmental management in their operations, and therefore remain predominantly illegal. There is the need for developing new business and environment models in country to address the informal sector and their role in sustainable natural resources use in agriculture, mining and industry, energy (charcoal), forestry (chain saw logging) and waste handling.

148. The inter-sectoral approach of Compliance and Enforcement Network (CEN) of regulatory agencies which was developed under the Ghana Environmental Resource Management programme could provide a more rigorous, collaborative and effective approach to natural resource permitting and enforcement in the informal sector in agriculture, mining, industry, forestry, and waste from human settlement.

149. The Associations' capacity should also be enhanced to encourage and provide programmes that will encourage registration and participation in their advocacy programmes on environment and sustainable consumption and production to drive environmental awareness and management to increase the competitiveness of the sector.

150. There is also a need for developing environmental criteria for integration in all assistance programmes for the private sector such as the Japanese Cooperation-National Board of Small Scale Industries joint programme to assist and enhance the viability of small and medium-sized businesses in Ghana; and the business-to-business programmes of the Netherlands Government to drive the integration of environment in the operations of micro, and small and medium-sized businesses.

3 CLIMATE CHANGE IMPLICATIONS

Existing analysis of climate change implications including climatic trends, increasing climate variability and strategic responses to them

151. Ghana is a Developing Country Party to the United Nations Framework Convention on Climate Change. In response to its obligation under the Convention, Ghana has prepared and submitted its *Initial National Communication* (INC) and the *Second National Communication* (SNC) to the Conference of Parties in 2000 and 2011 respectively.

152. The INC and SNC submitted to the UNFCCC fulfilled Ghana's obligation under the United Nations Convention on Climate Change and its commitment to reporting on the steps Ghana is taking or envisage undertaking to implement the Convention in accordance with Articles 4.1 and 12 of the Convention, which required each non-Annex I Party to submit its initial communication within three years of the entry into force of the Convention for that Party and thereafter every five to ten years. Subsequently, COP 17 adopted the guidelines for the preparation of biennial update reports from non-Annex I Parties contained in annex III of decision 2/CP.17, and also decided, among others that non-Annex I Parties, should submit their first biennial inventory update report by December 2014, which has led to Ghana currently initiated its Third National Communication which will also be the First Biennial Inventory Report in 2014.

153. The National Communication under the Convention contains information on a) national inventory of anthropogenic emissions by sources and removal by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties; b) general description of steps taken or envisaged by the non-Annex I Party to implement the Convention; and c) Any other information that the non-Annex I Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends.

154. The national greenhouse gas inventories for the entire time series of 1990-2000 in the Initial National Communication was recalculated and updated to 2010 in the SNC.

155. The impacts of climate variability and climate change on water resources, coastal resources, and agricultural crops were evaluated in the INC. The SNC built on the INC and expanded the impacts and vulnerability assessment to include fisheries, root and tuber crops production, cocoa production. The impacts on land use and incidence of poverty, as well as on vulnerability of women to climate variability and climate change were also assessed.

156. The climate variability and climate change impacts analysis reveal evidence of increasing surface air temperature in six ecological zones ranging from 0.4 ^{o}C to 0.9 ^{o}C for the period 1961-2000. Adopting the 40-year temperature trends as the baseline scenario, the Global

Circulation Model (GCM) scenarios that have been developed indicate that the mean daily temperatures are generally expected to change by 0.6^{o}C, 2.0^{o}C and 3.9^{o}C in 2020, 2050 and 2080 respectively (SNC, 2011).

157. The GCM scenarios also indicate annual mean rainfall is likely to reduce between 1.1 % and 3.1 % across all the six agro-ecological zones by 2020, with the highest reduction occurring in the rainforest and the coastal savannah zones. The changes in annual mean rainfall by 2080 is expected to be between 13 % and 21 % reduction of the observed baseline values.

158. The results of climate impact studies, using models which have downscaling capabilities to predict regional temperature and precipitation in Ghana over the period 2010–50, indicate warming in all regions of Ghana. The highest temperature increases are expected to be experienced in the Northern, Upper East, and Upper West regions, while the lowest will be in the Brong Ahafo region. For example, under one of the climate scenarios (Ghana Dry), temperatures in the three regions of the North will rise by 2.1–2.4°C by 2050. In comparison, the predicted rise in the Ashanti, Western, Eastern, Central, and Volta regions will be 1.7–2.0°C, and the rise in the Brong Ahafo region will be 1.3–1.6°C. (World Bank EACC, 2009).

159. The forecasts for precipitation indicate a cyclical pattern during the period 2010–50 for all regions, with high rainfall levels followed by a drought every decade. The wettest parts of the country are expected to be the Forest Agro-Ecological Zone (Ashanti and Western regions) and Coastal Agro-Ecological Zone (Volta, Eastern, Central, and Greater Accra regions). The northern and southern Savannah zones are expected to be relatively dry.

Identification of key factors of vulnerability with regard to climate variability and climate change, and an assessment of the capacity to respond

160. Ghana's water resources, agriculture, fish production, and coastal zone infrastructure are all predicted to be at risk. For instance, the vulnerability assessment of three major river basins, namely Pra, Ayensu and the White Volta predicted significant changes of 17-20 % reduction in stream flows by 2020. Ground water recharges also showed reductions of 17 %, 5 % and 22 % for Pra, Ayensu and the White Volta basins, respectively. It is however noted that the high annual runoff will have non-climate drivers such as deforestation of the watershed that also contribute to significant rate of evapo-transpiration in the three basins. Thus any future adaptation programme will need to consider addressing not only climate factors but also non-climate drivers to increase the resilience of the water resources.

161. The various studies further observe that most of the changes in stream flows will occur in upstream areas outside the territory of Ghana. This is because most of the rivers in Ghana are shared resources, raising the need of international collaboration in their transboundary management, as part of any adaptive response measures.

162. The overall trend in precipitation over 2006–2050 clearly indicates a downward trajectory in the absence of adaptation to climate change. This will affect significantly affect agricultural output, and lead to considerable variation in real growth of gross domestic product (GDP).

The study observed that adverse impacts on agricultural productivity become more pronounced over time. Agricultural GDP is estimated to decline by 3 to 8 % compared to the baseline projection for 2050s. The projections for cocoa pose serious socioeconomic implications in view of cocoa's significant contribution to national income and farmers' livelihoods.

163. Damage to the coastal zone in the form of flooding, land loss, and forced migration is estimated at € 4.0 million per annum by the 2020s, rising to €4.75 million per annum by the 2030s (EACC, 2009). The climate-related cost to agriculture and other vulnerable productive systems need to be monitored and tracked for informed decision making in adaptation response.

164. The implication of reducing runoff and precipitation will particularly affect hydropower generation. Simulation of hydropower indicates considerable reduction in hydropower output of order of 59 % by 2020. The findings are consistent with experience of the trend of Volta lake levels over the last four decades (1979-2010). The basin has experienced increased drought and flood frequency and periodic reduction in water levels and hydropower generation. The major challenge in 2007 was several months of inadequate power supply, which came to an end in September because of the low level of water in the Akosombo Dam. Electricity production from the Akosombo hydro station in 2007 was 3,104.33 gigawatt hours (GWh), or 45.3 % of peak production in 1997 (6851 GWh), and the production from 2006-2010 averaged 4970.28 representing 72 % of power produced in 1997 (ISSER, 2010).

165. The declining water levels and increasing power demand led to the diversification and supplementation of power generation with light crude oil (LCO) thermal power generation. The Thermal generation has consequently increased from 2810.40 (2006) to 3170.47 (2010) representing an increase of 12.8 % as total generation rose from 8428.97 to 10166.32 GWh from 2006 to 2010. The West Africa Gas Pipe and the development of the off-shore natural gas infrastructure in the Jubilee Oil and Gas field however provide opportunities for higher efficiency natural gas powered-plants and fuel switch from LCO to lower carbon intensity and low emissions technologies for energy security.

166. The implications of the wide fluctuations in runoff and stream flows, with the Volta basin experiencing significant reductions in runoff, are far reaching. There will be an increase in the risk of floods and/or droughts in both rural and urban areas in the Volta basin, which will exacerbated by lack of awareness on climate change and its impact, high dependence of the economy on water for hydropower generation, low penetration of irrigation in agriculture that is predominantly rain-fed, weak and inadequate infrastructure to cope with the high intensity of rain and floods, limited human resource capacity, weak sub-regional network and inadequate financial resources or low budgetary allocation.

167. The predicted warming with temperature increases from about $1^{o}C$ to over $3.9^{o}C$ will have adverse effects on human well-being and activities, food security, and water availability. In response to these climate changes, people will migrate in search of better land and environment. The population of Ghana has seen doubling every 25 years. Migration of

population from rural to urban areas will raise demand and put pressure and on municipal services—including water supply and sanitation, public health, energy, transportation, and housing services. Migration is also expected to occur not only within the country, but also from countries to the north of Ghana, which will also become hotter and drier. This rural to urban drift in population will worsen water and sanitation problems in peri-urban communities, particularly of Accra, Takoradi, Kumasi, and Tema.

Estimation of both vulnerability (identification of vulnerability factors) and capacity to respond to the consequences of climate variability and change

168. The USAID *Ghana Climate Change Vulnerability and Adaptation Assessment* (2011) together with the INC and the SNC provide a comprehensive overview of vulnerability and capacity to respond to the consequences of climate variability and change. It is anticipated that climate change in conjunction with other destructive land use practices could accelerate desertification in northern Ghana as rainfall declines and temperatures increase. With these changes, existing vulnerabilities (to soil wash-out, loss of fertility, recurring drought, low input decreased fallow period farming, deforestation, frequent hot bush fires, and overgrazing) will be exacerbated.

169. Social vulnerability is likely to be severe in the Upper East, Upper West, and Northern administrative regions. Urban districts are likely to be less vulnerable than rural districts. The Upper East, Upper West, and Northern regions have a much higher incidence of poverty than other regions of Ghana and thus have a lower intrinsic resilience to any livelihood shock. A district-level approach has been advocated to identifying the areas in greatest need of support for climate change adaptation since it is considered that this will help to target resources more appropriately than a regional-scale approach.

Policy review (e.g. climate-resilient development strategies, national adaptation programmes, low carbon development strategies), together with their institutional components

170. Against the backdrop of the high vulnerability of natural resources and socio-economic implications of climate variability and climate change to the economy and the people of Ghana, GoG is taking appropriate adaptation and mitigation measures to protect its people and also contribute to the global effort to mitigate climate change. The Policy and Measures (PaMs) include the preparation of national climate change adaptation policy framework (NCCPF) and programme of implementation (the national climate change policy-NCCP), the national climate change adaptation strategy (NCCAS).

171. It noteworthy that Ghana integrated climate variability and climate change as well as sustainable development action plans into its NDP framework (GSGDA, 2010-2013) in 2010, thus began the process of mainstreaming climate change and environment into the MTEF budgetary process and the national, metropolitan, municipal and district levels within the GoG decentralised structure.

172. Ghana has not only developed adaptation policy response actions to protect its people from the impacts and vulnerability to climate variability and climate change, but has also prepared and submitted its nationally appropriate mitigations actions (NAMAs) to the UNFCCC Secretariat for consideration under the Cancun Agreement. NAMAs is in line with Ghana's recognition that the present contribution of developing countries to greenhouse gas (GHG) emissions, particularly Ghana will not remain permanently low at the current levels as the country is poised to grow significantly with the emerging oil and gas industry.

173. Acknowledging the potential growth of GHG emissions as a result of the diversification of the power sector from predominantly hydropower to thermal generation in order to compensate for the dwindling hydropower potential due to climate impacts, Ghana has made the strategic decision to embrace the "Green Economy" as one of the pillars of its national climate change policy so as to make informed choices towards the trajectory of low emissions development strategy (LEDS) synonymous with low carbon growth (LCG) for sustainable development.

174. Ghana continues to receive support from multilateral and bilateral donor agencies for implementation of low emissions-related programmes in the dominant carbon emissions and/or removals sectors and categories. The Energy Sector programmes include renewable energy-based electricity for rural, social and economic development in Ghana promoting of appliance energy efficiency and transformation of the refrigerating appliances market in Ghana, energy development and access project, integration of renewable energy sources into the national energy grid mix to drive penetration, and the Bus Rapid Transit under Ghana Urban Transport. The Forestry and Land Use Change sector involves Growing Forest Partnership, Forest Resources Use Management Project, Ghana Readiness Preparation Proposal (R-PP), REDD+ R-PP Implementation, and the Chainsaw Milling Project.

Existing national or sub-regional studies on the expected effects of climate change should be considered including proposed responses, which may include technical, policy and institutional components

175. The Third National Communication Work Plan proposes comprehensive outputs:

- National development priorities and circumstances reviewed, analysed, described;
- National GHG Inventory;
- GHG emissions for selected sectors (energy, industrial processes, agriculture, land use change and forestry and waste re-calculated between 1990 and 2006 and estimated for 2007 and 2010 using 1990 and 2000 as base years);
- Emission trends and forecasts (projections) for the periods up to 2020, 2030 and 2050 developed;
- General description of measures to facilitate adequate adaptation to climate change;

- Country-wide climate scenarios reviewed and updated including "weather extremes";
- Integrated climate change impacts, vulnerability and adaptation assessment on key sectors in high risk agro-ecological zones reviewed and updated;
- Measures to facilitate adequate to climate change compiled, reviewed;
- Climate change mitigation assessment options including emission scenarios developed;
- Total impacts of policies and measures to mitigate climate change assessed and reported;
- National Action Plan on NAMAs for climate change developed;
- Measures to mitigate climate change compiled and reviewed;
- Climate change and related issues on disaster risk reduction mainstreamed into national development process;
- Needs for the development and transfer of environmentally sound technologies assessed and action plan developed;
- National capacity for systematic observation and research reviewed and assessed;
- Capacity building needs for climate change analysed and report developed; and,
- Access to and use of information technology to ensure efficient exchange and sharing of information including development of a database for tracking climate-related support.

Effects of climate change in exacerbating existing pressures or impacts and the linkages between environmental degradation (ecosystem services) and vulnerability, with a focus on the poorest and most exposed social groups.

176. Environmental degradation is caused mainly by mining operations, sand winning, natural disasters and weak land management. In three regions; Western, Eastern and Ashanti declining soil fertility has led to lower crop yields while rangeland depletion and deterioration in water quality has adversely affected the fish catch. Non-existent property rights, limited access to financial and other services, inadequate safety nets in time of stress or disaster, and lack of participation in decision-making may result in adoption of short term activities which tend to lower longer term resilience. This may make the most vulnerable even more vulnerable to environmental degradation, including degradation exacerbated by climate change.

177. Where livelihoods are already marginal, due to soil loss, low fertility or areas affected by mining, future climate variability in the form of extreme rainfall or recurring drought

periods will exacerbate future prospects. A key to this may be secure tenure and access to markets as this tends to encourage investment and reduces resource-degrading strategies. Faced with growing land scarcity, diminishing agricultural productivity and a reduced access to traditional products from forests and other natural resources, rural communities may turn to other activities that do not build longer term resilience.

Implications of climate change for the focal areas of cooperation should be assessed, including any safeguards or need for additional analyses to ensure that investments are adapted to increasing climate variability and predicted climate change effects

178. Some of the EC cooperation is on provision of resources to NREG and so by definition ought to be climate-protected. A good example is a proposal for a Western Region Integrated Development and Transport Plan which could create a balanced and diversified sustainable economy in the Western Region through its significant resource endowment and development potential.

179. To deal with the opportunities and challenges of the Western Region effectively it will be necessary to plan and design an integrated development and transport plan for the short, medium and long term. Climate changes nominally threaten this development in the form of ineffective infrastructure and accessibility due to washout, flooding and erosion. A 'roadmap' needs to be developed and a series of actions to collect effective data, establish policies, strategies and plans, implementation programmes and integrated management, followed up with monitoring and evaluation.

180. As many of the region's activities (large and small-scale mining and quarrying, gas pipeline (onshore and offshore) and offshore services port and harbour, gas processing plant, oil refinery, gas powered electricity generation, expanded food and industrial crops and likely new settlements) are being implemented in an uncoordinated way by both GoG and private sector entities there are significant risks to the future economy, the environment and the sustainability of the Region. The project proposed to produce an integrated transport and development plan would assist in effective management and implementation.

4 INTEGRATION OF ENVIRONMENTAL CONCERNS INTO THE MAIN POLICIES AND SECTORS

181. The *Medium-Term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA) 2010-2013* provides the context for the identification of links between the main government policies (overall development policy, poverty and sector policies) sustainable natural resource management. and environment protection policies, programmes, and projects of ministries, departments and agencies (MDAs)

182. Ghana is widely known to be endowed with abundant natural resources, which have played a very important role in the agricultural and industrial development efforts of the country. However, as a result of the relatively unrestrained exploitation of some of these natural resources to meet legitimate socio-economic needs, extensive damage has been done to productive lands and the environment through, principally, deforestation, air and water pollution, desertification, overgrazing, and the destruction of biodiversity.

183. Efforts continued to be made in addressing environmental issues, including the ratification of a number of international conventions related to the environment and the integration of the principles of sustainable development into country policies and programmes in order to achieve the target under the Millennium Development Goals (MDG 7 specifically) of reversing the loss of natural resources by 2015.

184. Policies, programmes and projects implemented in 2010 were aimed at achieving appropriate outcomes in the following key areas:

- Mineral Exploration and Extraction (including oil and gas)
- Biodiversity
- Protected Areas
- Restoration of Degraded Forest and Land Management
- Marine and Coastal Ecosystems
- Wetlands and Water Resources
- Waste, Pollution and Noise
- Community Participation
- Natural Disasters, Risks and Vulnerability
- Climate Variability and Change

185. The following specific policy measures have been pursued:

- Sustainable Development Action Plan (SDAP) with the theme "*Securing the Future for the Next Generation of Ghanaians" addressing Rio+20*;
- Linkages to the African ten-year programme: On Sustainable Consumption and Production;
- EPA Strategic Plan completed;
- Cost of environmental degradation calculated for the forestry sector under national environmental monitoring, verification and reporting system;
- SDAP/environmental indicators and monitoring system;
- Bridge and standardise the environmental indicators identified in the SDAP;
- Capacity building in SEA tools and mainstreamed into District Medium Term Plans (DMTP) under decentralised environmental management;
- Build a national database on environmental indicators and statistics, and compile a national compendium of environmental statistics;
- Pilot on online Environmental Assessment (EA) registration in EPA Regional and District offices under decentralised EA administration; and,
- Developed SEA on oil and gas to mainstream climate change and environment in the sectoral policy, plans, programmes and projects.

Promote sustainable extraction and use of mineral resources (selected list):

- A new method of gold extraction from concentrates without the use of mercury;
- Acquisition of airborne geophysical data to cover the entire country;
- Minerals Commission facilitated formation of multi-agency Mining Revenue Taskforce under NREG;
- Comprehensive human resource development plan was prepared for mining sector agencies to enable them perform their statutory functions;
- Exploration of areas for demarcation to small-scale miners;
- Regulations to enable effective implementation of the Minerals and Mining Act (Act 703) were prepared; and,
- MEST convened a committee to improve and mainstream safety, environmental protection and capacity enhancement towards better offshore drilling of oil and gas.

Integrate biodiversity issues into development planning and reversing the loss of biodiversity (selected list):

- Detailed list of activities under the National Biodiversity Strategy and Action Plan was prepared and costed, and implementing institutions identified;
- Under the Cocoa Partnership (CP) arrangement an environmental strategy, extensive environmental baseline study, was developed;
- MLNR is encouraging the development of ecotourism; and,
- MLNR promotes the use of bamboo and rattan as an alternative to the wood deficit.

Maintain and enhance the protected area system; and strengthen the legal framework on protected areas (selected list):

- A total distance of 19,671.54 km was inspected during the year;
- Protected area staff carried out many activities to maintain and enhance the protected area system;
- A total of 27,156.35 km of both external and internal Forest Reserve boundaries were cleared during the year;
- A total of 242.21 km of forest boundary was planted; and,
- MLNR developed a National Forest and Wildfire Management Policy to provide an institutional framework and strategies to guide wildfire prevention and control.

Reversing environmental degradation and ensure efficient land management (selected list):

- MLNR implement six key forest plantation projects to restore forest cover and to create employment for the rural and depressed urban communities;
- MLNR undertook studies to reclaim land degraded through illegal mining activities
- Framework for the Land Bill; land ownership and tenure, land management and administration and survey and mapping has been prepared and shared with stakeholders;
- Lands Commission commenced scanning of all lands registry and state land record as part of the process of migrating from manual to digital; and,
- Eight Deeds Registry offices were established as part of the process of decentralising the registration of land transaction and the preparation of the grounds for eventual title registration.

Appropriate management of coastal resources (selected list):

- GoG continued with the routine maintenance of the coastal protection programmes at various locations;
- Work commenced on the construction of groyne fields and beach nourishment to protect present and future infrastructure development including salt production;
- The Coastal Development Project aimed at keeping the coastline clean was implemented in four regions (Volta, Greater Accra, Central and Western Regions);
- Impact of aquatic and terrestrial ecosystems from the aerial spraying operations was monitored;
- Mapping was undertaken of 512 kilometres of coastline for tourism development, development of salt industry, checking of coastal erosion and the extension of Ghana's continental shelf beyond the 200 nautical miles exclusive economic zone to facilitate oil exploration; and,
- Geological mapping and detailed ground investigations to determine coastal pollution and sanitation sites, and areas prone to flooding and urban erosion were completed.

Sustainable use of wetlands and integrated water resources management (selected list):

- Integrated management of invasive aquatic weeds project (initiated under NREG in 2006);
- Water Resource Commission continued the hydrogeological studies;
- Data and information on major water users were compiled to assess quantity of volumes of water use to avoid over-exploitation of the resource;
- Identification of major water users were carried out and valid permit holders' register published; and,
- Management structures of two additional basins established for integrated management.

Efficient waste management and reduction of noise pollution (selected list):

- Committee on plastic waste management to advise and design modalities for controlling plastic waste was established;
- A pilot project on waste collection to create jobs as well as wealth was initiated;
- MEST led an inter-ministerial committee to develop new guidelines to regulate the deployment of telecommunication masts; and,

- MEST submitted five nuclear-related conventions to Parliament for ratification, and also submitted the Bio-Safety Bill to Parliament.

Effective community participation in the management of resources (selected list):

- MLNR revised the benefit-sharing arrangement of forest revenue from off reserves to sustain community participation;
- Community Forestry Management and the Participatory Forest Management projects in the Transitional Zone continued to be implemented;
- Fifty meetings were organised with district assemblies, forest fringe communities, traditional authorities and other stakeholders on benefit-sharing agreement;
- MLNR instituted various alternative livelihood schemes to wean fringe communities off forest resources; and,
- Loans granted with low interest rates have stimulated economic activities in the areas of bee-keeping, grass-cutter rearing, piggery, oil palm processing, soap making, cold stores businesses, sewing and bakery.

Mitigate natural disasters and reduce risks and vulnerability (selected list):

- Anti-bush fire campaign was undertaken;
- Various television and radio fire management education programmes were organised to create the necessary awareness of fire hazards;
- National Platform on Disaster Risk and Climate Change Adaption put in place measures to prepare for the 2010 rainy season, including identifying the causes of flooding, alerting the communities likely to be affected, and to plan for their timely and effective search and rescue, evacuation, and relief operations during flood emergencies;
- National Disaster Management Organisation (NADMO) co-ordinated emergency response/search and rescue, evacuation of victims of the 20th June floods (2012); and,
- Routine monitoring of seismic (earthquake) activities continued to be undertaken.

Adapt to impacts and vulnerability, and mitigate climate change and variability (selected list):

- National Climate Change Policy Framework was prepared and National Climate Change Committee established;
- National climate change policy is under preparation to mainstream climate change into sectoral policies, programmes and projects;

- Published its Second National Communication to the UNFCCC;
- Submitted a list of Nationally Appropriate Mitigation Actions (NAMAs) to the UNFCCC (under the Copenhagen Accord);
- Prepared its National Climate Change Adaptation Strategy (NCCAS);
- National Ozone Unit initiated the process of registering all importers and retailers of refrigerants;
- Water Resource Commission implemented climate change adaptation activities to promote adaptive and coping strategies for water resources use and management to reduce livelihood vulnerability;
- Climate Change integrated into the Management of Priority Health Risks; and,
- Submitted its 'Readiness Preparation Proposal' to the Forest Carbon Partnership Facility to assist preparation for reducing emissions from deforestation and forest degradation (REDD)[33] .

186. On the above basis, the links between the main government policies and sustainable natural resource management seem well-integrated, and in particular, SEAs have been undertaken to cover the main sectors. Given that the main EC intervention concerns the support to NREG it would seem that this should be effective in promoting environmental mainstreaming given that the primary government actors in the above policy areas (MEST/EPA, MLNR, Minerals Commission and the Forestry Commission) are supported through the NREG process. DPs in the sector have tended to show more interest by giving preference to bilateral dialogue rather than strategic discussion at sector level. Policy dialogue at sector level could be fostered during the co-chairmanship of the SWG by the EU Delegation.

[33] Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. "REDD+" goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

5 EU AND OTHER DONOR CO-OPERATION FROM AN ENVIRONMENTAL PERSPECTIVE

5.1 Co-operation funded by EU

Intervention Context

187. The general approach to cooperation funded by the EU is described in the *Country Strategy Paper and National Indicative Programme 2008 – 2013* with €367 million scheduled for the "A" allocation and €6.6 million for the "B" allocation, for the first two years of the 10th EDF. The "A" allocation covers macroeconomic support, sectoral policies, programmes and projects in support of the focal or non-focal areas of Community assistance. The "B" allocation covers unforeseen needs, such as emergency assistance which could not be financed from the EU budget, and could be triggered in response to specific mechanisms and procedures (does not constitute a part of the National Indicative Programme (NIP).

188. The five-year programming cycle finishes in 2013 with the conclusion of the 10th EDF and the programming for the 11th EDF will be six years from 2014 to 2020. In general, the NIP is being retained though for selected countries, such as Ghana, the CSP is not being produced. Where a country (e.g. Ghana) is considered to have good institutions and a good policy framework, then the EU preference is to use the government's own strategies and plans and provide cooperation within a process of joint programming between the government and EU member states.

Past and Current Experience

189. Under the 10th EDF, the EC in conjunction with four other development partners (DFID, AFD, the Netherlands, and the World Bank) have been providing sector budget support under the Natural Resources and Environmental Governance Programme (NREG) to address the environmental and natural resource concerns identified in Section 2. The EU has made available €8.0 million (2 % of the total NIP) to improve the management and governance of natural resources in order to contribute to growth and sustainability of the GoG national development strategies.

The main GoG institutions being supported under NREG are:

- Ministry of Environment, Science and Technology
- Ministry of Lands and Natural Resources
- Environmental Protection Agency
- Forestry Commission

- Minerals Commission

190. Following the conclusion of Phase I of NREG, the EC is considering further financial support of €7.0 million for the next two years, in line with the findings of the previous Country Environmental Profile (2006) which concluded that:

    - Strengthening environmental governance would be vital to ensuring that natural resources contributed to greater wealth and sustainable growth;
    - Removing policy, regulatory, and institutional bottlenecks would be crucial for reducing vulnerability of the poor in both rural and urban areas; and that
    - Reinforcing coordination of and dialogue within mainstream environment and natural resource management would be critical.

191. Under NREG there is significant emphasis on mining, forestry, and environment with a recent broadening to include oil and gas. This support decreases year by year and by 2013, only the EU sector budget support will be applicable.

192. Within this context, Table 5.1 indicates how the EC and GoG focus their cooperation.

Table 5.1 EC Cooperation under 10th EDF

10th EDF GHANA
1. Transport Connectivity and Regional Integration
(a) Trunk roads, other infrastructure and regional integration
(b) Feeder roads
(c) Studies
2. Governance
(a) Decentralisation framework and implementation (feeder roads, water and sanitation and rural infrastructure and development)
(a) Civil society capacity, social accountability (rural areas)
(b) Non-executive governance institutions
3. General Budget Support
4. Other Programmes
(a) Trade facilitation, regional integration and Economic Partnership Agreement support
(b) Migration, Diaspora and Security
(c) Environment and Natural Resource Management (including FLEGT)
(d) Technical Cooperation Facility

193. In **transport**, the aim is to decrease the maintenance backlog of the trunk road network, and to provide access to markets and social services in rural areas (feeder roads through

decentralisation) with some potential for investing in urban areas, ports, harbours and railways. Under this area, the EU has funded a study[34] on *Transport Sector Research Strategy and Climate Strategy* to consider improvements to policy and planning functions in Transport Sector to enable better delivery of development objectives of GoG to respond to the increasingly complex challenge of climate change and sustainable development. The EU-Ghana Joint Annual Review 2009 (JAR), which was the equivalent of the CSP Mid Term Review, considered the EDF programmes in the transport sector were on track to achieve their development results, despite some delays.

194. In **governance**, the aim is to establish a more effective, transparent and accountable decentralised local government system; to engage civil society in national dialogue and decision making; and to strengthen the practice of democracy, particularly redressing the imbalance of power and resources between the executive branch and the legislature. The JAR considered that progress has been limited due, partly, to lack of programme appraisal and partly to poor quality of the initial technical assistance (to the Ghana Police) and to insufficient delegated authority to the NAO.

195. With **general budget support** (GBS) provided in the context of the Multi-Donor Budgetary Support Programme, MDBS) the aim is to support the GoG macroeconomic stability and reform programme, thus contributing to poverty reduction, economic growth, equitable access to social services and improvement in public finance management. The JAR noted that whilst disbursements have been regular without any major delay, their impact has suffered from the low level and limited breadth and depth of dialogue under the MDBS. It was considered that there was excessive focus on the negotiation of triggers rather than on strategic issues that should be tackled at the macro rather than sectoral level. Some MDBS triggers were not relevant, too focused on processes rather than outcomes, and often too vague and subjective.

196. Non-focal sectors cover Trade Facilitation, Regional Integration and support for Economic Partnership Agreements (including ICT); Migration, Security and the Diaspora; Natural Resources Management (including FLEGT); and Technical Cooperation Facility. The JAR considered that there has been good progress in the Water and Sanitation Sector though limited achievements in the Trade and Environment (lack of programmes coming on stream).

197. The **environmental and natural resources**, on which much of the country's economic activity and the population's livelihood depend, are being depleted at an increasing rate:

- Forests are threatened by expanding agricultural land, mining and non-regulated wood industry predominantly illegal small-scale chain saw logging, large scale non-sustainable excessive logging activities, fuel wood extraction for charcoal production, destruction through illegal artisanal and small scale mining, poor silvicultural management practices, hunters, palm wine tapers, honey collectors, and

[34] Currently at Draft Report stage

bush fires caused mainly by farmers through slash-and-burn agriculture;

- Crop yields have stagnated with productivity declining due to soil erosion. The cost of soil degradation due to soil erosion has been estimated to be worth at least 2 % of total Ghana's GDP, mostly affecting poor rural communities;
- Fish, timber, and non-timber forest product stocks are decreasing rapidly;
- Coastal towns face severe water shortages during the dry season;
- Wildlife populations and biodiversity are in serious decline; and,
- Health-related pollution (due to indoor and outdoor air pollution, and water and sanitation issues) has emerged as a serious threat to the majority of the population.

198. The existing rate of destruction of biodiversity in Ghana will lead to further food insecurity, poverty in rural areas, erosion of genetic resources, and inability of the natural environment to cope with natural and human-made changes. Ghana is currently taking steps to address some of these issues, through joining the Forestry Law Enforcement, Governance and Trade (FLEGT) initiative and participating in Voluntary Partnership Agreements (VPA), to reduce illegal logging.

199. Under 9th EDF (though implemented 2007-2011) are Water, Sanitation and Health actions (collectively known as WASH projects) totalling € 42.9 million. Under Environment and Climate Change the table below lists the major actions.

Table 5.2 EC Cooperation in Environment and Climate Change

EC Cooperation in Environment and Climate Change		
Title of Intervention	**End Year**	**€ (M)**
Protected Area Development Programme Phase II	2009	7.8
Mining Sector Support Programme	2010	40
Bamboo as sustainable biomass energy: A suitable alternative for firewood and charcoal production in Africa	2013	1.33
NREG (+ EUR 7 million rider to be prepared)	2013	8
Governance Initiative for Rights and Accountability in Forest Management	2014	0.99
Use of Jatropha plant to improve sustainable renewable energy development and create income generating activities	2015	1.9
Provision of modern, affordable and sustainable energy services to rural poor communities in West African countries (Ghana)	2015	1.65

EC Cooperation in Environment and Climate Change		
Supporting the integration of legal and legitimate domestic timber markets into Voluntary Partnership Agreements (Ghana)	2015	1.99

200. In addition to the above there are some centrally-managed projects and regional actions under Economic Community of West African States (ECOWAS) plus, in the energy sector some European Investment Bank loans. There are also commitments under roads and transport.

201. Within the Harmonisation and Aid Effectiveness framework, most of Ghana's Development Partners (DP) have assembled a joint strategy as a response to align their support to the GoG national development strategies, in particular with the *Ghana Poverty Reduction Strategy II* and the *Programme of Action* (of the governance review carried out by the *African Peer Review Mechanism*). The EC *Country Strategy Paper* is fully aligned with the NDP and the activities of other DPs as developed in the *Ghana Joint Assistance Strategy*.

202. The EU signed the Financing Agreement for the contribution to NREG in 2009 with the release of funds contingent on a series of "triggers" being satisfied. The overall progress against agreed 2008 targets and triggers was generally satisfactory, with all six triggers having been met, particularly regarding the signature of the Voluntary Partnership Agreement (with the EU) and the understanding and commitment to action on climate change. Some targets were less than satisfactorily achieved, partly due to the need for MDAs to adapt to the new budget support regime rather than the more familiar project-based funding modality.

203. A future focus is to maintain emphasis on:

- Implementing the VPA, which DPs view as crucial to managing Ghana's forests sustainably, maintaining market access and setting the framework for tackling issue of illegality on the domestic market
- Publication at the district level of revenue disbursements, and thereby strengthening transparency and accountability
- Enhanced revenue collection in the minerals sector
- Tackling the issue of social conflicts that has arisen in some mining communities
- Continued work on climate change strategies
- Strategic Environmental Assessment of the oil sector.

...within the three sectors of concern: Forestry and Wildlife Sector, Mining Sector and the Environment Sector.

204. Following the outcome of the 2011 Joint Review of the MDBS Performance Assessment Framework, the 2011 performance tranche triggers were considered to have been satisfied:

- Stabilisation of the macroeconomic situation;
- Improvement of public financial management;
- All NREG work plans were integrated into the annual budget and the MTEF 2010-2012; and,
- Most donor-funded projects which were not formerly captured are now reflected in the national budget.

205. According to the assessment, satisfactory progress was also achieved on all the six key targets and indicators of NREG as follows:

- Dissemination of the latest information (up to 2010) by the Forestry Commission on royalty payment at local level;
- A comprehensive strategy prepared by the Forestry Commission for addressing the domestic market wood supply;
- Implementation plans for the local conflict tracking tool by the Mineral Commission;
- Strategy for the use of the guidelines on sub-national mining revenues by the Minerals Commission;
- MEST and EPA to formally submit the discussion document on the National Framework for Climate Change to inform Cabinet on developments and intent;
- MEST and EPA to prepare a dedicated document setting out their institutional functions and structure.

206. Following the above outcomes, the EC is considering further financial support of €7.0 million for the next two years. The JAR identified the following six key challenges and opportunities relevant to the CEP:

- High short term vulnerability of Ghana (though with longer term prospects from future oil revenues);
- Potential negative impact that oil revenues may have on agriculture and the related need to speed up the rehabilitation of feeder roads as envisaged in the CSP; and,
- Encouraging developments in the management of forestry and mining (i.e. the signing of the VPA and participation in the EITI) should be supported through a greater participation in NREG.

207. A key challenge for Ghana is environmental management and whether or not sector budget support is the most appropriate way forward for the period 2014 -2020.

Other Specific Interventions

208. The following EU interventions are discrete activities in addition to the NREG sector budget support.

Protected Area Development Programme

209. The Protected Area Development Programme (PADP) prime objective is to enhance the conservation of biodiversity heritage in the Protected Areas (PA) of Ankasa and Bia, and the Globally Significant Biodiversity Area (GSBA) of Krokosua Hill Forest Reserve (KHFR) located within the High Forest Zone of the Western Region of Ghana. In Ghana, these almost virgin PAs represent the last significant tropical rainforest fragments of the Upper Guinea Forest Ecosystem from Guinea to Togo. Ghana has lost more than 90 % of its initial 80 000 km^2 of tropical rainforest. Ankasa (509 km^2) and Bia (306 km^2) are some of the last unexploited pockets and act as anchors for the rich flora and fauna of the West Africa sub-region. They harbour more than 350 species of birds, 100 species of mammals and primates including forest elephants, chimpanzees and the Diana monkey as well as an extremely diverse butterfly fauna.

210. A predecessor programme (PADP I) made significant contributions towards enhanced conservation of biodiversity; management plans for Ankasa and Bia PAs were prepared and limited infrastructure for conservation activities and tourism were developed. A community-based programme known as Community Resource Management Areas was piloted to improve the natural resource management capacity of fringe communities in off-reserve wildlife conservation. PADP II builds on the results of PADP I and has an overall budget of € 7,400,000, of which € 6,500,000 is to be funded from the EDF. The programme is to consolidate and extend on- and off-reserve achievements, in particular securing long-term management prospects for the PAs. This is to be achieved mainly through further improving the conservation and management capacity of the Wildlife Division and by complementing park infrastructure for administration and tourism. Off-reserve conservation is to centre on expansion of the participatory concepts to a wider area surrounding the target areas. Programme support for eco-tourism development and income generating activities is to contribute to reduced poverty in rural communities adjacent to Ankasa, Bia and the KHFR.

On Climate Change

211. The EU has continued to support the GoG in its commitment to climate change action through its support to the NREG process and specifically to MEST and EPA and their climate change unit. In particular, this has supported:

- Development of the National Climate Change Adaptation Strategy;
- Development and submittal of the country's Second National Communications (to the UNFCCC);
- Development of the Third National Communications; and,
- The ongoing process of national engagement on climate change.

212. The EPA led the preparation of the draft NCCAS which aims to climate-proof developments and to build resilience to climate change impacts now and in the future in order to reinforce and increase the capacity of the people and ecosystems to adapt to the impacts of climate change. Ultimately the NCCAS is to position Ghana to reduce the risks of climate change and capitalise on any opportunities that climate change provides for sustainable development.

213. NCCAS has six principal objectives:

- Improve societal awareness and preparedness for future and potential climate change;
- Enhance the mainstreaming of climate change into national development to reduce climate change risks;
- Increase the robustness of infrastructure development and long-term investments;
- Enhance the adaptability of vulnerable ecological and social systems by increasing the flexibility and resilience of these systems;
- Avoid mal-adaptation by reversing the trends that increase vulnerability; and,
- Foster competitiveness and promote technological innovation.

214. Further, the NCCAS identifies ten priority action programmes that enjoy consensus amongst national stakeholders. These action programmes are cross-sectoral in nature and also ecosystem-based. Table 5.3 lists the titles of these action programmes.

Table 5.3 NCCAS Priority Actions
Increasing resilience to climate change impacts: identifying and enhancing early warning systems
Alternative livelihoods: minimising impacts of climate change for the poor and vulnerable
Enhance national capacity to adapt to climate change through improved land use management
Adapting to climate change through enhanced research and awareness creation
Development and implementation of environmental sanitation strategies to adapt to climate change
Managing water resources as climate change adaptation to enhance productivity and livelihoods
Minimising climate change impacts on socio-economic development through agricultural diversification
Minimising climate change impacts human health through improved access to healthcare
Demand- and supply-side measures for adapting the national energy system to impacts of climate change
Adaptation to climate change: sustaining livelihoods through enhanced fisheries resource management

Integration of the Environment into Other Cooperation Areas

215. The Environmental Protection Agency (strengthened under NREG) has continued to promote and mainstream the use of SEA across Government as a key tool to assess policies and to inform decision-making, building on the experience of the SEA of GPRS I and II. Subsequent SEAs have included:

- Water and Sanitation
- Energy
- Transport
- Mining
- Agricultural Development
- Tourism

Environmental Impacts or Potential Risks

216. There has been an over-reliance of a major intervention area (climate change) being co-ordinated by one of the DPs (DFID) which then did not achieve the desired results for various internal reasons to deliver that coordination during at least the first half of 2012. Given that climate change is cross-cutting and critical to future resilience of Ghana to climate change shocks, it is important that in addition to any perceived external coordination, the EU should ensure that its own areas of intervention are aligned, as a minimum, with the requirements of the EU Integration Handbook and not rely, solely, on external coordination by others to deliver that consistency.

217. The potential risks to PADP II are:

- Security of parts of PAs is uncertain regarding legislation, logging, compensation;
- Required infrastructure development (access roads and connection to national grid) is only partly complete, thus limiting access and use of the PAs;
- Re-structuring of the Wildlife Division is incomplete and adequate staff are unavailable to implement the Programme;
- System for funding allocation and revenue retention is not yet functioning; and,
- Revenues from tourism on-reserve and wildlife management off-reserve may be insufficient to guarantee community co-operation for conservation.

218. The programme for PADP II includes specific activities to ensure that risks are fully addressed, including:

- Institutional strengthening measures to enable decentralised government implementation;
- Identification and support to appropriate NGOs to support off-reserve activities for local communities, especially measures developing sustainable alternative natural resource based products to increase household incomes.

219. Involvement of local communities is dependent on their trust and co-operation. The most appropriate mechanism for gaining co-operation is to ensure that all conflicts, including outstanding compensation claims by accredited traditional landowners, are resolved through negotiation. There is a GoG commitment to meet its obligations for land compensation claims. Land compensation concepts piloted at Ankasa and Bia during Phase I still need to be considered and settlement finalised.

Lessons Learned

220. There have been several evaluations or reviews that may offer some insight and guidance for future EU efforts:

- Two performance reviews that precede the release of NREG funding tranches (at least for 2010-2011)
- A Joint Annual Report (2009) took the place of the mid-term review of the CSP 2008-2013
- The review of the PADP I which was used to inform and guide formulation of PADP II
- A Final Evaluation of the Mining Sector Support Programme (2010, revised 2011)

221. Key lessons to be drawn from the above include the need to have or make provision for:

- Robust systems ensuring implementation of agreements, strategies, plans
- Publishing of information to strengthen transparency and accountability
- Ensuring appropriate revenue systems
- Ensuring institutional buy-in and coordination
- Using tools and techniques delivered under programmes
- Monitoring of risk as identified in the log frames
- Legal context and clarity, professional attitudes and service
- Rigorous adherence to timelines
- Rigorous follow-up within the DP community to ensure delivery

Implications for the Environment of Sector Budget Support

222. A universal challenge in sector budget support is the tracking of relevant expenditures designed to produce environmental outcomes, especially when multiple funding sources (from several DPs) could obscure the situation. Without resilient transparency, the relative resource allocation given to different work programmes may reflect personal and institutional interests rather than sector or national interests.

223. Given the continuing interest of the EU in funding via this modality, at least until 2013, there should be encouragement to ensure greater separation in roles and responsibilities between institutions in the sector, operating within the NREG framework. It seems clear that

particularly intractable environmental challenges (such as illegal mining) require a more decentralised approach. This has been recognised by several DPs (e.g. the Dutch) who have pulled out of the NREG funding framework and who now channel their resources in a more targeted way at sub-national level.

Implications for the Geographical and Thematic Programmes (if any)

224. The predominant thematic action has been that of supporting the NREG programme (this is discussed above). Another important theme, yet increasingly fragmented, is that of climate change. This theme is noticeably uncoordinated across the DP landscape. Attempts have been made (notably by DFID in early 2012) to consider how to optimise the climate change effort in order to allocate efficiently resources from government, DPs and civil society. Yet, the theme remains fragmented and uncoordinated.

225. Given the evident lack of a consistent coordination towards climate change there would seem to be an opportunity to tackle this in line with several policy pronouncements concerning EU budgetary processes and climate change (climate-related expenditure to be at least 20 % of the overall EU budget), sustainable development (*Agenda for Change*) and cross-cutting issues (*EU Consensus on Development* and the *Paris Declaration*) all of which could be focussed onto the challenge of integrating climate change considerations across several sectors; agriculture, forestry, fisheries, water, transport, health and so on. For instance, there could be merit in establishing a mechanism by which all DP interventions could be assessed for their climate change coherence in terms of a national vulnerability. Currently some individual DPs, through some form of "climate screening", may make a programme or project internally coherent, yet not contribute to reduced national vulnerability. For instance, the development of oil and gas exploration and mining are two examples that could jeopardise national adaptive responses.

The Compact

226. GoG and DPs have entered into a Compact (signed June 2012) with the objective of improving the effective and strategic use of development assistance and other forms of development finance and cooperation, in support of Ghana's medium to long-term development. The Compact is aligned with the objectives and guiding principles of the GSGDA which expires in 2013 and Ghana's Aid Policy and Strategy which continues until 2015. All parties to the Compact also reaffirm their commitment to the aid effectiveness principles as agreed by the Paris Declaration (2005), the Accra Agenda for Action (2008) and the Busan Partnership for Effective Development Cooperation (2011).

227. The Compact is to provide guidance for the strategic choices to be made by GoG and DPs the specific issues of peace and security, democracy - human rights – good governance, migration and development, trade – investment –EPA, climate change – environment – energy**,** regional issues and also on Joint EU-Ghana programming of external assistance.

228. Within the issue of Climate Change, Environment, Energy, the Compact allowed GoG and EU to reaffirm their commitment to cooperate in the context of the UNFCCC negotiations,

in support of adopting a single global and comprehensive instrument. Following the Rio+20 Summit, GoG and EU have notably stressed their common objective to foster a transition towards an inclusive green economy, the fight against poverty, the attainment of the Millennium Development Goals. They noted that achieving sustainable development should be based on appropriate consumption and production patterns, protection and management of natural resources in the context of low emissions, green development and disaster risk reduction. Both partners expressed concerns on the widely recognised challenge of environmental degradation taking place in Ghana due to extensive ASM and sometimes illegal mining activities and over-exploitation of the forestry sector, coastal erosion and air pollution. They also reaffirmed their commitment to an effective implementation of the VPA/FLEGT.

229. More specifically, the DPs envisage support to strengthen environmental management and governance at national, regional, district and community levels. Efforts are to include support for development and implementation of key policies and strategies as well as strengthening monitoring and evaluation. DPs will support the EPA in the implementation of its Five Year Strategic Plan (2011-2015) which focuses on the policy goal of ensuring that "*all sections of the community value the environment and strive for environmentally sustainable development, with sound and efficient resource management, taking into account social and equity issues*". DPs will also support the EPA to provide the needed leadership in environmental management and governance in the districts; they will also support MEST in the development and implementation of the National Environment Policy.

230. To mitigate the impact of climate change, DPs will assist implementation of the NCCPF, including sector-specific strategies for water and sanitation, agriculture, energy and transport. DPs will also support implementation of NCCAS including the accessing of climate change financing. In addition, the DPs will support efforts to reduce deforestation and forest degradation (specifically, REDD+) and promote sustainable management of the remaining forests. In addition, DPs will support national efforts to move from disaster response to emergency preparedness through the implementation of the Ghana Action Plan on Disaster and Risk Reduction (2011 – 2015). DP support for sustainable land management interventions at the district and community levels will also help to preserve agricultural/arable lands and also recover lands lost to degradation due to climatic elements and human activities.

231. DPs have committed to promote coherence across Ghana's environment interventions including identifying linkages between climate change, desertification and sustainable land management to inform the development of interventions that will make sustainable impacts on land management. DPs will also support GoG efforts at regularising ASM activities to reduce environmental deterioration, and will continue to support ongoing measures by the Minerals Commission, MEST and EPA to manage the environmental problems associated with large-scale commercial mining.

Joint EU-Ghana Programming of External Assistance

232. Given that the traditional Country Strategy is replaced by the Compact, the EU is undertaking an EU Joint Programming of their respective bilateral assistance for the period until 2020 and this will be based on the Compact commitments.

5.2 Co-operation funded by other donors

233. The following donor countries/multilateral institutions are active within the sector:

- Canada ~ High Commission, Canadian International Development Agency (CIDA)
- Denmark ~ Royal Danish Embassy (DANIDA)
- France ~ French Development Agency (AFD)
- Japan ~ International Cooperation Agency (JICA)
- Netherlands ~ Embassy of the Kingdom of the Netherlands
- Norway ~ Royal Norwegian Embassy
- Switzerland ~ Embassy of Switzerland to Ghana
- United Kingdom ~ Department for International Development (DFID)

- European Union ~ EU Delegation to the Republic of Ghana (EUD)
- Food and Agriculture Organisation (FAO)
- International Fund for Agricultural Development (IFAD)
- UN Development Programme (UNDP)
- US Agency for International Development (USAID)
- World Bank

Past, Current Experience, Intended Programmes/Projects

234. Most of the donors responded to requests for meetings and/or information; several also participate in an Environment Sector Working Group now being co-chaired between the EU Delegation and UNDP. Below, follows a summary of past, current/intended programmes and projects.

Canada ~ High Commission, Canadian International Development Agency (CIDA)

235. Environmental sustainability is tended to be treated as a cross-cutting issue with the Agency being active within two sectors of interest: Food Security and Agriculture (water and land), and Children and Youth (within a water and sanitation framework). CIDA is working within three northern regions covering about 220 communities on desertification issues and within the context of implementing National Action Plan via the Ghana Environmental Management Programme. CIDA assisted with LAP 1 and is contributing to LAP2. In the water sector, the Agency is supporting the Ministry of Water Resources, Works and Housing via the Northern Small Towns Water Project also within the Hydrogeological Assessment Project. These are basic water and sanitation infrastructure projects with the

district assemblies. They are also supporting the EPA in a district-wide assistance project in water-related environmental management.

236. The Agency also has interests in SLEM ~ reducing bush fires, rainwater harvesting and so on; governance aspects at community, district, regional level via environmental management committees at each level (District Environmental Management Committees, (DEMCs) and Community Environmental Management Committees (CEMCs). The institutional strengthening of districts is about ensuring that the conditions on EIAs permitted by EPA are monitored for implementation. The Agency partners with MOFA and provides sector budget support which is triggered by SLEM achievements.

237. Gender is also cross-cutting. There is little specific activity on climate change because this is done through adaptive measures at programme or project level. The Agency attends ENR WG to develop coherence and the DFID Climate Change sub group though noted that no minutes came out of the January (2012) meeting. The Agency has links to SADA and tree-planting. It was noted that the NCCC is supposed to co-ordinate climate change via MEST though it is not clear that this happens in practice. The DPs should coordinate synergies and linkages of the various activities for effective delivery, monitoring and evaluation of integrated programme impacts. MEST should complete the NCCPF to access CC funding for institutional strengthening and adaptation programmes for SADA (e.g. campaign for greening the North agenda to enhance vegetative cover.)

Denmark ~ Royal Danish Embassy (DANIDA)

238. DANIDA is planning to phase-out smaller scale bilateral activities. "Green Growth" has been given substantial attention in DANIDA's new strategy, and that will play a role in its forthcoming Private Sector Programme. Currently, Denmark has two small-scale climate programmes; one on climate change adaptation, targeting water security and flood risk reduction in Northern Ghana; and the other about raising awareness on the effect of climate change on water resources in Ghana generally.

France ~ French Development Agency (AFD)

239. The Agency is active in three sectors; agriculture, energy, and decentralisation (focussing on water and sanitation, transport and infrastructure). It considers that NREG has not lived up to expectation (particularly in the Forestry Sector) and has pulled out of further support. Its main priority in Environment is to focus on cost of environmental degradation (to agriculture and fisheries) by building national capacity to undertake this costing exercise. It also has a biodiversity (estuary/mangrove) project delivered through IUCN and funded by the French Global Environment Fund. It is concerned about the GoG thrust to mechanise agriculture without fully appreciating the impacts; on conservation, water management, soil erosion and so on. Like, CIDA, it too has interests in SLEM, particularly in the north where soil fertility is poor and has promoted rice cropping using rain-fed systems (bunds being constructed by road contractors). Similar to CIDA, climate change is assessed project-by-project.

240. The Agency has been funding the rubber/oil palm sector for carbon credits (using the Verified Carbon Standard) using outgrowers (Phase 1 2750 outgrowers, Phase 2 with 4000 outgrowers) via Ghana Rubber Estates Limited, noting the need to balance, cash/food and export crops.

Japan ~ Japan International Cooperation Agency (JICA)

241. The Agency has two themes; Agricultural and Rural Development and Natural Environment Conservation. Under the former, it has two projects: Project for Sustainable Development of Rain-Fed Lowland Rice Production (2009-2014) targeting 1,000 rice farmers and their associated Regional Agriculture Development Units and District Agriculture Development Units. This project is implemented by the Directorate of Crops Services (DCS) of MOFA. Its goal is to improve the productivity and profitability of rice farming in rain-fed lowland areas with the aim to disseminate a model for sustainable development of rain-fed lowland rice production.

242. The other project is a Study on Upper West Integrated Agricultural Development. The first stage of this project investigates the climate conditions and vulnerabilities of the Upper West Region. The results will be incorporated into guidelines for development and diffusion of agricultural and rural development techniques, and then a master plan proposing development activities will be drawn up to enhance the capabilities of Ghanaian agency- and community-based organisation to develop agricultural and rural areas.

243. Under the theme, Natural Environment Conservation, a Participatory Forest Resource Management Project in the Transitional Zone (PAFORM) was undertaken 2004-2009, implemented by MLNR and the Forestry Commission. At first the Project aimed at mainly forest management. This was re-tuned to emphasise the participation of the local people while also focusing on community development involving income generation and green-belt activities.

Netherlands ~ Embassy of the Kingdom of the Netherlands

244. The Dutch, too, are leaving the Environment sector (2012 being the last year of NREG support) and will, instead, be developing infrastructure projects; an integrated water management programme; with urban water, sanitation and health (WASH) projects (including solid waste management, waste water treatment plants and e-waste) and an integrated water resources management project (for three watersheds); each will be for five years with the former attracting €100 million and the latter € 30 to 40 million.

245. The Embassy considers that NREG has not performed successfully due to weak centralised institutions, for example, the Forestry Commission and the Minerals Commission. The only organisation that drew any benefits was the EPA. It is considered that the decentralised municipal and district assemblies need to be the beneficiaries; when using centralised institutions. Otherwise, there is no linkage with traditional chiefs so it becomes impossible

to have an influence on issues such as illegal mining and logging. New bilateral programmes will deal directly at district level with large technical assistance components and infrastructure investment. Previously there was some general budget support and some sector budget support (health and environment). It is hoped that the watershed programme will link with FLEGT and VPA and become FSC Compliant.

Norway ~ Royal Norwegian Embassy

246. The Embassy has interests in forestry (Forest Investment Programme) and energy (Energy Plus) in partnership with others and a focus on "climate-smart" agriculture tying in with food security and longer term adaptation with other parties e.g. World Bank and UN agencies.

247. They do not provide budget support only projects thus only have an adjacent interest in NREG. In energy, the embassy is supporting oilfield development in western region by setting up an environmental framework (oil spill capacity, legislation and so on) working with MEST/EPA. There were extensive discussions with MoEn and the Renewable Energy Authority and helped to support the Renewable Energy Act (832) 2011. Within MoEn, Power and Petroleum established the Directorate for RE (also assisted by GIZ).

248. Noting the large difference between north and south Ghana, Norway is also concentrating on Disaster Risk Reduction (DRR) especially on Early Warning Systems (EWS) to cope with droughts and floods (liaising with Ministry of Interior). Norway was working with DFID on a similar programme but this did not materialise so, instead, partnering with UNDP on this; should begin this year with data collection/collation.

249. Another large area of focus is spatial planning; developing a land use model in the western region, involving several GoG entities (e.g. MLNR, MEST). There are 6000 mining companies; lots of small-scale problems; exacerbated by traditional authorities owning 85 % of land. A further activity is the National Dam Safety Unit which surveyed all forms of dams in western region concluding this year; and linked this to DRR especially on how to retain water. Also have interests in sustainable land management, particularly in the southern region.

Switzerland ~ Swiss Economic Development Cooperation (SEDC)

250. The Swiss cooperation supports four main areas: Finance, Trade, Macroeconomics, Infrastructure (principally Energy). They also have an interest in REDD+ where they are filling part of a funding gap with €800 000 of bilateral support. Tend not to like budget support as the amounts that can be contributed are relatively small and cannot demonstrate impact. Within the REDD process, the Swiss are funding a scoping study and follow-up pilots through International Tropical Timber Organisation, their preferred contractor. Swiss cooperation representatives also sit on the Forest Sub Group of the ENR Sector Working Group and also attend the quarterly meetings of the NREG (though do not contribute financially).

251. Although intending to support renewable energy they have been waiting for the Renewable Energy Act to be implanted to see how the feed-in-tariff and other matters will work in practice. They do not support CSOs unless it is via Government, again for reasons of monitoring and accountability. Other than the above there are no specific interventions in Environment or Climate Change *per se*.

United Kingdom ~ Department for International Development (DFID)

252. Several key personnel have recently departed leaving a short-term gap in institutional memory. What follows has been pieced together using the DFID Ghana web site, interviews with DFID consultants and other DPs. There is no specific support to the Environment Sector though there is support to SADA which may offers complementary benefits.

253. It is understood that there are three work streams:

- Through the DFID wider DEWPoint programme[35] (perhaps € 640 000)
- A €17 million three-year climate change programme for Ghana that will largely focus on support to the Savannah Accelerated Development Authority (SADA) of which € 2.5 million would support to an accountability mechanism along the lines of STAR-Ghana[36]
- A Strategic Programme Review on climate change

254. Through the DEW Point mechanism, technical assistance would be provided to:

- Develop training modules on climate change for senior government officials and DPs
- Analytical work on issues such as migration and distributional impacts of climate change
- Develop MRV systems and other M & E systems for climate change
- MEST for: Planning/scheduling of events, organising participation of key government officials at international meetings and negotiations; SADA
- MOFEP for working on climate finance issues

Food and Agriculture Organisation (FAO)

255. It is understood that the following interventions are active:

- Support for the control of the new invasive papaya mealy bug by classical biological control

[35] The DEW Point resource centre was established in 2007 and its purpose is to provide advice, knowledge management and related technical services to DFID and development partners in the following areas: water resources, water supply and sanitation, environment and climate change

[36] Strengthening, Transparency, Accountability and Responsiveness in Ghana

- Enhanced Guinea fowl production in the northern regions
- Ghana; Empowering Cowpea small holder farmers for sustainable increases in cowpea production to achieve poverty reduction through training in Integrated Production and Pest Management/Farmer Field Schools
- Conservation and management of pollinators for sustainable agriculture through an ecosystem approach
- Agricultural Water Management Landscape Analysis
- Support to the implementation process of the NEPAD[37] Comprehensive Africa Agriculture Development Programme (CAADP)
- "Building Capacity of ECOWAS for effective CAADP Implementation in West Africa"
- Strategic HIV/AIDS Response for Fisheries Communities in Africa
- Developing a combined e-Learning Curriculum and Information Platform on food standards as a contribution to upgrading food quality and safety assurance systems in developing countries
- CountrySTAT for Sub-Saharan Africa: Strengthening the CountrySTAT System established in 17 Sub-Saharan African Countries - Phase II
- Enhancing Human Security through developing local capacity for holistic community-based conflict prevention in Northern Ghana
- Support to Women Farming communities in Eastern Region
- Block Farming for Change
- Empowerment of Poor Women and their Families in Gingaani through a Sustainable Improved Beekeeping
- Larabanga Youth Association Small-Scale Rabbit Production Project

International Fund for Agricultural Development (IFAD)

256. It is understood that the following interventions are active:

- Rural and Agricultural Finance Programme
- Northern Rural Growth Programme
- Root and Tuber Improvement and Marketing Programme
- Rural Enterprises Project – Phase II
- Northern Region Poverty-Reduction Programme
- Rural Financial Services Project
- Upper East Region Land Conservation & Smallholder Rehabilitation Project (Phase II)
- Root and Tuber Improvement Programme
- Village Infrastructure Programme
- Upper West Agricultural Development Project

[37] New Partnership for Africa's Development

- Upper East Region Land Conservation and Smallholder Rehabilitation Project
- Smallholder Credit, Input Supply and Marketing Project
- Smallholder Rehabilitation and Development Programme
- Volta Region Agricultural Development Project

UN Development Programme (UNDP)

257. UNDP has an Environment, Climate Change and Energy Efficiency Programme under it Sustainability Development Cluster Programme comprising:

- Climate Change and Health Project
- AAP Project
- Energy Efficiency Project
- Montreal Protocol Project
- Hydrochloroflourocarbon Project
- UNITAR Project
- Ozone Project
- Drylands Project
- Ghana Environmental Conventions Coordinating Authority Project
- Recovery Project
- Cocoa Project

258. The UNDP is to co-chair the NREG support with the EU.

US Agency for International Development (USAID)

259. In June 2011, USAID published its Ghana Climate Change Vulnerability and Adaptation Assessment. It is also pursuing an Integrated Coastal Fisheries and Governance Initiative.

World Bank

260. The Bank is engaged with NREG but is now reducing support as Ghana has become a MIC country and the Bank's policy is to move away from sector budget support for MICs. It has a fisheries project to reduce pressure via a Fisheries Management Approach with co-management with key stakeholders. Its REDD activities include: re-forestation, plantation, diversification and agro-forestry with support to the FIP under Climate Investment Funds (with Norway, Netherlands, US, Australia, DFID,) about € 40 million via AfD and IFC.

261. It has a Sustainable Land and Water Management programme; Land Administration Project (LAP) to mainstream water and soil conservation with small-scale farmers to build resilience to climate change vulnerability of natural resources. A technical assistance is being prepared to contribute € 4M to lead institutions under NREG (MOFEP, FC, MLNR, EPA, MEST and MC) noting that better indicators are needed; together with strengthening

of forecasting; and better understanding/accounting (inventories) for natural resources wealth.

262. It recognises the challenges posed by the current legal framework of land lease, security, ownership, and relative attraction to the private sector. The Bank will not continue with the support to the environment regulatory functions of the EPA (permitting, M & E, compliance, enforcement, strengthen judiciary). Rather it would further capacity development in low carbon growth/low emissions development agenda in line with the aspirations of the Green Economy.

263. The Bank mainstreams climate change into sectors; programmes and projects (transport, agriculture, energy, health) with capacity support to MDAs to cost adaptation and mitigation programmes in the budget process as part of mainstreaming climate change. In addition, there is interest in strengthening capacity and institutions to improve SEAs.

Co-ordination Mechanisms between Donors and the EC

264. The primary co-ordination mechanism between donors is the Environment Sector Working Group, now being co-chaired between the EU Delegation and UNDP, though several DPs do not participate, e.g. Canada. There has been some attempt to consider the usefulness of establishing a smaller group in relation to climate change. During the period leading up to the UNFCCC climate change meeting in Durban 2011, there was some concern that dialogue between partners in Ghana was not sufficiently strong. Whilst it was recognised that a proliferation of groups was not desirable, it was appreciated that climate change is a broad issue; not just about environment and with impacts on many key areas, agriculture, growth, food security, poverty. One opinion was that keeping a group anchored in the ENR sector might therefore limit it. Since there is a multiplicity of initiatives, nationally and internationally, it has become difficult for government, DPs and civil society to allocate resources. Concerns have been expressed as follows:

- How to work across different sector groups; not well served by existing mechanisms
- Work differently rather than just creating a group
- Effective coordination between sectors with follow-up to meetings
- Relationship between the existing structures and how they interface is key: support existing efforts rather than creating parallel mechanisms
- Need champions within other sector groups
- Traditional authorities: how to engage them
- Each sector has its own data so we need to coordinate; everyone wants to be in charge/hold on to their data; sense of competition between universities, NGOs, GoG
- Paris Declaration and the Accra Agenda for Action provide the frame to coordinate
- GoG under MDBS has established groups where major fields of policy are discussed
- Everyone is overloaded, attending all the same meetings: how to address the capacity

265. The key outcome of the meeting, to discuss the usefulness of establishing a smaller group in relation to climate change, was that there was no overwhelming support for yet another group. DFID did not produce a minute of that January 2012 meeting and, to date[38], the discussion on how to co-ordinate climate change among government, DPs and NGOs/CSOs has not been meaningfully progressed.

[38] 22 August 2012

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Trends of and Pressures on Environmental Resources

266. Key aspects of the state and trends of the environment have been identified in Section 1 and 2. The trends of economic activities that drive the national GDP growth, which are also the key drivers of the environmental degradation and deforestation that tend to perpetuate poverty cycles have been based primarily on the State of Ghanaian Economy published annually by the Institute of Statistical, Social, and Economic Research, University of Ghana.

267. Ghana's economy recorded the highest growth rate of 8.4% in 2008 and annual average of about 6 per cent from 2006-2010. Ghana's national accounts were rebased from 1993 to 2006 and classified the country as middle-income economy. The new and growing contributing sectors in the rebasing are information communication technologies (ICT) and oil and gas following the oil development of Jubilee oil fields. The key sectors that drive Ghana's economic performance Agriculture (30.48%), Services (including ICT) (49.64%) and industry including mining and energy, and oil and gas (19.88%).

268. The key economic activities driving Ghana's GDP growth are also the very sources and causes of degradation and depletion of natural resources upon which the country's ecological capital is derived. Recent country-specific information and activity data collected from the World Bank's project on REDD+ based on remote sensing data in the Revised Forestry and Wild Life Policy has provided details of the major drivers of deforestation and forest degradation. The data indicates agriculture and forestry (cocoa production, crops and timber logging) contributes to half of the total degradation and deforestation, 35 per cent by wood harvesting and charcoal production, 10 per cent by urban sprawl and infrastructure development and 5 per cent by mining and exploration.

269. The annual rate of loss of forests due to land use changes however reduced from 135ha per year from 1990-2000 to 115ha per year from 2000-2010 as a result of sector wide budget support and fiscal support and intervention in the sector by the EU and the World Bank and other DPs under the natural resources and environmental governance (NREG) program. Community Resource Management Areas (CREMA) programmes piloted also improved the natural resource management capacity of fringe communities in off-reserve wildlife conservation areas such the Kakum Forest. Notwithstanding, the reducing trend, the annual rate of deforestation estimated rate of 2% for the period still represents one of the highest in the world.

270. The trends of pressures and environmental degradation of urban sprawl, poor sanitation has been based on the national environmental sanitation strategy action plan (NESSAP), Water, Sanitation, and Health (WASH) program outcomes, and revised National Water Policy. The available information show the sector benefited from increased EU and Other DPs investment particularly in community water coverage. Urban water coverage increased from 55% to 62 per cent from 2006 to 2010, while rural and small towns has risen from 52.86 to 58.97 % in 2010, The increasing national water coverage also improved sanitation coverage from 10% in 2006 to an estimated 13.06% by 2011. The performance will help Ghana attain the MDG 7 for water coverage by 2015.

271. The alternative technology for gold recovery by artisanal and small scale mining should be promoted to sustain the replacement of the use of mercury and reducing mercury contamination by small scale mining. Inappropriate disposal of untreated effluent including seepage into wetlands and the marine environment, principally driven by population pressure are primarily due to non-functional treatment plants, limited treatment infrastructure or lack of it in various local government areas, contribute to increasing degradation of lagoons, lakes, mangroves and other coastal resources. The promotion and investment in on-site sewage treatment technologies for sewage is strongly advocated in the absence of investment in central treatment infrastructure.

272. Ghana's revised national Biodiversity Conservation Strategy Action Plan indicate that loss of biodiversity is on the increase, primarily due to the difficulties in mainstreaming the action plans in sectoral medium term development plans. While Ghana is commended for making tremendous strides towards the attainment of the five of the Millennium Development Goals (MDGs) by 2015, the negative impacts of the GDP growth drivers threaten Ghana's effort at meeting MDG 7 on environmental sustainability, particularly to reverse the loss of environmental resources, reduce biodiversity loss especially number of species facing extinction, the proportion of the population without sustainable access to basic sanitation

Policy, Regulatory and Institutional Constraints and Challenges

273. A significant hurdle to the successful implementation of policies, regulations and institutional responsibility is the process of decentralisation. Whilst decentralisation is, potentially, an appropriate mechanism for enhanced natural resource base protection, the process of de-centralising has proceeded at a pace that has outstripped local government capability to operationalise the opportunity, based on current funding priorities. Recognising that the institutional strength of the District tier of local government is weak and largely incapable of delivering its mandate of environmental and natural resource management, there is an opportunity for ensuring that the existing environmental actions are secured through EC support to the District level. A strong District environmental and natural resource management capability is necessary to safeguard sectoral interventions and direct technical interventions at local level.

Implications of Climate Variability and Climate Change

274. Climate change represents an additional and formidable challenge to sustainable development. By interacting with other environmental trends and the intensification of the existing pressures (from industrialisation, globalisation, rapid urbanisation and demographic growth) on natural resources, it poses a significant and increasingly well-documented threat, not only to the environment, but also to the economic and social pillars of sustainable development.

275. These changes will in turn have significant effects on ecosystems as well as human activities. For example, the increasing scarcity of freshwater, the expected reduction in crop yields, livestock and forest productivity, as well as the possible collapse of fish stocks as a result of overfishing, are likely to have adverse impacts on food security and severely threaten rural but also urban livelihoods. The destruction of infrastructure (transport, energy, industry, human settlements and so on) by extreme weather events, the change in lake levels, bank erosion etc. may lead to severe disruptions of economic activity as well as major social and humanitarian catastrophes. Health impacts resulting from the changed distribution of disease vectors, malnutrition, heat stress, floods, droughts, declining water and air quality, and large-scale displacement of populations, may place a substantial additional burden on already over-stretched health services.

276. The GSGDA is now the primary vehicle by which the GoG integrates environmental concerns into the sectors. Given that the main interest within the EU Country Strategy Paper is the support of NREG it is critical that environment mainstreaming is assured since NREG has implications across the spectrum of environmental pressures (Table 6.3).

Table 6.3 NREG Potential Influences across Sectors

Environmental and Natural Resource Pressures	Land Use & Management	Water Use & Management	Air Quality & Management	Climate Variability & Change	Mining and Oil & Gas Development	Forest Exploitation & Biodiversity Loss	Agricultural & Livestock Management	Energy Production	Urbanisation	Waste Management
Sectors										
Industry										
Rural Development										
Water Resources										
Agriculture										
Forestry										
Fisheries										
Education										
Health										

277. NREG Priorities have been identified (Technical Appendix 8.2.3) and integrated into the MTEF Sector Budget for 2012-2013. There could be more focus on environmental services provision across sectors with clear distinctions of responsibility between, say, agriculture, water resources and forestry. For instance, when water flows are low, poor in quality and infrastructure is being silted up, it needs to be clear on root causes ~ weak water resource planning *per se*, or weak forestry management in the catchment.

278. Because the natural environment plays a key role in human well-being and activities, several sectors are particularly, and directly, dependent on high quality environmental resources; agriculture, fisheries, forestry and so on. As an example, in the health sector several diseases may be exacerbated by pollution or other degraded environmental conditions. Since sectors are interdependent, all are influenced in some way by the environment. Human activities in all sectors produce effects or consequences on the environment (e.g. deforestation, biodiversity loss, soil erosion, air pollution, water contamination and so on) and some sectors such as transport, energy, agriculture and industry directly pollute and consume natural resources.

279. Other sectors, such as education, governance or macroeconomic reforms have more indirect impacts, through changing behaviour and practices affecting the environment (both positively and negatively). Depending on their intensity, duration, frequency, reversibility, cumulative or synergic nature and socio-economic consequences, potential impacts may (or not) be considered to be significant, i.e. important enough to justify mitigation or enhancement measures. Addressing issues (of resource usage and management) related to these significant impacts should be part of EU support to sector programmes and policies.

280. Some sectors are more vulnerable to environmental changes (including those resulting from climate change), others produce higher impacts, and all sectors have the potential for environmental integration. The key threats (pressures) to the environment and natural resources degradation without the integration of sustainable development action plans are Land Use and Land Use Changes, Water and Sanitation, Air Quality, Climate Variability and Change, Mining and Oil and Gas Development, Forest Exploitation and Biodiversity Loss, Agricultural and Livestock Management, Energy Production, Urbanisation and Waste Management.

281. These key pressures on the natural resources are well known and well studied. There is an abundance of policies, strategies, laws and regulations in relation to these resources and their identified pressures. Yet there is a continuing requirement to bring the full rigour of policy application and regulatory enforcement to achieve the aspirations of the protecting laws. The issue of population growth and its associated poverty continues to threaten most interventions in the management of environment and natural resources. To a certain extent technologies are able to lessen the impact in the shorter term though the longer term requires wider thinking and planning.

282. Sustainable development is the key to reducing vulnerability and, ultimately, exposure to climate change. The capacity of human societies both to adapt to and to mitigate the effects of climate change depends as much on socio-economic factors as on geographical ones. The chosen development pathways may contribute to climate change adaptation and/or mitigation or, on the contrary, may make it more difficult.

283. To reduce vulnerability to potential climate change impacts, a wide range of possible adaptation measures are available. Some of them, such as modifications in the range of crops to match changes in agro-climatic zones or the adoption of new crops and/or varieties deemed better adapted to the new climatic and ecological conditions, specifically address the effects of climate change. Many potential adaptation measures, however, are not climate-specific but constitute good practices that contribute to wider developmental and sustainability objectives. Promoting water efficiency and integrated water resources management, adopting cultivation techniques that reduce soil erosion, strengthening land planning and management institutions, maintaining a critical mass of diversified, natural ecosystems, adapting storage and distribution systems to reduce vulnerability to extreme weather events, diversifying sources of rural income, or promoting access to insurance are examples of such good practices that lead to greater overall resilience and sustainability.

6.2 Recommendations

284. In order to strengthen environmental management and governance at national, regional, district and community levels, support will be required for:

- Implementation and mainstreaming of key policies and strategies developed for 14 key environmental pressures under the SDAP (see Technical Appendix 8.2.2) in sectoral medium-term development plans (SMTDPs), the national action plans for Sustainable Energy for All (SE4ALL2030) and Sanitation for ALL, 2020 (NESSAP), and the National Climate Change Policy (NCCP, 2012)
- Strengthening policy, planning and monitoring and evaluation (PPME) of all MDAs and MMDAs to collect and report coordinated data on sustainable environmental indicators for performance tracking and trends analysis of environmental policy, programmes and projects to drive mainstreaming in policy-decision making;
- Implementation by the EPA in its five year strategic plan (2011 to 2015) which focuses on the policy goal of ensuring that, "*... All sections of the community. Value the environment and strive for environmentally sustainable development, with sound and efficient resource management, taking into account social and equity issues...*";
- The decentralisation of the EPA to provide the needed leadership in environmental management and governance in the districts; and,
- The MEST, EPA and NDPC in the coordination of the mainstreaming and implementation of the National Environment Policy, Sustainable Development Action Plan, and National Climate Change Policy (NCCP) and National Climate

Change Adaptation Strategy (NCCAS), Nationally Appropriate Mitigation Actions (NAMAs).

285. In order to mitigate the impact of climate change, support will be required for:

- GoG implementation of an NCCPF, including sector-specific strategies for water and sanitation, agriculture, energy and transport;
- GoG implementation of the NCCAS as well as accessing climate change financing;
- GoG to reduce deforestation and forest degradation (REDD) and promote sustainable management of the remaining forests;
- Support national efforts to move from disaster response to emergency preparedness to the implementation of the Ghana Action Plan on Disaster and Risk Reduction (2011 to 2015);
- Support the sustainable land management interventions at the district and community levels to preserve agricultural/arable lands and also recover land currently lost to degradation due to climatic elements and human activities; and,
- Promote coherence across Ghana's environmental efforts, including identifying linkages among climate change, desertification and sustainable land management to inform the development of interventions that will make sustainable impacts on land management.

286. To stem the tide of environmental deterioration associated with mining, support will be required to:

- Sustain GoG efforts to facilitate the acquisition of mining concessions for ASMs, regularise the activities in the sector to make them eligible for SLEM support; and,
- Continue to support ongoing measures by the Minerals Commission, MEST and EPA to manage the environmental problems associated with large-scale commercial mining.
- Build capacity to enforce environmental regulations and compliance
- Support national advocacy platform for development of standardised procedures and guidelines on the right of people to have access to natural resources, including minerals for maintaining a basic standard of living, and their concomitant responsibility to ensure the sustainable use of such resources in line with the provisions under the Biodiversity convention.

287. Ensure the integration of environmental sustainability considerations in government policies, plans and programmes, support will be required for (see Technical Appendix 8.2.3):

- Capacity building and Training of personnel of MMDAs and MDAs in the conduct of SEAs;
- Implementation of the recommendations of SEAs carried out in the various sectors;

- Continuation of the coordination with the relevant ministries and agencies to the ENR Sector Working Group to promote the integration of environmental sustainability across the sectors; and,
- Promoting and building of linkages between the environment and agriculture and other renewable resource-related livelihoods (fisheries, forestry) including the consideration of the gender equality dimensions and involvement of civil society organisations.

288. In addition to the resource-based possibilities for intervention there are also possibilities for addressing cross-cutting issues, whilst recognising the connectivity of resources, such as:

- **Education and Awareness** (e.g. in sustainable land management, moving away from charcoal use when other forms of fuel sources are available in urban centres, and facility compliance with water, air and other regulations)
- **Low Carbon Development** (e.g. the implementation of the NAMAs)
- **Green Economy** (e.g. developing renewable energy, efficient use of natural resources and innovative technologies)
- **Technology and Innovation** (e.g. alternatives to traditional gold extraction using mercury amalgams)
- **Policy, Planning, Monitoring, and Evaluation** (including; data studies, capacity-building for a professional civil service, in part to overcome apparent lack of will and commitment to fulfil institutional mandates (via the Office of the Civil Service see Technical Annex 8.2.5 for an overview of its Improvement Programme) and revise any existing national land use plan)

District Level Resourcing

289. Capacity-Building in a professional civil service could also be promulgated through the District tier. District offices are clearly under-resourced for their tasks, yet need professional training in how to conduct government business. The lack of a professional cadre of personnel simply equates to a less efficient and effective use of human resources responsible for managing/interfacing with donor interventions. The value of any donor intervention is immediately degraded. A strong District ENR capability (supported by the relevant MDA) is necessary to safeguard sectoral interventions and direct technical interventions at local level. Modalities of budget support and SWAps have the potential to engage and energise institutional capacity weakness at this level of local government, if supported by appropriate training and resourcing.

Sector Level

290. Oil and gas exploration and production is both an opportunity (generating substantial flows of revenue which could be used for livelihood development) and a threat (compromise ENR by direct impacts and through unplanned development along access roads and elsewhere). The impacts of oil and gas exploration and production are well known and the ways to

mitigate most of these are also well known. Weak and good practice examples in Africa are available and an exchange of experiences with other countries could be encouraged and supported.

Project Level

291. The following steps are recommended for integrating climate proofing into the general process of future EC cooperation in Ghana. The EC Delegation to:

- Review EC Draft Guidelines on the Integration of Environment and Climate Change in Development Cooperation, October 2009;
- Review the relevant Sector Scripts (relevant to Rural Development and to Infrastructure/Transport);
- Review the ongoing cooperation in Ghana and identify potential climate change and climate variability risks using the relevant sector scripts;
- Consider potential adaptation or mitigation strategies to climate-proof the ongoing cooperation, in conjunction with relevant DPs and GoG; and,
- Implement the adaptation or mitigation strategies and undertake specific monitoring and evaluation.

Donor Coordination

292. Donor coordination seems to be quite weak, from the GoG perspective, with national DP interests taking a priority even within the NREG process. There is scope and opportunity for better coordination between DPs though this seems to rely on individuals within DPs having an interest in doing this. This also means that should that individual leave then a donor-coordination hiatus may prevail. Given that a professional civil service approach should already be embedded within EU processes, it would seem beneficial for the EU to undertake the coordination role, since it should not then be dependent on an individual; the system should take care of it. For instance, just identifying the appropriate persons in each DP responsible or relevant to environmental and climate change was trial and error. Obtaining a simple list of which DP is doing what, when by and what budget is not straightforward. This should be a given, yet considerable time is taken obtaining basic information about what DP are actually doing, why and where. So, better coordination and alignment of national strategies should increase the benefits to the sector.

At this stage it is not clear how the Compact will be used to deliver EU cooperation, via what mix of modalities (different modalities could be used at different levels) the above recommendations deliberately are not prescriptive and leave flexibility to negotiate specifics with the GoG. It is suggested that the recommendations are aligned with the relevant, GoG approved activities within the GSGDA, the Sustainable Development Action Plan (see Technical Annex 8.2.2) the NAMAs and the MDG7 programme. Priorities also need to be reflective of Joint Programming and developed in conjunction with GoG and other DPs.

7 COUNTRY STRATEGY PAPER ENVIRONMENTAL SUMMARY

A Country Environmental Profile was drafted in November 2012, the key findings, conclusions and recommendations are provided below.

State, Trends, Pressures of Key Environmental Resources

Land

Land is an essential resource for Ghana's economic growth; the source of agriculture, mining, sand winning, and quarrying, generates the bulk of the country's income and employment, both directly and indirectly. In 2010, the GDP contributions of agriculture was 29.9% averaging 30.5 % from 2006-2010. Cocoa production grew by 22% from 2005/2006 season to 2010/2011 reaching 903 646 tonnes (almost reaching the 1 million tonnes GoG target). It is estimated that land use for crop cultivation has increased by 24.9 % (maize by 25%, and rice 45%) with marginal increases in yields of maize from 12.2 to 15.43 tonnes/ha and rice 13.2 to 15.48 tonnes/ha from 2006 to2010. The expansion of agricultural lands for crops and cocoa production has been attributed to loss of fertility and low productivity as a result land degradation and non-sustainable land use in subsistence agricultural practices. The factors impacting agriculture include; soil erosion, salinisation, acidification, and plinthite formation and natural hazards such as drought, desertification, and bushfires. The major impact on crop yields is limited access to irrigation and a high reliance on rain-fed agriculture without early warning systems in most agro-ecological zones. It is estimated that only about 1% of land under cultivation has irrigation facilities.

Recent country–specific data collected from the World Bank's project on REDD+ estimates annual rate of loss of forests due to land use changes/conversions at 135 ha per year from 1990-2000 and 115 ha per year from 2000-2010. Agricultural land expansion contributes 50 % and 5 % by mining and exploration. For the period 1996-2008, agricultural expansion for cocoa production, loss of fallow areas, and food crop cultivation in the High Forest Zone covered a total of 2.6 million ha of off-reserve areas.

The key issues are of continuing inappropriate management of the land which leads to rapid soil erosion, increasing loss of fertility, and increasing loss of productive capacity. The relatively high air temperature enhances the mineralisation process in the soil, which tends to reduce the organic content, which in turn allows soils to be washed away during the rainy seasons, if not properly managed. Thus, the rural communities are locked into cycles of economic instability.

Key Policy Focus Area

Ghana has identified and committed to sustainable utilisation of the land resources as urgent priority. The Medium Term Development Policy Framework and the Ghana Shared Growth and Development Agenda (MTDPF-GSGDA 2010-2013) Food and Agriculture Sector Development Policy (FASDEP) and its Investment Plan (METASIP) 2010-2015 has integrated sustainable development action plans to improve agricultural productivity by sustainable management of land

and environment (SLEM). The strategies include mainstreaming SLEM practices in agriculture, promoting irrigation development, increase science and technology research and information communication technology application (e.g. early warning systems) in Research-Extension-Farmer Linkages. The Agricultural Sustainable Land Management Strategy and Action Plan were launched in August 2009 to improve productivity and growth.

Water

Ghana is well endowed with water resources. The total available renewable water resources are estimated to be 53.2 billion m^3 per year. During the rainy season, rainwater harvesting provides a major source of surface water for many rural communities through the implementation of rainwater catchment system[39]. The National Water Policy, 2007 and Ghana's Water Vision, 2025 recognises the potential of rainwater harvesting to contribute to meeting the water demand by households and institutions. There are existing good practices in a few hospitals (e.g. Mampong Akuapim Orthopaedic Hospital and universities (e.g. Ashesi University College, Brekuso). Many of the major river systems for urban water supply analysed have maintained their quality status since 2005 though some (e.g. Weija Lake) have showed some decline in quality.

Water quality monitoring data of the Water Resources Commission (WRC) indicate naturally occurring surface waters and groundwater resources in Ghana can generally be characterised as good except for some cases of localized pollution arising from large scale surface mining operations and illegal artisanal mining ("galamsey"). Also high arsenic levels of between 40.5 to 1,290 mg/L have been observed in the Pra and Tano Basins. Two drilling records of Community Water and Sanitation (CWSA) indicate about 20% of boreholes for domestic water supplies have high concentrations of manganese, iron, or both. For instance, concentrations above the Ghana Standards Board permissible limits of 0 to 0.1 mg/1 (for manganese) and 0 to 0.3mg/1 (for iron) have been reported in the Eastern, Greater-Accra, Central, Northern, Ashanti, Volta and Western Regions. In addition, low pH (water acidity) levels are associated with groundwater in most of the geological formations in these regions. In some mining communities, high levels of arsenic have been recorded in the groundwater (e.g. at Obuasi and Prestea) and high cyanide at Sumang in the Ankobra basin above permissible levels. High concentrations of fluoride have also been observed in the Upper East, Upper West and Northern regions. Studies cited by WRC indicate about 20 to 30% of groundwater sources (boreholes) have fluoride levels higher than 1.5mg/l (WHO/Ghana Standard Boards Permissible Limit), giving rise to the need of borehole water treatment in some localities.

In the urban and peri-urban environment, discharge of untreated domestic waste water and industrial effluent have resulted in serious water pollution of some rivers and lagoons such as the Subin River in Kumasi, Korle and Kpeshi lagoons in Accra, Gao and Chemu lagoons in Tema, and Fosu Lagoon in Cape Coast. The discharges also are major land-based sources of pollution of the Guinea Current large marine ecosystem. Those located near industrial areas such as Korle, Chemu, and Gao Lagoons are dying due to nutrient enrichment and eutrophication, which are also sources of intense odour nuisance.

[39] The state of Ghanaian Economy, (ISSER,2010)

While water pollution constitutes a major threat, the WRC notes per capita water availability per annum is declining due to high population growth. It is projected that by 2020 the country‘s per capita water availability will be just over 1000 m^3 per annum which will make Ghana a water-stressed country. This will further be exacerbated by observed and predicted impacts of climate variability and climate change.

Water resources in Ghana are the main sources of the country’s power generation. The current installed hydroelectric capacity is 1,072 GWh from Akosombo and Akuse hydro-electric power plants. The Bui hydroelectric power under construction will generate 400MW. The national strategic energy plan projects hydropower production to reach 2500MW 50% of total thermal and hydropower generation by 2015.

The impoundments of water in Ghana are not only for power and potable water supply, but also serve as potential irrigation sources for agriculture. The total water-managed area in the Volta Basin is about 6,400 hectares (ha) [40] though the area actually irrigated may only be 4,000 ha, since a large part of the area theoretically under irrigation is not currently in use. It is estimated that the irrigation potential of Ghana is about 500,000 ha, which could be used effectively for enhancing the national food security system as part of an adaptation strategy to respond to future climate change.

The widespread ASM and regulated mining, driven by the high world market prices of gold, do not only contribute to deforestation but also to water pollution and contamination as well as land degradation with the use of mercury for gold recovery. River courses are diverted in many instances because of surface mining and the communities compensated with borehole water supply. Such schemes are not sustainable where the mining operations are short lived. The cost of maintenance and depreciation cannot be supported by community budgets at the District Assemblies. Similarly, increasing rural-urban migration and urban sprawl do not only lead to deforestation but also exert pressure on water resources through water pollution and land degradation by poor sanitation practices, and encroachment of green belts created for wetland catchment management.

Another major source of water contamination is untreated sewage into wetlands and the marine environment due to non-functional treatment plants, limited infrastructure or lack of it in various local government areas. Water pollution threatens the attainment of MDG 7 on water and sanitation for 50% of the population by 2015 and 75% by 2025. The lack of clean drinking water and sanitation systems is a severe public health concern in Ghana, contributing to 70 % of diseases in the country. Households without access to clean water are forced to use less reliable and hygienic sources, and often pay more. However, the sector benefited from increased EU Investment particularly in community water coverage. Urban water coverage increased from 55% to 62 % from 2006 to 2010, while rural and small towns have risen from 52.86 to 58.97 % in 2010. The increasing national water coverage also improved sanitation coverage from 10% in 2006 to an estimated 13.06% by 2011. Increasing water coverage is being used to improve sanitation and hygiene to achieve public health benefits. For instance, current sanitation interventions programmes for construction of toilet facilities in rural and village schools include borehole water supply to encourage and enforce hand washing to achieve the sanitation and hygiene co-benefits.

[40] FAO, 1999

The key issues are of water resources increasingly at risk because of climate and non-climate factors: inappropriate management, particularly deforestation within catchments, inappropriate waste disposal, weak agricultural practices, leading to a cycle of poverty especially impacting health.

Key Policy Focus Area

The National Water Policy formulation, which was supported by the EU and other DPs under NREG, is aligned with SDAPs, the MTDPF-GSGDA 2010-2013, the MDGs and the "Africa Water Vision" of the New Partnership for Africa's Development (NEPAD). The key priority is protection of water bodies and ecosystems health by integrated water resources management, particularly water catchment buffer regulation and enforcement, water for energy, food security and transportation, urban, community and small town water coverage. The Rural Water Supply and Sanitation Strategy Strategic Investment Plan of the Ghana Water and Sanitation Policy also aims at maximising health benefits through integration of water, sanitation, and hygiene programmes such as hand-washing promotion. The strategies also address international legal framework for domestic and transboundary water issues with the neighbouring countries to ensure international cooperation in the sustainable management of shared water basins.

Air

The main industrial activities are: mining, agriculture and manufacturing which all contribute towards atmospheric pollution: gaseous contaminants and particulate matter and which have an adverse social and economic effect on human health. In addition, there are localised poor air quality hotspots due to bush fires, (ageing) vehicle exhaust gases and vehicle noise pollution. The current capacity to monitor and enforce comprehensive environmental standards in air quality appears weak. Urban air quality is monitored indicating that the main sources of pollutants are open burning of municipal waste, particularly of used tyres, particulate dust, vehicular emissions, and industrial emissions.

The key issues are of increasing poor particulate quality of urban air, and a continuing poor quality of indoor air quality in rural communities arising from fuel wood burning for cooking and heating hot water.

Climate

The impacts of climate variability and climate change on water resources, coastal resources, and agricultural crops were evaluated in the preparation of Ghana's Initial National Communication (INC) in 2000 and the Second National Communication (SNC) in 2010. Observed evidence revealed increasing temperatures in six ecological zones ranging from 0.4 ^{o}C to 0.9 ^{o}C for the period 1961-2000. The predicted mean daily temperatures range of 0.6^{o}C, 2.0^{o}C and 3.9^{o}C in 2020, 2050

and 2080 respectively with the three regions of the North recording the highest change of 2.1–2.4°C by 2050 compared to the rest ranging 1.3-2.0°C, (World Bank EACC, 2009).

The annual mean rainfall is likely to reduce between 1.1 % and 3.1 % across all the six agro-ecological zones by 2020. The wettest parts of the country are expected to be the Forest Agro-Ecological Zone (Ashanti and Western regions) and Coastal Agro-Ecological Zone (Volta, Eastern, Central, and Greater Accra regions). The northern and southern Savannah zones are expected to be relatively dry.

The vulnerability assessment of three major river basins, namely Pra, Ayensu and the White Volta predicted significant changes of 17-20 % reduction in stream flows by 2020. Ground water recharges also showed reductions of 17 %, 5 % and 22 % for Pra, Ayensu and the White Volta basins, respectively. This will lead to considerable reduction in hydropower output ~ 59 % by 2020 is projected. This is consistent with observed impacts. Frequency of drought has reduced from about 15 years to 7-10 years during the last 60 years. Electricity production from the Akosombo hydropower station in 2007 was 3,104.33 gigawatt hours (GWh), representing only 45.3 % of peak production in 1997 (6851 GWh) while production from 2006-2010 averaged 4970.28 representing 28 % loss of capacity during the period (ISSER, 2010).

Agricultural gross domestic product (GDP) is estimated to decline by 3 to 8 % compared to the baseline projection for 2050s. The impact on cocoa poses serious socio-economic implications in view of cocoa's significant contribution to national income and farmers' livelihoods. Damage to the coastal zone in the form of flooding, land loss, and forced migration is estimated at € 4.0 million per annum by the 2020s, rising to €4.75 million per annum by the 2030s (EACC, 2009).

Extreme events will include increases in the risk of floods and/or droughts in both rural and urban areas in the Volta basin and warming with temperature increases from about 1^{o}C to more than 3.9°C which will have adverse effects on human well-being, food security, water security, energy security and lead to forced migration to low impact areas. Migration is also expected to occur not only within the country, but also from countries to the north of Ghana, which will also become hotter and drier. The various studies further observe that most of the changes in stream flows will occur in upstream areas outside the territory of Ghana. This is because most of the rivers in Ghana are shared resources, raising the need of international collaboration in their transboundary management, as part of any adaptive response measures.

The key issues are of a mean annual temperature rise by 1.0 to 3.0 °C by the 2060s, and 1.5 to 5.2 °C by the 2090s with the projected rate of warming being most rapid in the northern inland regions of Ghana than the coastal regions. Although projected mean temperature increases most rapidly in the interior regions of Ghana, the projected changes in the daily temperature extremes ('hot' and 'cold' days and nights) in Ghana are largest in the coastal areas, and smaller inland. Projections of mean annual rainfall are unclear.

Key Policy Focus Area

Ghana is committed to protecting its people from climate impacts with adequate adaptation strategy. Ghana has therefore completed the NCCPF and its Programmes of Action for Adaptation and

NAMAs and its monitoring, reporting and verification (MRVs) under the Cancun agreements. The key NCCP focus areas are low carbon growth, agriculture and food security, natural resource management, and human health and mainstreaming the focus areas in the National Sectoral Medium Term Expenditure Framework.

Mineral Resources

Ghana is a signatory to the Extractive Industries Transparency Initiative (EITI) which sets a global standard for sectoral transparency. Ghana is a country with extensive mineral resources (second largest producer of gold in Africa, with at least twelve formal gold mines, seven of which are large open-pit operations). It is the third largest producer of bauxite and manganese on the continent. Small amounts of diamonds are also found in Ghana. Small-scale (gold and diamond) mining provides substantial national employment. The oil and gas sector is a new and increasingly important economic sector for the country.

Mining and quarrying contributed 1.8% to GDP in 2010. Gold, diamonds, bauxite and manganese production in the mining and quarrying grew at 7.6 % in 2010. Except diamonds production, which declined during that period, gold, bauxite and manganese has consistently increased. Gold production particularly increased by 42.03 % from 2006 reaching a record level of 3.33 million ounces in 2010. The estimated people engaged in artisanal and small-scale mining (ASM) is estimated at 500,000 in 2010. The expansion of gold production is attributable to the favourable world market prices for bullion gold, which makes low level mineralisation profitable in the short term without appropriate environmental practices. The price of gold has also precipitated a "gold rush" in ASM in Ghana with high component of non-regulated and illegal mining called "*galamsey*". The scale of unsustainable ASM operation has increased with the infiltration of foreign participation with machinery in illegal mining at the community level, thus increasing the impacts on natural resources. Mining is now estimated to contribute 5% of the annual rate of loss of forests due to land use changes/conversions compared to forestry and logging of 35% and agriculture 50%.

The key issues are of severe land degradation due to uncontrolled and increasing Artisanal and Small-Scale Mining (ASM) activities using inappropriate methods, periodic water pollution from large scale mining operations and potential downstream impacts of oilfield development.

Key Policy Focus Area

The key mining and mineral policy focus area to address the problem of ASM include government undertaking geological survey and designation of areas for sustainable artisanal and small-scale mining, facilitating registration an regularisation of ASMs to make then legal and eligible for environmental management support, capacity building and financial support, and increased decentralisation of the Minerals Commission to strengthen enforcement of mining regulations at the local level.

Forest Resources

Ghana has approximately 2.6 million ha of forest reserves dedicated to production, about 500,000 ha of unreserved forests, as well as an additional 2 million ha of crop land that also produce timber.

Ghana's forest and woodland resources provide diverse economic products and environmental services.

Ghana's forest is the main sources of timber production for export and wood for the local domestic market. The forestry and logging (10.1 % in 2010) increased from a negative growth of -4.1% in 2007 and contributed 2.3 % of total foreign exchange earnings from the agriculture[41] sector. The sector is also the dominant supply of fuel wood extraction for firewood and charcoal production, of which 90% is obtained directly from the natural forest. The remaining 10% is from wood waste i.e. logging and sawmill residue, and planted forests. The charcoal and wood fuel consumption is driven by increasing population and the high dependency of rural and urban households (about 80%) for cooking and water heating, as well as demand by commercial, industrial and institutional use. Fuel wood extraction is projected to increase from 18 million tons in 2000 to 25 million tons in 2020.

Recent data based on the World Bank's project on REDD+ estimates the annual rate of loss of forests due to land use changes to be 135 ha per year between1990-2000 and 115ha per year from 2000-2010. The total cumulative loss from 2000-2010 amounts to 1.154 million ha represents 19% reduction. It is estimated wood harvesting contributes 35 %. Wood removal for fuel wood and charcoal production is estimated at 30 million m^3 per year while forest timber logging and harvesting from the regulated sector amounts to 3.72 million m^3 per year for export and 1.8 million m^3/year by predominantly illegal logging for the domestic market. The rate of deforestation is estimated at 2% in 2010.

The condition of Ghana's forests has been in decline for many years, particularly since the 1990s. The forest is degraded with many forest reserves being heavily encroached and the off-reserve carbon stocks being rapidly depleted. Wood for timber, fuel wood and charcoal, wildlife and other non-timber forest products are all being extracted at levels that are above the replenishment level. Ghana formally concluded Forest Law Enforcement, Governance and Trade (FLEGT) Voluntary Partnership Agreement (VPA) with the EU on 20 November 2009. The VPA is a bilateral agreement between the European Union (EU) and wood exporting countries, which aims to improve forest governance and ensure that the wood imported into the EU has complied with the legal requirements of the partner country. The VPAs include commitments and action from both parties to halt trade in illegal timber, notably with a licence scheme to verify the legality of timber exported to the EU. The agreements also promote better enforcement of forest law and promote an inclusive approach involving civil society and the private sector. The VPA has led to the revision of the Forest and Wildlife policy, providing a legal framework and compliance monitoring system aimed at ensuring that all timber imports into the EU from Ghana have been legally acquired, harvested, transported and exported.

The key issues are of increasing degradation of the forest resource with weak institutional capacity in forest resources management, complicated tenure and tree rights, and increasing threats from a growing population's need to use the land space for other productive purposes.

[41] GDP contributions are classified into Agriculture, Industry and Services. Forestry/ logging is a sub-sector of agriculture by ISSER classification. Agriculture comprises crops, livestock, cocoa, forestry/logging, and fisheries (The State of the Ghanaian Economy, ISSER 2010)

Key Policy Focus Areas

The MTDPF 2010-2013 presents 10 key areas of focus for sustainable natural resource management (SNRM), two of which are key areas under sustainable domestic energy, seven under SNRM and three key areas focusing on climate change adaption and mitigation response actions. The key priority areas for 2010-2020 include sustainable domestic energy supply aimed at promoting sustainable production of wood fuel and efficient charcoal production and use from well managed woodlots, and development of alternative fuel sources through research and capacity building, as well as nationally appropriate mitigation action through REDD+. Ghana is also participating in Forest Improvement Program (FIP) of the World Bank. The FIP will finance efforts to address the underlying causes of deforestation and forest degradation and to overcome barriers that have hindered past efforts to do so. The Investments is aimed essentially at reducing emissions from deforestation and forest degradation and to protect and enhance forest carbon stocks; The programme strives for maximising co-benefits of sustainable development, including the conservation of biodiversity, protection of the rights of indigenous peoples and local communities, poverty reduction and rural livelihood enhancements.

Biodiversity

Ghana has a rich stock of biological diversity. The National Biodiversity Strategic Action Plan notes that marine and other aquatic ecosystems reported include about 2,974 indigenous plant species, 504 fishes, 728 birds, 225 mammals, 221 species of amphibians and reptiles have been recorded. It recognises that biodiversity in Ghana is under severe pressure in all ecological zones in varying degrees. There is declining trends, especially in forest, dry and sub-humid, marine and coastal and inland water biodiversity The major threats to biodiversity include land-use conversions, over exploitation of resources, pollution, invasive alien species, climate change effects, predation, mis-application of chemicals into the environment and wild fires. In rivers and streams fish populations are declining, Marine mammals are all threatened. Generally, fish stocks are declining. There is increasing loss of biodiversity through illegal logging, destruction of natural habitats, charcoal production, poaching, forest governance, declining fisheries, loss of wetland ecosystem services. Habitat degradation results from such activities as pollution, wild fire, over harvesting of genetic resources, misapplication of chemicals. Over exploitation includes excessive cutting of trees in stressed environments for fire wood as energy source, by-catch and use of inappropriate harvesting techniques such as pair trawling and beach seine. Many forest reserves are degraded from excessive extraction of timber and other resources. The Transition zone, formerly a forested area is rapidly turning into savannah and expanding further into the moist forest zone. There is rapid deforestation and loss of watersheds. There is decline in soil fertility. In the Northern savannah, there is high intensity of wild fires, increasing incidents of floods and droughts.

The key issues are of increasing loss of biodiversity through charcoal extraction, illegal logging, destruction of natural habitat, poaching[42], poor forest governance, declining fisheries and loss of wetland ecosystem services.

Key Policy Focus Areas

Sustaining Protected Area systems including building capacity and strengthening data and information management, promotion of proper forest management, avoiding clear cutting of forests, review traditional skills in management of Protected Area systems and incorporate these, where appropriate, into modern technologies; Promote full and active participation of traditional authority, landowners, communities and other stakeholders in protected area management, promote minimal use of agricultural chemicals, and minimise the conversion of forested off-reserve areas (ORAs) into non-forest land uses, such as for crop production and grazing, and empowering local level administration structures to enact bye-laws for the management, use and protection of biological resources and biodiversity.

Human Settlement

Population pressure and rural urban migration is increasing pressure on land. The urban population including peri-urban grew from 44 % in 2000 to 51.59%. Recent data based on the World Bank's project on REDD+ estimates annual rate of loss of forests due to land use changes from 2000-2010 as 115 ha per year from 135 ha per year from 1990-2000. The total cumulative loss from 2000 - 2010 amounts to 1.154 million ha representing 19.0 % reduction. The land use and land use change and forestry estimates urban sprawl and infrastructure development contribute about 10 %. Increasing rural-urban migration and urban sprawl do not only lead to deforestation only but also exert pressure on resources through water pollution and land degradation as a result of poor sanitation practices. This include disposal of untreated sewage into wetlands and the marine environment due to non-functional treatment plants, limited infrastructure or lack of it in various local government areas. Sand winning is driven by the high growth rate of the construction sector, particularly in the housing sector, and threaten erosion of coastal resources and severe land degradation.

The pollution of watercourses, wetlands, lagoons and rivers from point and non-point sources is threatening the quality of water available for abstraction for potable and other direct productive uses. There are numerous rivers, lakes and lagoons, in the human settlement environment that are polluted by human and industrial waste disposal. They include many lagoons along the coast which serve important ecological and hydrological functions. The main ones are the Kenta and Abu lagoon complex, Songhua lagoon in Ada, Chemo and Sakami lagoons in Tema, Korle and Kipsie lagoons in Accra, Fosu lagoon in Cape Coast, Bunya, Nacka and Jangle lagoons, and Tano-Ehy lagoon complex. The challenges of poor sanitation, land degradation due to erosion, pollution of water bodies due to indiscriminate defecation and refuse disposal, poor waste management, poor air

[42] At the technical meeting it was suggested that "*over-exploitation*" be used instead of poaching, however the latter is illegal whilst the former is not

quality and unplanned developments leading to frequent flooding are all due to inadequate environmental sanitation infrastructure and services.

In the rural areas, Ghana is not only experiencing increasing temperature trends and decreasing rainfall, but also unpredictable and unreliable rainfall patterns. This makes it difficult for the indigenous and vulnerable farmers to determine the rainfall seasons for crop production, which affects farmers using indigenous knowledge, with consequences for future food insecurity. The linkage between spatial/land use planning and socio-economic development in the planning and management of cities, towns and communities in the country is weak at all levels. The issue of land ownership poses a major challenge to land use in the country. Problems associated with this include the general indiscipline in the land market; complicated land tenure systems; and cumbersome land title registration procedures all of which impede the efficient use of land for development purposes.

The key issues are of an increasingly inadequate spatial and development planning; inefficient spatial/land use plans; weak plan implementation and weak enforcement of planning and building regulations; lack of integration of climate change adaptation and disaster risk reduction into land use planning; and inadequate human resource capacity for land use planning.

Key Policy Focus Areas

The critical environmental and sanitation services, with potential for job creation while minimising pollution of the environment from poor disposal of refuse, sewage, and discharge of liquid waste identified in the NESSAP include:

- Composting of biodegradable organic fraction of municipal solid waste, which constitutes 60-70% depending on the level of development of the communities;
- Recycling of treated wastewater in urban agriculture to replace polluted water being used for irrigation to support estimated 47 -162 ha of vegetable production and up to 800 ha of maize in Accra;
- Promote Decentralised Treatment, Re-Use and Recovery Systems (DTRRS) for sewage management in digesters and as well as aerobic composting of sewage plants in peri-urban communities, institutions, hospitals, schools and in hotels to address the sanitation and water problems associated with uncontrolled discharge of sewage;
- Promote the bio-digester and bio-filters technologies for uptake by the private sector to provide the sewage treatment services for a large number of people - more than 20,000 households of which 5,200 are in Accra alone - rely on banned pan latrines. Close to 5.2 million people are able to benefit from the environmentally sound technologies to improve household sanitation to meet Ghana's commitment to UN Sanitation for All and MDG 7 by 2015.

Environmental Policy

Implementation of the environmental policy over the years has been largely sectoral. The 1991 National Environment Policy (NEP) was revised and finalised in 2012 under the Natural Resources and Environmental Governance (NREG) system. The revised policy, including climate variability and climate change is integrated within the Ghana's Shared Growth and Development Agenda

(GSGDA) 2010-2013 for the sustainable management of natural resources. The GSGDA integrates adaptation measures to make agriculture resilient to climate variability and climate change, supports research into selected crop development suitable for each ecological zone, and promotes SLEM practices in agriculture to achieve food security. It also emphasises integrated watershed management and riparian buffer zone protection for all water bodies to achieve water and energy security, creating awareness of environmental and climate change issues, and environmental standard-setting and enforcement of regulations to sustain progress in these areas.

The Natural Resources and Environmental Governance (NREG) system, supported by EU and other DPs since 2008 under sector budget support (SBS), successfully strengthened the institutional and financial capacities of some of the participating key agencies and commissions even though SBS accounts for a limited share of the total budget funding. The strengthening included; building capacity for the sector-specific revision of policies and legislation to reflect the current and emerging realities of environmental issues facing Ghana. The institutions that benefited under the NREG framework are; Environmental Protection Agency (EPA), Mineral Commission, Forestry Commission, the Ministry of Land and Natural Resources and its ministries, departments and agencies (MDAs) under Land Administration. The SBS-approach also revealed strongly how the previous sector-specific financing approach had under-supported the activities of responsible MDAs with the consequences of limiting the development of institutional capacities for compliance and enforcement across relevant agencies. SBS has significantly helped in the formulation of Ghana's National Sustainable Development Action Plan (SDAP) that seeks to integrate sustainable consumption and production within the Strategic Environmental Assessment (SEA) programme to continue mainstreaming environment in policies, plans and projects at the local government level. The process also ensured the consensus to fund the preparation of Sustainable Development Action Plans (SDAP) that formed the basis of the revised National Environment Policy covering 14 identifiable sectors by the relevant agencies and departments, namely; Land, Agriculture, Transport, Industry, Biodiversity Conservation, Forest and Wildlife, Water, Sanitation, Energy, Minerals, Petroleum, Human Settlements, Waste Management, and Pollution Prevention and Control.

The NREG has also funded the development of the National Climate Change Policy Framework (NCCPF) and National Climate Change Policy (NCCP) and Programmes of Actions (PoAs) which was built on climate variability and climate change, country programmes under various enabling activities in climate impacts, vulnerability and adaptation, leading to the preparation of Nationally Appropriate Mitigation Actions (NAMAs) and National Climate Change Adaptation Strategy (NACCAS) supported by the EU and other DPs. The enabling activities include support from multilateral and bilateral donor agencies received for implementation of low emissions-related programmes in the dominant carbon emissions and/or removals sectors and categories. The Energy Sector programmes are renewable energy-based electricity for rural, social and economic development in Ghana, promoting of appliance energy efficiency and transformation of the refrigerating appliances market in Ghana, energy development and access project integration of renewable energy sources into the national energy grid mix to drive penetration, and the Bus Rapid Transit under Ghana Urban Transport. The Forestry and Land Use Change sector involving the Growing Forest Partnership, Forest Resources Use Management Project, Ghana Readiness Preparation Proposal, REDD+, and the Chainsaw Milling Project.

Sectoral Policies and Measures

The key sectoral Policies and Measures (PaMs) are based on the SDAPs and climate change and climate variability integrated in the GSGDA. The approach recognised that national development paths are conceived as not usually resulting from integrated policy programmes, but they emerge from various decision-making processes involving numerous private actors and public agencies within varied institutional governance frameworks of state, markets, and civil society. Consequently, the sectoral PaMs have been developed using participatory consultative approaches based on the Strategic Environmental Assessment process of capacity building at all levels of government decision-making and adequate participation of relevant stakeholders.

The sectoral policies and programmes emerging also seek to address key environmental issues that exacerbate environmental degradation and deforestation. They include the continuous challenge of unregulated/illegal small scale activities such as gold rush popularly called "*galamsey*", chainsaw logging, sand winning, settlements and encroachment in water catchment areas, which are occurring at unprecedented levels and defy the existing capacity of enforcement actions. The root cause identified includes access and property rights of the local people who own the land. The constitution and the mining and mineral laws in Ghana vests all industrial mineral in the GoG, which makes every level of mineral extraction, without the requite registration, a regularisation in accordance with the Mining and Mineral Act for small scale mining illegal.

The need to regularise artisanal and small scale mining has been acknowledged and needs to address property owners' access rights and also the basis of ensuring provision of extension services in sustainable mining, cooperative approach to access financial and other services, and adequate capacity building. These response actions including environmental monitoring, compliance and enforcement can only be effectively implemented when mechanisms are in place to regularise and regulate the activities. The regularisation also holds the key to minimising complicity and bribery in the enforcement of the mining and mineral laws. The need of involvement of chiefs and the people in the design and implementation of the emerging programmes would be essential to the success of the compliance and enforcement in the future.

The sectoral programmes and projects that offer potential funding opportunities identified for energy security, water security, food security based on SDAPs towards attainment of MDG 7 and NCCPF addressing adaptation for climate resilient economy and Nationally Appropriate Mitigation Actions for low carbon growth mandated in the Ghana's Shared Growth and Development Agenda (GSGDA 2010-2013).

Legislative Framework

The GSGDA requires the Environmental Protection Agency (EPA) to enforce environmental standards and endorses sufficient monitoring and control for effective enforcement and compliance of sector specific laws and regulations particularly activities outlawed in fisheries, forestry, and mining. For instance, compliance of reclamation of degraded and deforested land by timber and mining companies is a precondition to renewal of licences. The GSGDA further recognises that decentralising environmental management should include enforcement of relevant laws on waste/illegal mining/chainsaw logging at the local level. On the emerging oil and gas sector, GoG is

committed to enforcing a culture of compliance within a sustained regulatory framework. This will require persistent and stringent monitoring of reporting verification, building capacity of the judiciary in enforcing compliance, effective integration and mainstreaming of multilateral environmental agreements and international protocols into national laws for enforcement of compliance, and promote mechanisms to reduce bureaucratic interference in enforcement of laws and regulations for effective compliance and enforcement. The GSGDA therefore demonstrates strong willingness to enforce legislation.

GoG has demonstrated its commitment to enforcement of environmental legislation through the enactment of the Environmental Protection Agency, 1994 (Act 490). The Act makes environmental offences criminal and enforceable in the court of law. The subsidiary legislation, the Environmental Assessment Regulations, 1999 (LI 1652) made environmental assessment mandatory for all new developments and environmental management plans (EMP) mandatory for identifiable existing polluting operations. The EPA Act 490 thus became the lead legislation. All development permits are subject to the EA Regulations (LI 1652) and the EPA environmental permit system. The EPA Act and regulations define and develop national environmental quality standards for permissible levels of environmental indicators to determine non-compliance for appropriate enforcement actions under the Act and the subsidiary Regulations.

The general consensus of consultative meeting and interviews of DPs, selected ministries, departments and agencies (MDAs) and civil society organisations strongly indicate the weakest link in the policy and legislation cycle is compliance, monitoring and enforcement regime of environmental legislation, which undermined implementation and realisation of policy objectives especially in the area of illegal mining, logging and sand winning due to complicity of land owners and the unresolved question of access rights under the current constitution that vets all land and mineral resources in the government of Ghana.

Institutional Framework

The sector ministry for environment, currently Ministry of Environment, Science and Technology (MEST) is responsible for the coordination of the National Environmental Policy (NEP). The EPA is the lead institution. The National Development Planning Commission (NDPC) shall ensure the continued mainstreaming of the environment in the MTDPF and the Medium Term Expenditure Framework (MTEF). The national policy empowers the MEST, EPA and NDPC to integrate and coordinate all environmental management functions within and between all MDAs, The MEST and EPA are to be responsible for the development of subsidiary policies within the framework of the national policy and will also have the role of review and harmonising existing legislation and enact new ones to deal with emerging environmental challenges. The institutional framework, under the previous sector-specific MTEF approach, was generally weak, under-staffed, lacking logistics for effective discharge of legislative functions.

Climate Change Implications

Ghana is a Developing Country Party to the United Nations Framework Convention on Climate Change (UNFCCC). In response to its obligation under the Convention, Ghana has prepared and submitted its *Initial National Communication* (INC) and the *Second National Communication* (SNC) to the Conference of Parties in 2000 and 2011 respectively. The climate variability and climate change impacts analysis reveal evidence of increasing surface air temperature in six ecological zones ranging from 0.4 ^{o}C to 0.9 ^{o}C for the period 1961-2000. Adopting the 40-year temperature trends as the baseline scenario, the Global Circulation Model (GCM) scenarios that have been developed indicate that the mean daily temperatures are generally expected to change by 0.6^{o}C, 2.0^{o}C and 3.9^{o}C in 2020, 2050 and 2080 respectively (SNC, 2011).

The GCM scenarios also indicate annual mean rainfall is likely to reduce between 1.1 % and 3.1 % across all the six agro-ecological zones by 2020, with the highest reduction occurring in the rainforest and the coastal savannah zones. The changes in annual mean rainfall by 2080 is expected to be between 13 % and 21 % reduction of the observed baseline values. The forecast for precipitation indicate a cyclical pattern during the period 2010–50 for all regions, with high rainfall levels followed by a drought every decade.

Ghana's water resources, agriculture, fish production, and coastal zone infrastructure are all predicted to be at risk. It is however noted that the high annual runoff will have non-climate drivers such as deforestation of the watershed that also contribute to significant rate of evapo-transpiration in the three basins. Thus any future adaptation programme will need to consider addressing not only climate factors but also non-climate drivers to increase the resilience of the water resources. The various studies further observe that most of the changes in stream flows will occur in upstream areas outside the territory of Ghana. This is because most of the rivers in Ghana are shared resources. Ghana is a riparian state that shares a number of basins with neighbouring countries. The Volta River basin is shared with Cote d'lvoire, Burkina Faso, Togo, Benin and Mali. The Bia is shared with Cote d'lvoire, while the lower reaches of the Tano River also form part of the boundary with Cote d'lvoire. The need for international collaboration in their transboundary management is clear.

The implications of the wide fluctuations in runoff and stream flows, with the Volta basin experiencing significant reductions in runoff, are far reaching. There will be an increase in the risk of floods and/or droughts in both rural and urban areas in the Volta basin, which will be exacerbated by lack of awareness on climate change and its impact, high dependence of the economy on water for hydropower generation, low penetration of irrigation in agriculture that is predominantly rain-fed, weak and inadequate infrastructure to cope with the high intensity of rain and floods, limited human resource capacity, weak sub-regional network and inadequate financial resources or low budgetary allocation. The predicted warming with temperature increases from about 1^{o}C to over 3.9^{o}C will have adverse effects on human well-being and activities, food security, and water availability. In response to this climate change, people will migrate in search of better land and environment. Migration of population from rural to urban areas due to climate impacts in the long term will raise demand and put pressure on municipal services - including water supply and sanitation, public health, energy, transportation, and housing services. Migration is also expected to

occur not only within the country, but also from countries to the north of Ghana, which will also become hotter and drier. This rural to urban drift in population will worsen water and sanitation problems in peri-urban communities, particularly those of Accra, Takoradi, Kumasi, and Tema.

GoG integrated climate variability and climate change as well as sustainable development action plans into its development framework, 2010-2013 *Ghana Shared Growth and Development Agenda* (GSGDA) in 2010, and began the process of mainstreaming climate change and environment into the Ghana's Medium Term Expenditure Framework (MTEF) through the budgetary process at all levels of government (national, metropolitan, municipal and district) within the decentralised governance structure of Ghana.

Environmental degradation is caused mainly by mining operations, sand winning, natural disasters and weak land management. In three regions, Western, Eastern and Ashanti, declining soil fertility has led to lower crop yields while rangeland depletion and deterioration in water quality has adversely affected the fish catch. Non-existent property rights, limited access to financial and other services, inadequate safety nets in time of stress or disaster, and lack of participation in decision-making may result in adoption of short term activities which tend to lower longer term resilience. This may make the most vulnerable even more vulnerable to environmental degradation, including degradation exacerbated by climate change. Where livelihoods are already marginal, due to soil loss, low fertility or areas affected by mining, future climate variability in the form of extreme rainfall or recurring drought periods will exacerbate future prospects. A key to this may be secure tenure and access to markets as this tends to encourage investment and reduces resource-degrading strategies. Faced with growing land scarcity, diminishing agricultural productivity and a reduced access to traditional products from forests and other natural resources, rural communities may turn to other activities that do not build longer term resilience.

Integration of Environmental Concerns into the Main Policies and Sectors

The *Medium-Term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA) 2010-2013* provides the context for the identification of links between the main government policies (overall development policy, poverty and sector policies) and sustainable natural resource management and environment protection policies, programmes, and projects of ministries, departments and agencies.

Efforts continued to be made to address environmental issues, including ratification of a number of international conventions related to environment and the integration of the principles of sustainable development into country policies and programmes in order to achieve the target under the Millennium Development Goals (MDG 7 specifically) of reversing the loss of natural resources by 2015.

The GSGDA 2010-2013 adopted and mandated strategic environmental assessment (SEA) as a well-established model of an consultative and participatory approach to mainstreaming environment into sector-specific development plans and programmes at all levels of government (national, metropolitan, municipal, and district). The SEA process involves thorough public discussions by relevant stakeholders to identify key issues. The application of SEA procedures provides the platform for the evaluation of environmental effects and social dimensions of sectoral development

policies, programmes and projects. It also assists the MDAs and MMDAs to integrate the outcomes into the MTEF for budgetary allocation and implementation. Sustainable indicators are developed for monitoring and evaluation of the impact of the environment on development outcomes.

The sector budget support approach, such as NREG SBS, is a relatively new aid modality and accounts for a limited share of the total budget funding. There is a particular interest from development partners, incl. donors, NGOs etc., in assessing how the implementation of the identified reforms move forward and how the programme affects women, the poor and marginalised rural communities. As such, long-term civil society support mechanism was envisaged as a component to the NREG SBS. Currently, CARE and SNV, through funding from CARE Denmark and the Royal Netherlands Embassy, are implemented a pilot civil society support mechanism called "Kasa" from 2008-2010. The experiences and lessons learned from Kasa will inform the longer term mechanism planned to support civil society engagement in the NRE sector. "*Kasa*", a word in a local dialect meaning "*talk*" seeks to increase transparency, accountability and broad engagement in NRE governance in Ghana.

The links between the main government policies and sustainable natural resource management seem well-integrated and, in particular, SEAs have been undertaken to cover the main sectors. Given that the main EC intervention concerns the support to the NREG programme it would seem that this should be effective in promoting environmental mainstreaming given that the primary government actors in the above policy areas (Ministry of Environment, Science and Technology/Environmental Protection Agency, Ministry of Lands and Natural Resources, Minerals Commission and the Forestry Commission) are all supported through the NREG process.

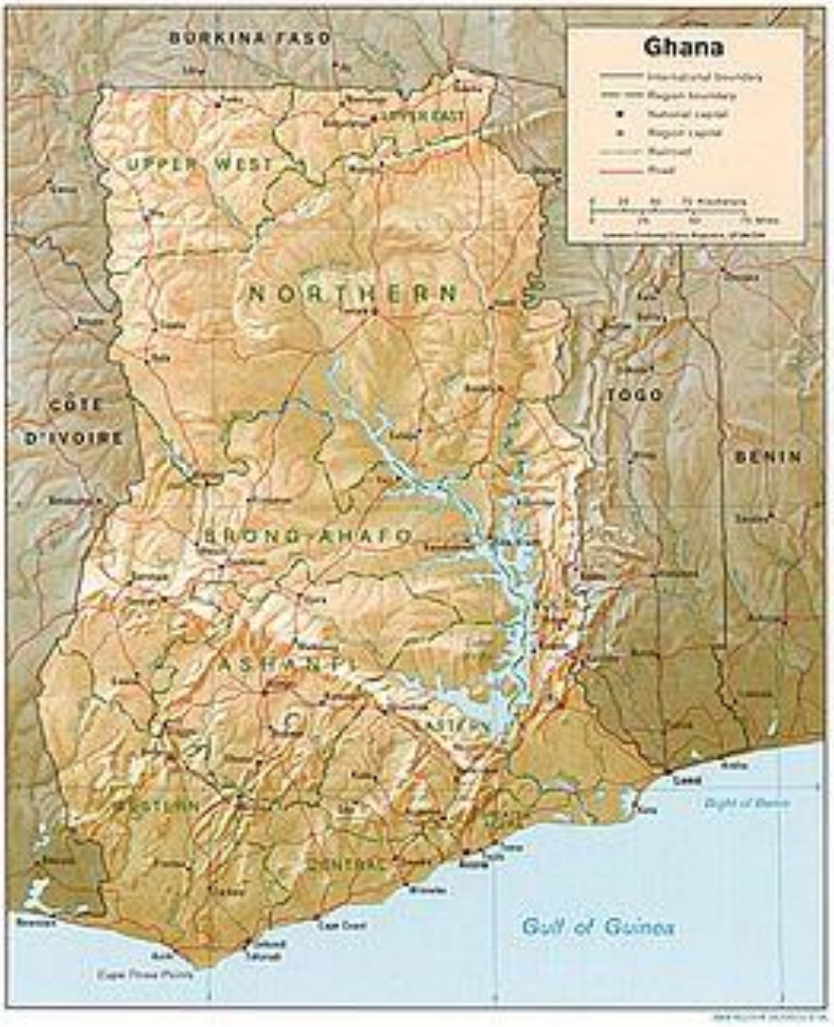
The NREG SBS by EU and other DPs was the main driver for the success of mainstreaming environmental sustainability into key sectoral policies, plan and programmes even though SBS accounts for a limited share of the total budget funding. Sector specific programmes and projects in power generation, renewable energy, integrated water resource management, agriculture, forestry and waste management that offer funding opportunities in the future EDF are listed in the GSGDA 2010-2013 and sector policies and measures, action plans, strategic investment plans developed by ministries, departments and agencies for funding. They include particularly: energy security projects in low carbon intensity and low emissions power generation (e.g. natural gas infrastructure and substitution of light crude oil in power generation and natural gas combined cycle technology transfer); emission avoidance or reduction in renewable energy (mini-hydro, wind, solar, geothermal, biomass), emission reduction in end-use energy efficiency improvement in residential, commercial, and industrial applications), integrated water resources management, sustainable agriculture and livelihood, SLEM in forestry and mining and land administration, and water, sanitation and waste treatment technology diffusion. The projects identified address nationally appropriate mitigations actions and adaptation in climate change policy framework, and/or sustainable development action plans integrated in the national MTEF for monitoring and evaluation to track Ghana's commitment to low carbon growth and low emissions development agenda.

8 TECHNICAL APPENDICES

8.1 Environmental Maps of the Country

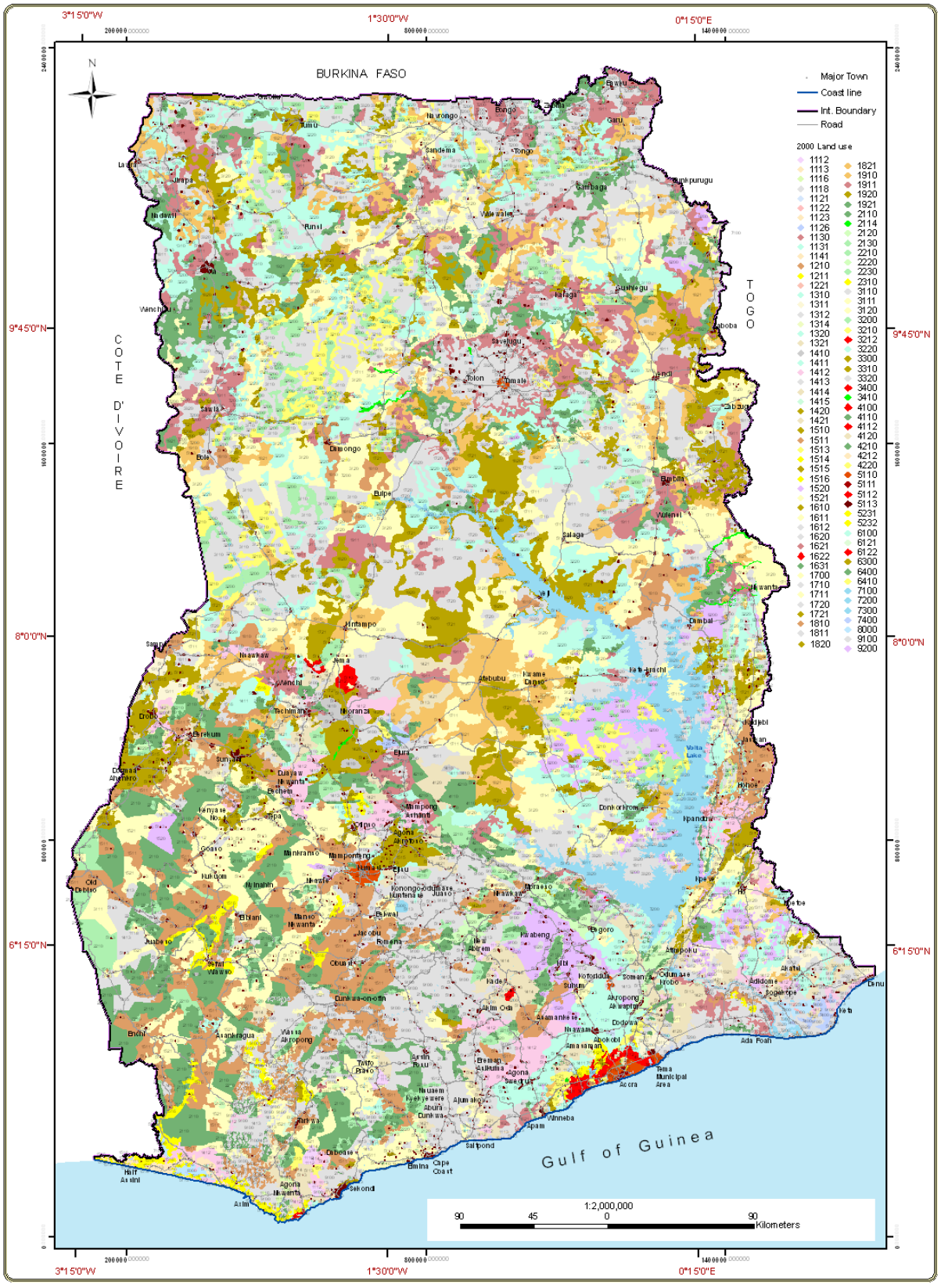
8.1.1 Administrative Map of Ghana

8.1.2 General Topography of Ghana



8.1.3 Land Use Map of Ghana

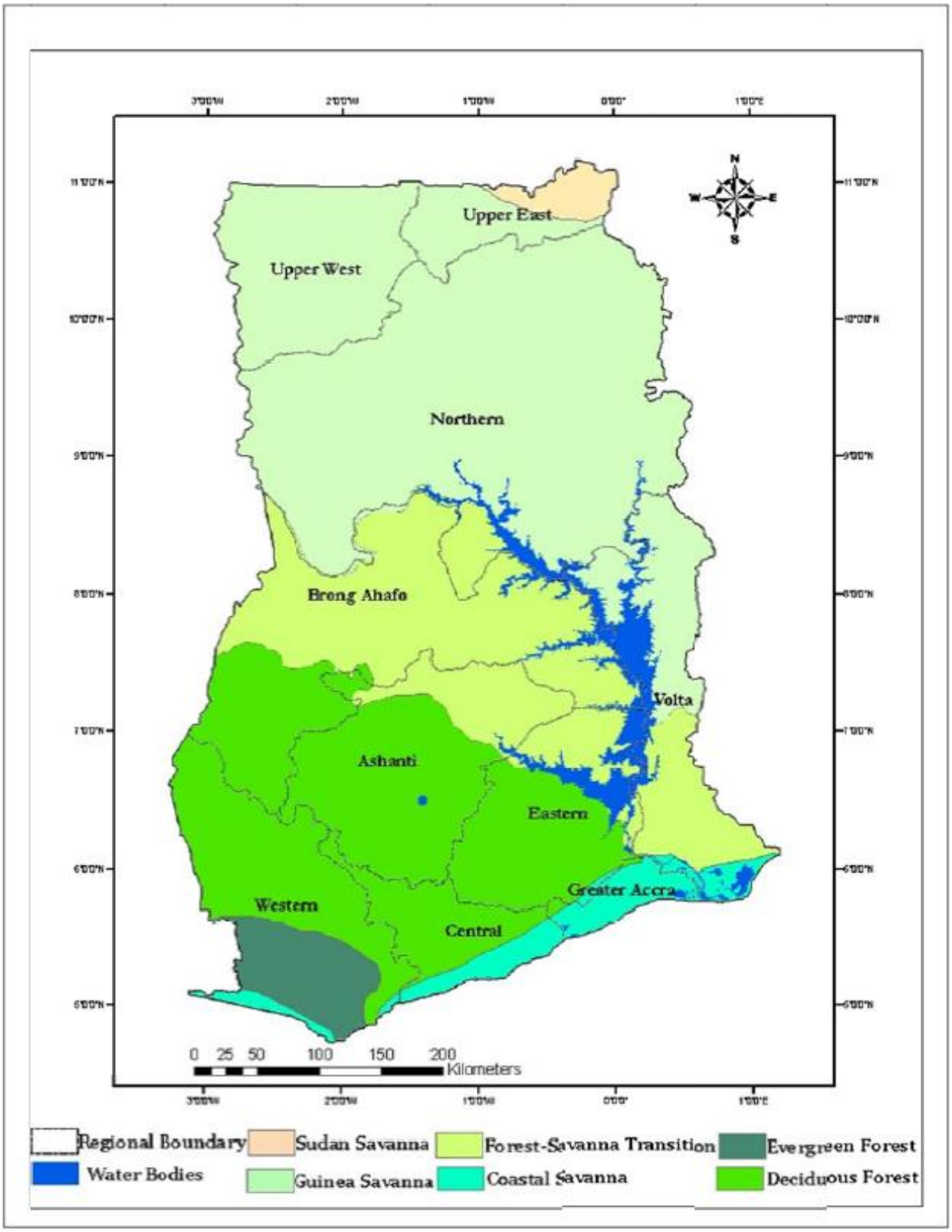
(MOFEP, 2011)



8.1.4 The Main Rivers of Ghana

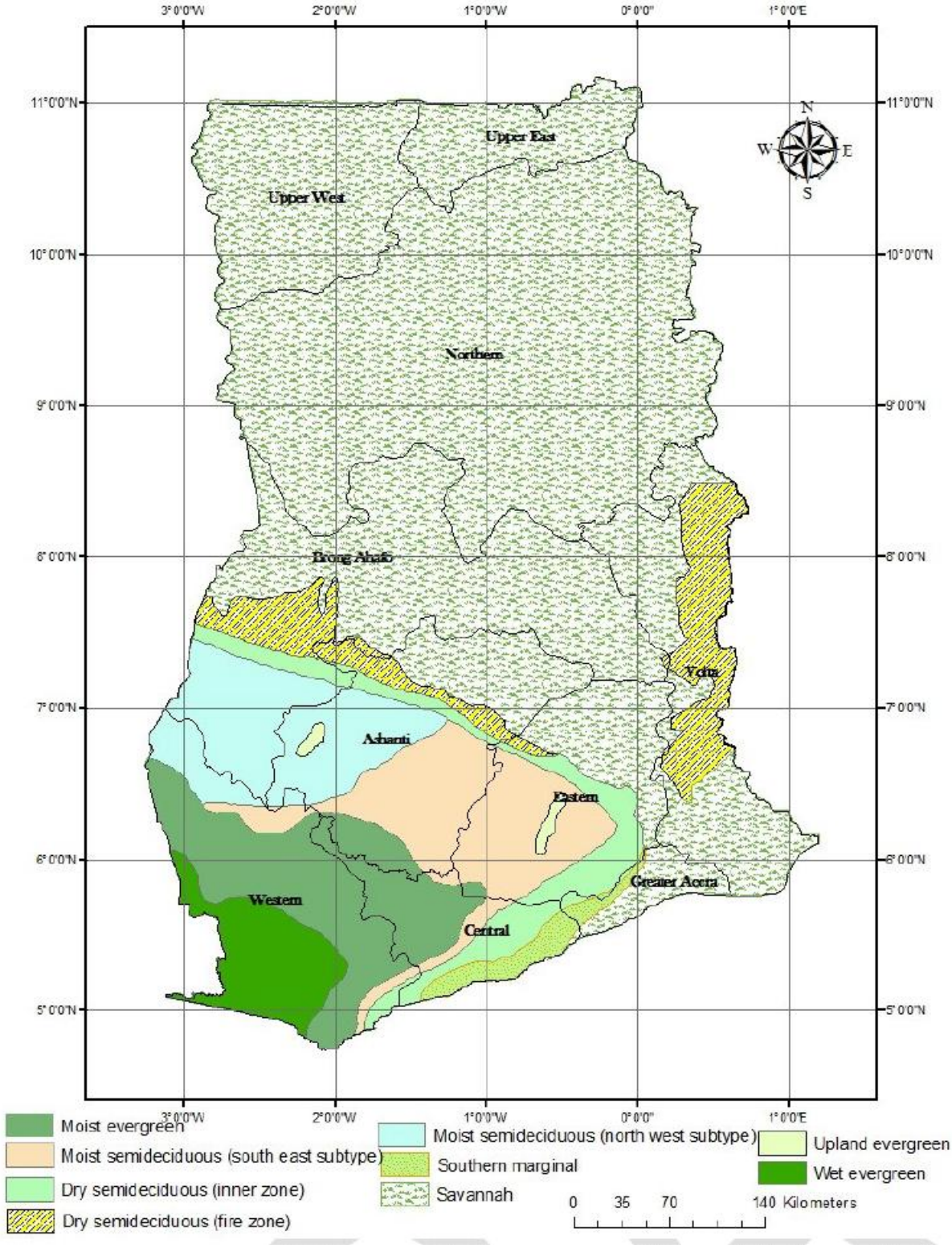
8.1.5 The Ecological Zones of Ghana

(USAID, 2011)

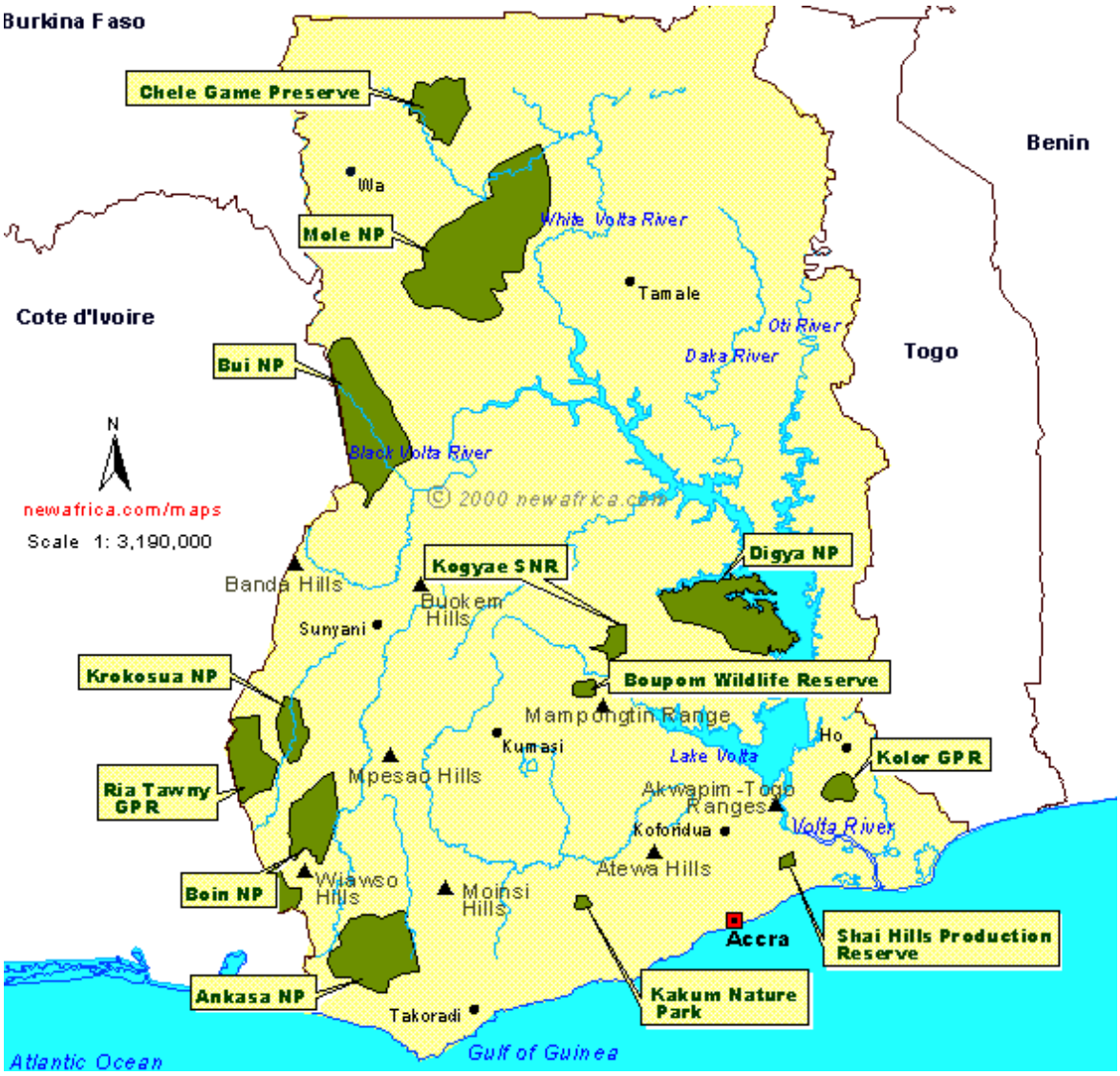


8.1.6 The Forested Areas of Ghana

(FIP, 2012)



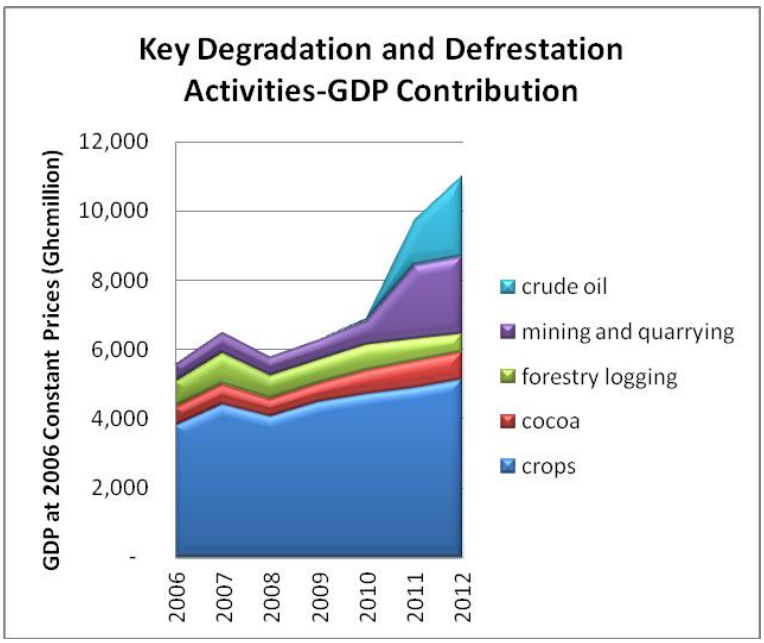
8.1.7 The National Parks in Ghana

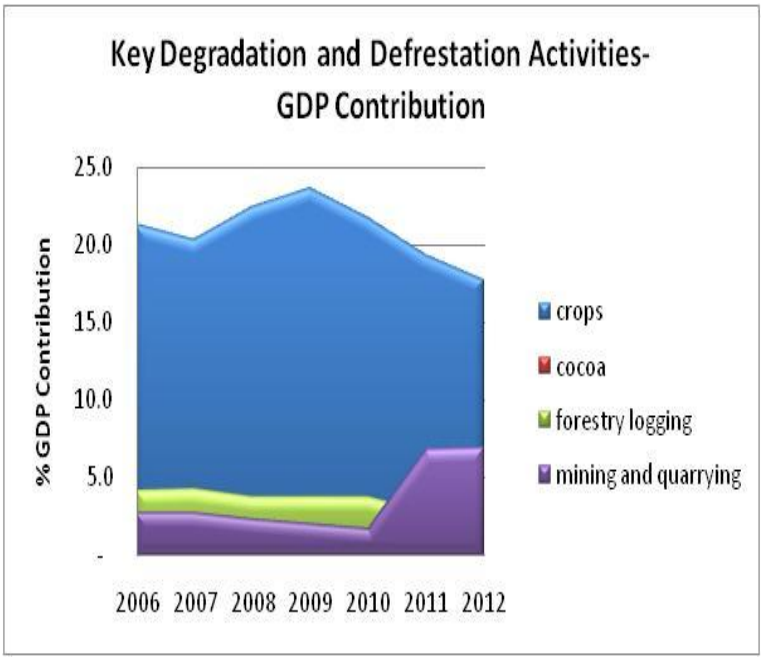


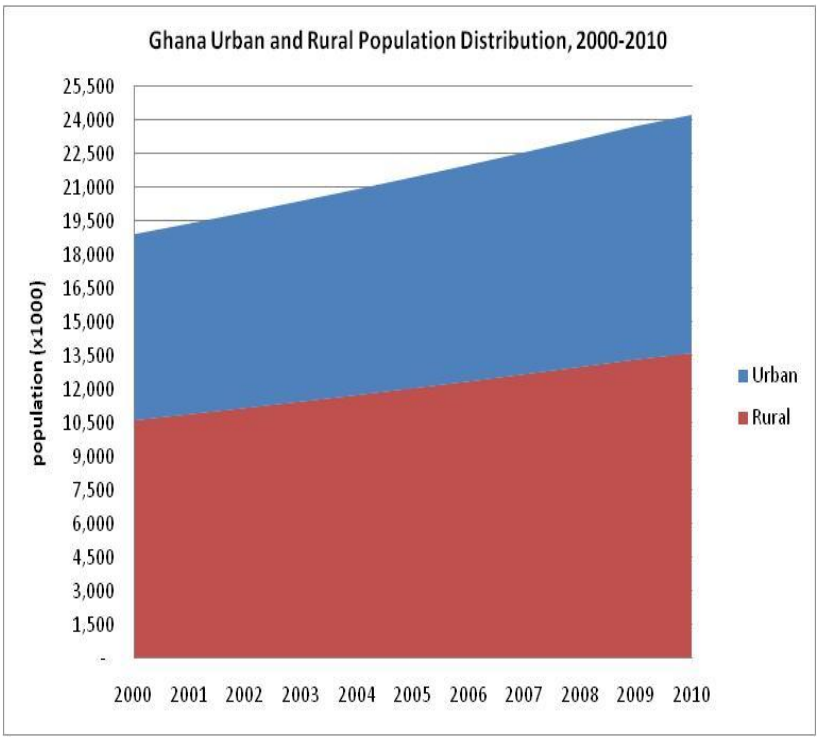
8.1.8 Some Key Trends and Drivers

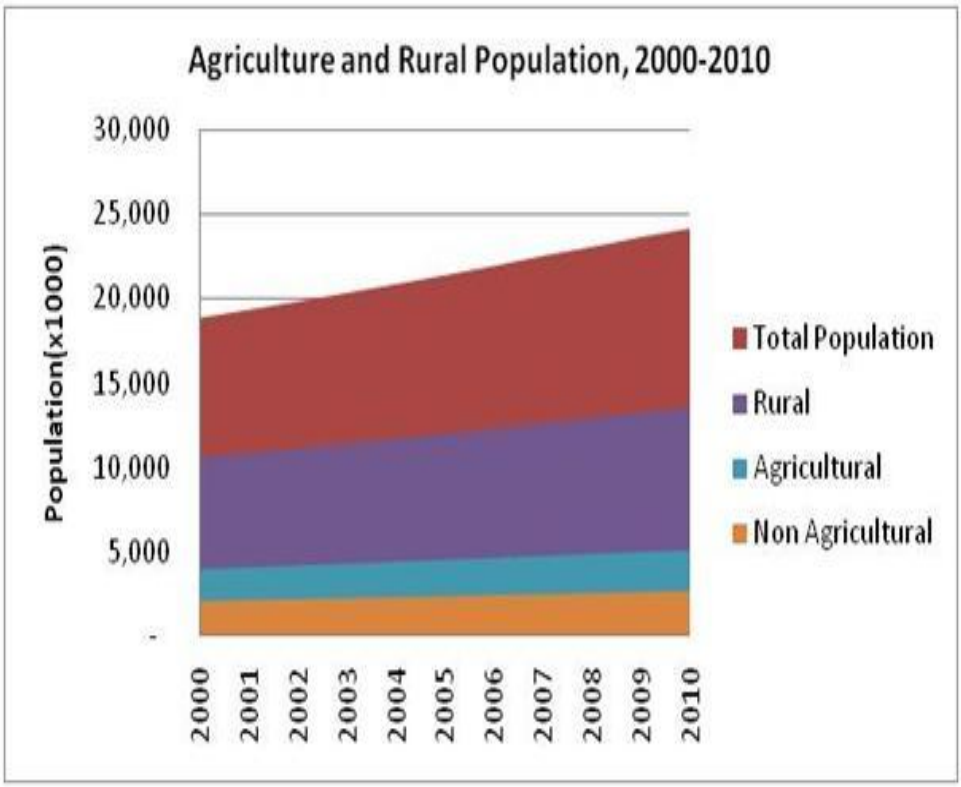
Source: Ghana Statistical Service (www.stats.gov.gh):

The State of Ghanaian Economy, ISSER, 2010

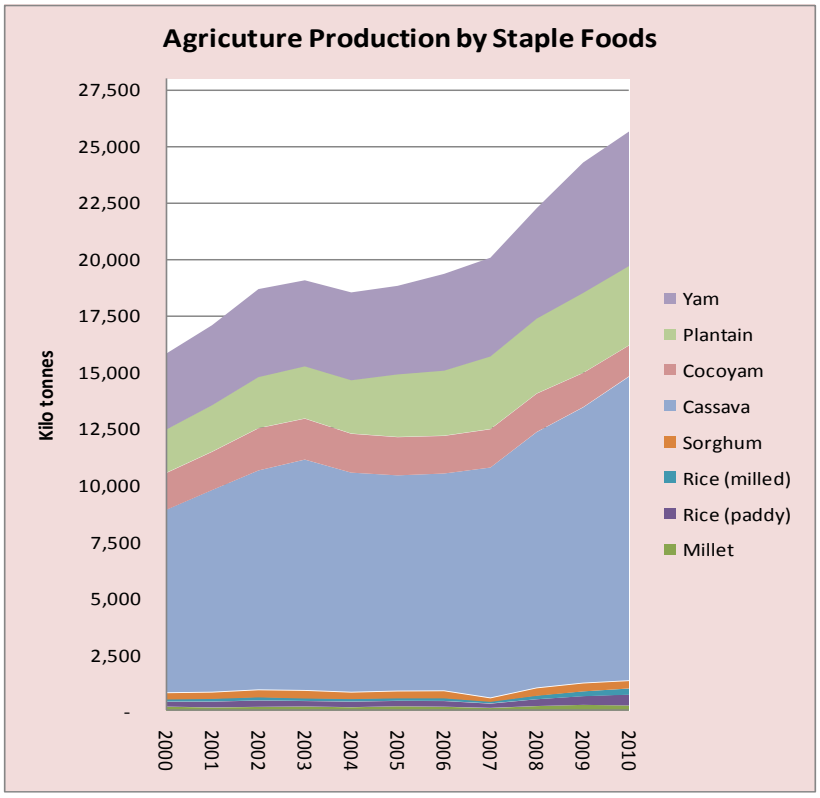


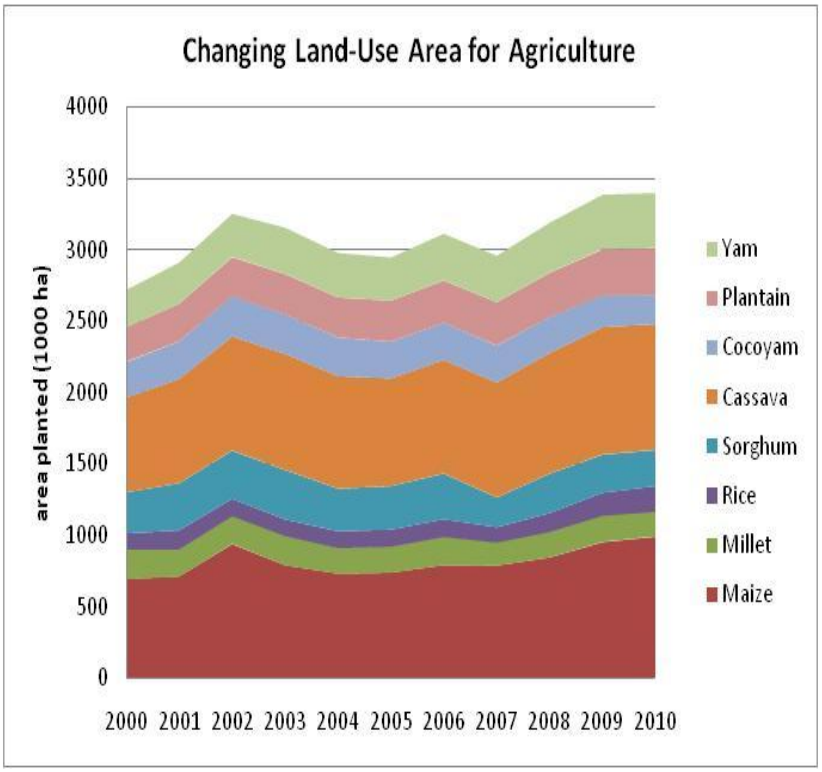



Ghana Urban and Rural Population Distribution, 2000-2010
population (x1000)
25,500
24,000
22,500
21,000
19,500
18,000
16,500
15,000
13,500
12,000
10,500
9,000
7,500
6,000
4,500
3,000
1,500
-
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Urban
Rural

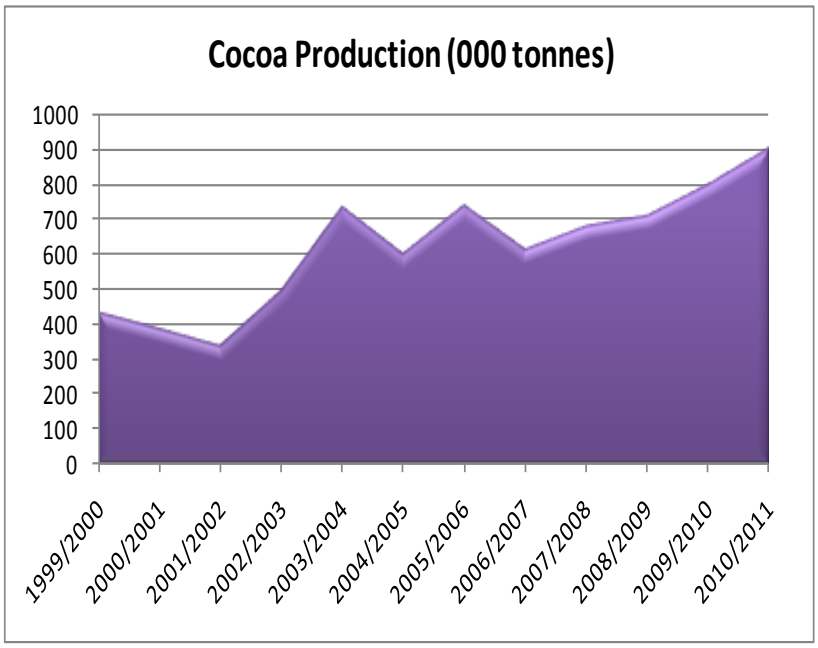

Agriculture and Rural Population, 2000-2010
Population(x1000)
30,000
25,000
20,000
15,000
10,000
5,000
-
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Total Population
Rural
Agricultural
Non Agricultural

Agricultural Crops Production and Changing Land Use Area

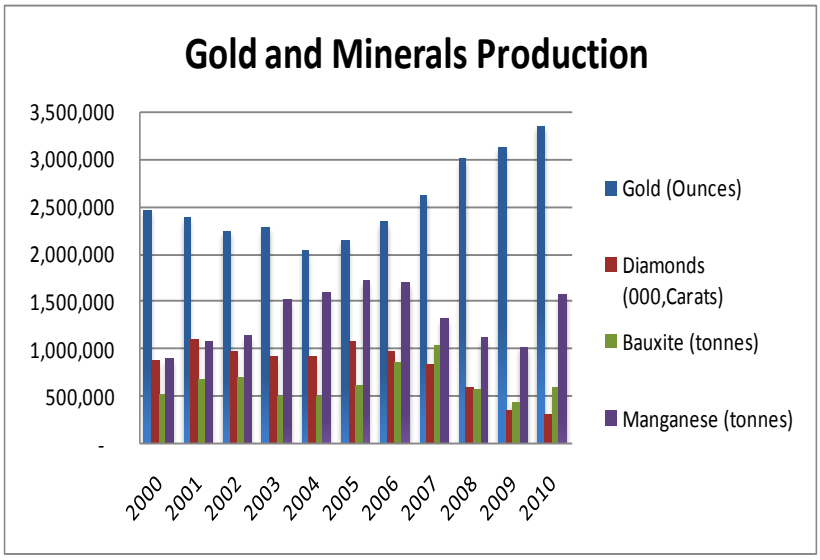


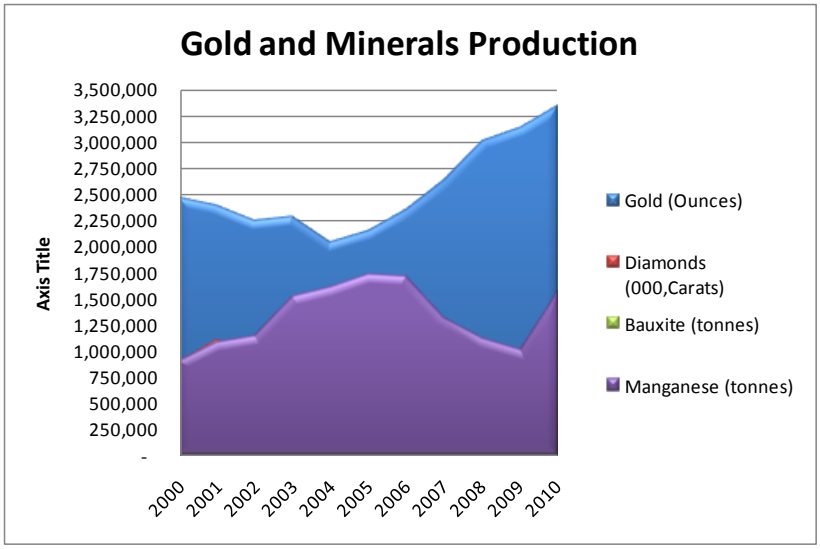


Agriculture Expansion-Cocoa Production

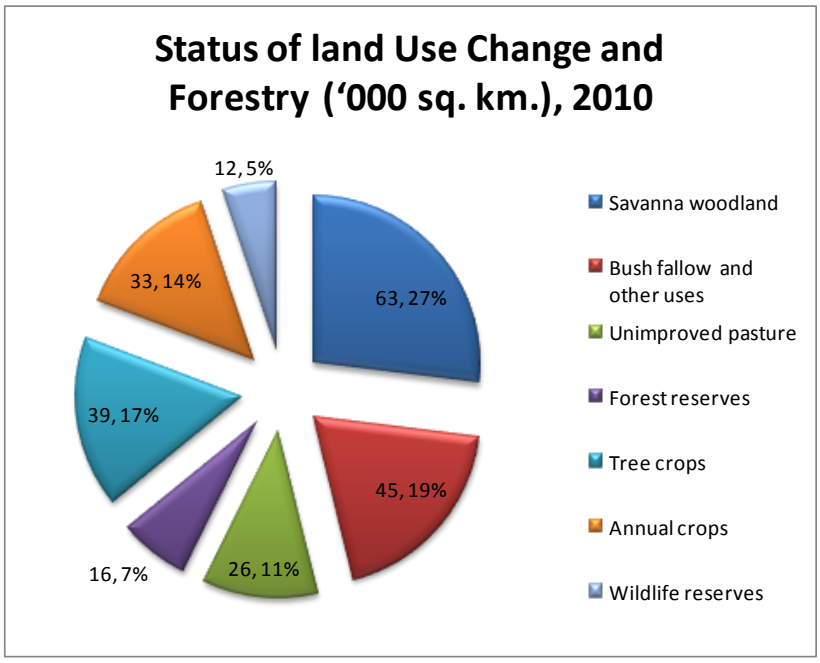


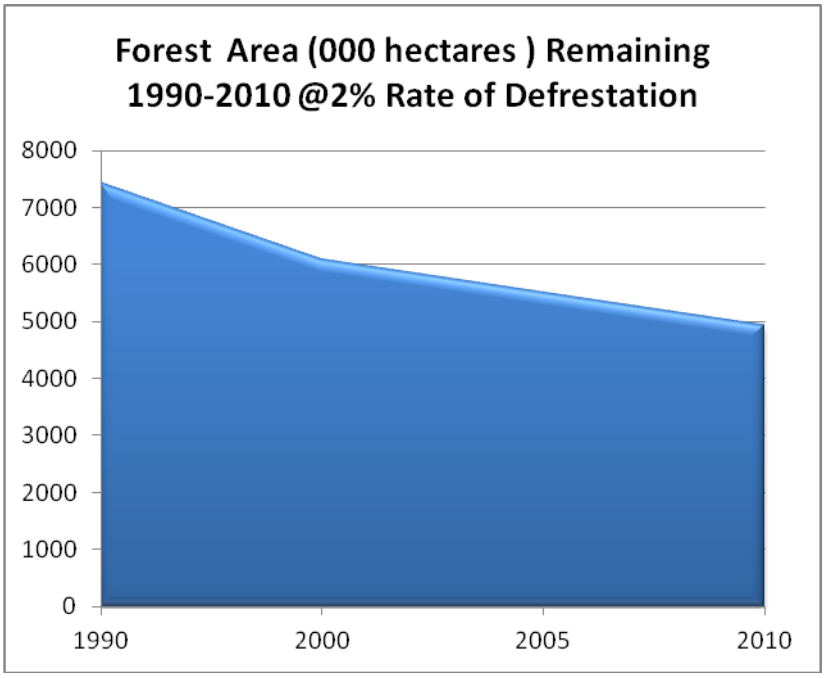
Gold and Mineral Production

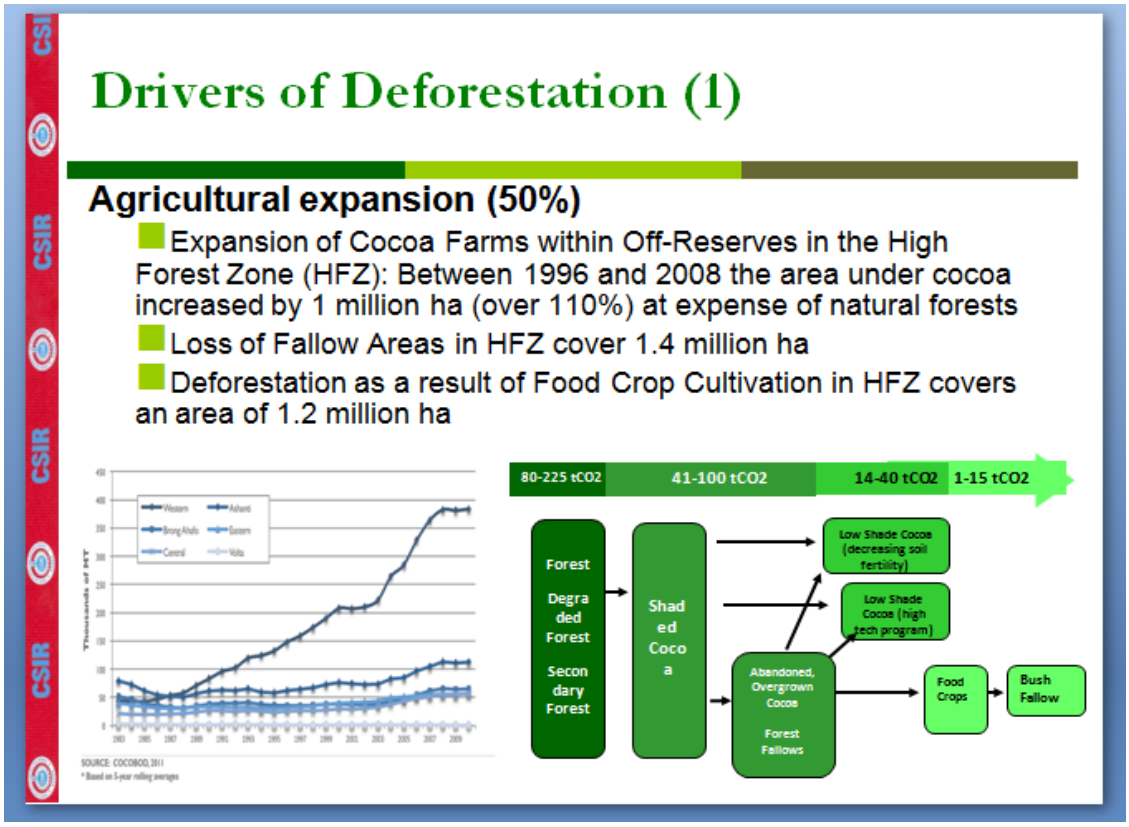




Deforestation and Forest Degradation Impacts of Economic Activities




Forest Area (000 hectares) Remaining
1990-2010 @2% Rate of Defrestation
8000
7000
6000
5000
4000
3000
2000
1000
0
1990
2000
2005
2010


Drivers of Deforestation (1)
Agricultural expansion (50%)
Expansion of Cocoa Farms within Off-Reserves in the High Forest Zone (HFZ): Between 1996 and 2008 the area under cocoa increased by 1 million ha (over 110%) at expense of natural forests
Loss of Fallow Areas in HFZ cover 1.4 million ha
Deforestation as a result of Food Crop Cultivation in HFZ covers an area of 1.2 million ha
80-225 tCO2
41-100 tCO2
14-40 tCO2
1-15 tCO2
Forest Degraded Forest Secondary Forest
Shaded Cocoa
Low Shade Cocoa (decreasing soil fertility)
Low Shade Cocoa (high tech program)
Abandoned, Overgrown Cocoa Forest Fallows
Food Crops
Bush Fallow

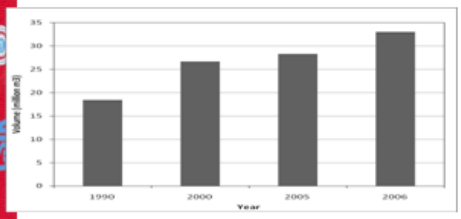
Drivers of Deforestation (2)

Wood harvesting (35%)

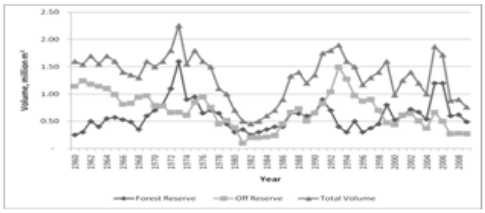
- Wood removal for Fuelwood and charcoal estimated at 30 million m^3 $year^{-1}$
- Timber harvest is currently 3.72 million m^3 $year^{-1}$
  - 2 million m^3 $year^{-1}$ is legal and from Formal sector
  - 1.8 million m^3 $year^{-1}$ is illegal and is mainly to supply the Domestic Market.

Urban sprawl and infrastructure development (10%)

Mining and mineral exploitation (5%).



Woodfuel Consumption (1990-2006)



On – and off-reserve recorded timber extraction (1960-2009)

8.2 Environmental Policies, Statements, Action Plans, Other Information

8.2.1 Environmental Policies, Programmes and Plans

Policies, Programmes and Plans related to Environment	
1991	National Environmental Policy
1991	National Environmental Action Plan
1994	Forest and Wildlife Policy
1996	Soil Fertility Management Plan
1998	National Wildfire Policy
1999	Environmental Sanitation Policy
2002	Land Policy of Ghana (1999) rev 2002
2004	National Action Programme to Combat Drought and Desertification
2007	National Water Policy
2009	Medium Term Energy Sector Strategy (2009-2015)
2010	Ghana Shared Growth and Development Agenda/PRSP II (2010-2013)
2010	Bio-energy Policy
2010	Sustainable Development Action Plan
2010	The Environmental Sanitation Policy (Revised)
2010	National Environmental Sanitation Strategy and Action Plan
2011	Second National Communication (to UNFCCC)
2012	Revised National Environmental Policy

8.2.2 Sustainable Development Action Plan and its Indicators

Sustainable Development Action Plan and its Indicators	
Chemicals	• Current figures on use of banned chemicals • Number of deaths due to poisoning • Number of poisoning cases reported
Agriculture	• Total land area • Agricultural land area • Area under cultivation • Area under irrigation • Area planted to major food crops • Production of major food crops • Mean annual growth rates for area planted to major food crops • Mean annual production growth rates major food crops • Levels of per capita consumption of selected food crops • Domestic food demand and supply • Quantity and value of cereal imports • Production of industrial crops • Livestock population • Meat production • Imports of livestock and poultry products • Water ways under aquaculture • Annual fish production • Agrochemical imports • Fertiliser imports • Growth rates of agricultural sub sectors • Post harvest losses
Energy	• Energy use by various sector groups • Energy use per capita and per unit of GDP • Industrial energy intensities • Agricultural energy intensities • Service/commercial energy intensities • Household energy intensities • Transport energy intensities • Renewable energy share
Housing and Construction	• Housing stock and deficit • Housing type • Housing density
Manufacturing	• Processing of raw material for export • Use of raw material for local production • Import of raw materials for manufactured exports • Number of industries by region
Tourism	• Contribution to GDP • Number of tourists

Sustainable Development Action Plan and its Indicators	
	• Sites visited
Transport	• Total of metalled roads • Total of feeder roads • Inland waterways • Total of railways • Number of airplanes and air traffic by airport • Fuel consumption by aviation • Movement of people by mode of transport • Contribution of air, road, rail traffic to GHG emissions
Waste Management	• Number of recycling industries • Number of waste to energy projects and capacities
Water and Sanitation	• Treated water production • Production to supply shortfalls • Regional coverage in urban water supply
Mining	• Total number of mining licenses granted • Total land area being mined • Total minerals mined by type of mineral • Number of communities affected by mining activities • Number of persons displaced by mining activities • Number of chemical spill incidents per mining area • Number of mining pollution cases reported • Number of reported land use conflicts from mining • Total area of reclaimed mined land • Total area left not reclaimed after mining • Total area of mined forest reserves • Total area farmlands lost to mining • Total area affected by illegal mining • Labour force engaged in mining • Energy consumed by mining (fuel) • Treated water consumed by mining • Total electricity from the national grid consumed

The Environmental Sanitation Policy (Revised, 2010)

The Environmental Sanitation Policy (Revised, 2010) responds to the various reviews carried out to assess how effectively the previous policy published in 1999 has been implemented. The revised policy objectives and measures are presented in a way that enhances strategic planning and subsequent implementation.

The broad principles underlying Ghana's Environmental Sanitation Policy (Revised, 2010) are:

- The principle of environmental sanitation services as a public good
- The principle of environmental sanitation services as an economic good
- The polluter-pays-principle
- The principle of cost recovery to ensure value-for-money ensuring economy, effectiveness and efficiency
- The principle of subsidiarity in order to ensure participatory decision-making at the lowest appropriate level in society
- The principle of improving equity and gender sensitivity
- The principle of recognizing indigenous knowledge, diversity of religious and cultural practices
- The precautionary principle that seeks to minimise activities that have the potential to negatively affect the integrity of all environmental resources
- The principle of community participation and social intermediation

The ESP defines the principal components of environmental sanitation to include:

- Collection and sanitary disposal of wastes, including solid wastes, liquid wastes, excreta, industrial wastes, health-care and other hazardous wastes
- Storm-water drainage
- Cleansing of thoroughfares, markets and other public spaces
- Control of pests and vectors of disease
- Food hygiene
- Environmental sanitation education
- Inspection and enforcement of sanitary regulations
- Disposal of the dead
- Control of rearing and straying of animals
- Monitoring the observance of environmental standards

Policy Focus Areas

In order to provide a clear basis for achieving the overall goal of the sector, the policy provides strategic elements under the following policy focus areas:

- Capacity Development
- Information, Education and Communication
- Legislation and Regulation
- Levels of Service
- Sustainable Financing and Cost Recovery
- Research and Development
- Monitoring and Evaluation

The various strategies and action plans of the **National Environmental Sanitation Strategy and Action Plan** are derived from the objectives and measures under the above focal areas.

8.2.3 NREG Budget Integrated into MTEF Sector Budget

PRIORITY AREA1

Policy Thrust: 3b. Accelerated Agricultural Modernisation and Natural Resource Management – Natural Resource Sector Objective 2:Support activities under the National climate change secretariat MTEF Objective 1: Mitigate the impact of climate variability and change		
ACTIVITIES	**OUTPUT**	**OUTCOMES**
Development of Policy Strategies (Consultancy)	National Climate Change Policy Framework completed and implementation initiated	Climate Change mainstreamed into National Agenda
Development of action plans and implementation schedule for prioritized sectors	Action plans developed for prioritised sectors	
Institutionalise roles and responsibilities for Policy implementation	Roles and responsibilities institutionalized	Climate Change mainstreamed into Sector and National Agenda
Implementation coordination	Coordination structures developed and implemented	
Monitoring and evaluation of policy implementation		
Promote various mitigation options under the 5 prioritized sectors in the National Climate Change Policy	Detail plan for NAMAS provided	Adaptive capacity enhanced towards sustainable development
Support for National Climate Committee activities		Climate change issues discussed, decisions taken and effected
PRIORITY AREA 2 Environmental and Natural Resource Advisory Council Enhance policy and regulatory framework and effective co-ordination among key Government agencies to improve the performance of the environment sector		
ACTIVITIES	**OUTPUT**	**OUTCOMES**
Procure consultant to facilitate a study on the Environmental cost of mining. Procure Logistics for ENRAC Secretariat Support for ENRAC activities	Consultants terms of reference drafted and consultants procured Necessary stakeholder consultations carried out Final report submitted to cabinet Logistics procured for effective service delivery	Government advised on sustainable development issues. ENRAC coordinated for effective work towards national development as it relates to environmental and natural resources Cross-sectoral Policy issues on environment and natural resources discussed and implementation initiated

MTEF OBJECTIVE 4: Provide adequate resource and incentives for human resource capacity development.		
Training in evidence based performance monitoring and technical reporting and provision of 5 laptops and M&E software for 10 M&E desk officers and their deputies in MEST and its 4 MDAs	Improvement in evidence base monitoring for informed decision making	Projects implementation on course and completion on schedule
Capacity strengthening of MEST/PPME /Environment Units Provide the requisite skills necessary for a better budget/ financial accounting and reporting. Support for budget preparation	Cash management process impacted on accounting staff Deployment of GIFMIS enhanced 2 budget officers sponsored to financial management course quarterly budget review meetings held MDA annual work plan prepare Stakeholder consultations held	Capacity built in public financial management Budget preparation programme supported and enhanced for effective outcome
PRIORITY AREA 4 **POLICY OBJECTIVE 2 : Institutional Capacity development**		
MTEF OBJECTIVE 4: Provide adequate resource and incentives for institutional capacity development.		
Build six additional offices by December, 2012 to accommodate additional staff	office space made available for staff to work	Well performing ministry through effective service delivery
Logistics procured for monitoring and evaluation of projects and programmes of MEST country-wide	MEST projects properly monitored and implementation on- course	Projects successfully implemented for national development
PRIORITY AREA 5 **MTEF OBJECTIVE 4:Improve Government commitment to international Protocols and conventions and their Incorporation into National Agenda**		
Enhance the capacities of relevant Agencies to adequately enforce laws on principles of sustainable development.	Capacity in relevant Agencies enhanced	Laws on Sustainable Development enforced by MDAs
Mainstream tenets of Environmental sustainability into National Development Planning.		
Mainstream international Protocols into National Laws for the promotion of sustainable development	Dues subscription paid	International agreements internalized
Develop an appropriate response to climate challenges through linkages between and among research, industry, and the government machinery.	Provision of technical and financial support (subscription) to the West Africa Science Centre on Climate Change	Research information on climate change made available for development. Recommendations/Reports made available for

Provide support for participation in COP 18 to Ghana delegation	Delegation participates in COP 18	implementation towards an effective environmental management
Finalization of the draft national environment policy	SEA conducted on the National Environment Policy	National Environment Policy finalized
	Preparation and final launch of implementation strategy for NEP	
PRIORITY AREA 6 **MTEF OBJECTIVE 4: Curb the loss of Biodiversity by the intensification of safe and sound environmental Practices**		
Facilitate the development of a relevant sector Bio diversity Policies	Biodiversity strategy and Action Plan implemented through stakeholder engagement	improvement in Biodiversity conservation for sound environmental management, natural resource management and sustainable development
Promote Research Public Education and awareness on biodiversity and Ecosystem services		
Facilitate the collaboration and harmonization of Biodiversity in related agreements.		
Establish a monitoring mechanism for Biodiversity activities		
Establishment of a steering committee to mainstream biodiversity issues into sector programmes		
PRIORITY AREA 7 **MTEF OBJECTIVE 2:Enhance community participation in environmental and natural resource management including awareness creation**		
Develop initiatives to increase awareness of the conditions of natural resources among local communities.	Well informed local communities on environmental and natural resource management issues	Improvement in biodiversity conservation and protection of natural resources for sustainable development
Develop and Educate information communication and education (ICE materials) as a means to develop community responsibility to manage the environment on a sustainable basis in mining, sand winning, pollution of water bodies and deforestation areas.	Development of ICE materials. Well informed local communities. Ability to manage the environment on a sustainable basis.	
Encourage local communities to develop a sense of stewardship over natural resource by soliciting the support, education and co-operation of local/ traditional leaders and community members to increase local awareness about environmental degradation and management issues	Platform for community participation established to create awareness. Community members gain skills and knowledge necessary to undertake environmental management initiatives Lobbying and negotiation skills of communities well	

	enhanced	
PRIORITY AREA 8 **OBJECTIVE: build institutional capacity within the Ministry for effective service delivery**		
ACTIVITIES	**OUTPUT**	**OUTCOMES**
Training for Environmental and Natural Resource Secretariat	Knowledge and skills required for handling ENRAC issues acquired	Effective service deliverance
Build capacity of MEST staff to assist in the enforcement of laws on sustainable development	Capacity of staff enhanced	Laws on sustainable development enforced
Training in Project management for 20 Project coordinators and deputies handling NREG Project	Enough trained staff to deliver better quality performance.	Quality service delivery to the public achieved
PRIORITY AREA 9 **MTEF OBJECTIVE 3: Strengthen and develop local level capacity to participate in the management and governance of natural resources.**		
Strengthen co-ordination among Metropolitans Municipals and District Assemblies (MMDAs) to enforce planning regulations relevant to the environment	Institutional capacities of MMDAs strengthened to manage natural resources at the district level	Land Use Plans prepared and Development control enhanced in District Assemblies
Establish a community leadership programmes that provides training and education in coastal zone management.	The necessary skills and confidence in coastal community leaders instilled to manage the coastlines.	Clean and well preserved coastline for tourism
Awareness creation on the negative impact of plastic disposal on the environment. Education and training in alternative livelihood Encouraging and supporting prospective investors in aquaculture Engaging stakeholders in Integrated Coastal Zone Management (ICZM) training and planning	Communities sensitized on proper disposal methods for plastic waste. Stakeholders sensitized on the concepts and processes of ICZM.	Clean and well preserved coastline for tourism Improved fisheries resources Improved living standard and poverty reduced ICZM Action points developed and applied
Training in environmental management and evidence base monitoring for NGOs and CBOs in environment.	Well informed NGOs and CBOs acting as watchdog	relevant environmental monitoring skills acquired
PRIORITY AREA 10 **POLICY THRUST :Oil and Gas extraction** **SECTOR OBJECTIVE: Strengthen environmental management as relates to oil and gas sector including building of the institutional and legal framework**.		
Pursue the review of the EPA Act and the development of Regulations for oil and gas operations.	Institutional capacity and legal framework for oil and gas sector strengthened	Ghana oil extraction done in a Clean environment.

Collaborate with institutions and agencies relevant to the oil and gas development to organise consultative meetings with stakeholders on clean oil extraction.	Consultative meetings organised for stakeholders	Stakeholders in the oil industry brought on board the clean environment crusade
PRIORITY AREA 11 **POLICY THRUST: Natural Resource Management** **MTEF OBJECTIVE 2:Use of low carbon growth (LCG) as a specific approach to integrate the link between climate and development**		
Prioritize technical and systematic innovation initiatives in the most pressing areas and those areas with the potential for rapid cost effective results.	10 scientist/engineers/ researchers in the building ,application and management of small/ micro satellites in Ghana trained Satellite Ground Station for Environmental monitoring built at Kuntunse. Symposia on the use of space technology for natural resource management in Ghana organised	Environmental and natural resource management improved in Ghana through the application of space science and technology
Involve a wide range of stakeholders so as to understand and negotiate trade offs and achieve broad consensus for a package of LCG policies for sustainable development	Stake holder consultations organised on LCG policies for sustainable Development	Mainstreaming of LCG policies in sector strategies
Create the knowledge base that would allow the country to enter international negotiation with a clear understanding of the potential for emission abetment, and the financing needs of the country.	CDM secretariat operationalise to promote and monitor greenhouse gas emission reduction	negotiation skills enhanced Public awareness raised on CDM activities (internal and external) CDM project activities approved by host country

8.2.4 Excerpt from National Environmental Policy Matrix, April 2012

POLICY FOCUS	POLICY OBJECTIVE	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES
INSTITUTIONAL AND LEGAL FRAMEWORK	Enhance effectiveness of Institutional and Legislative Framework	• The Environmental Protection Agency (EPA) as a lead institution shall conduct audit and review existing skills, capacities, functions capacities and deployment of resources. • The EPA shall amend outdated legislation and introduce new laws to deal with emerging environmental challenges; • the coordinating role of the Ministry of Environment, Science and Technology (MEST), EPA and NDPC shall be clearly defined, to establish appropriate mechanisms and structures; • The MEST, EPA and other relevant stakeholders shall develop subsidiary policies within the framework of this national policy; • empower the MEST, EPA and NDPC to integrate and coordinate all environmental management functions within and between all MDAs; • charge the MEST and EPA to negotiate and enter into relevant international agreements, ensuring their coordinated requirements; • establish mechanisms including ADR methods and procedures for the resolution of local and international disputes; • Provide avenues for appeals against decisions in all spheres of government. • compliance of existing environmental legislation with the Constitution; • how the results of the audit can be used to develop relevant and effective environmental legislation, norms and standards; • how to conduct regular reviews of the relevance and	MEST, EPA, Attorney General's Dept, NDPC, Ministry of Information, Ghana Maritime Authority, Town and Country Planning Department, Ministry of Local Government and Rural Development, MMDAs Forestry Commission, Ministry of Energy, Energy commission, Ghana Standards Authority, NGOs, CSOs, Parliament, MDAs, LC, MC, Local Govt, Min. of Foreign Affairs, EPA, Parliament, Maritime Authority

POLICY FOCUS	POLICY OBJECTIVE	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES
		appropriateness of all government policies, strategies, plans, legislation and standards that have impacts on the environment in order to update them in line with emerging developments in environmental management; • Domesticating international laws, conventions and protocols on the environment into national laws and regulations. • Consistency of existing environmental legislation with the constitution • How the audit results can be used to develop relevant and effective environmental legislation, norms and standards • To align relevant and appropriate government policies, programmes and plans and their impacts on the environment and strategizing to meet emerging issues. • Domesticate relevant international laws, conventions and protocols on the environment into national laws and regulations	
SUSTAINABLE RESOURCE USE AND MANAGEMENT	Promoting Sustainable Resource Use and Impact Management	• Facilitate equitable access to natural and cultural resources to promote sustainable lifestyle for all citizenry • Promote sustainable use of the natural and cultural resources to enhance sustainable lifestyle of all citizenry • Mainstreaming environmental considerations/issues into National development processes.	EPA, MEST, FC, MC, MOFA, WRC, MoE, TCPD
PARTICIPATION AND COORDINATION	Facilitating Participation and Coordination in Environmental Governance	• establishing multi-sectoral advisory structures (e.g. Inter-Ministerial Committee) in all spheres of government to enable all interested and affected parties to participate in environmental governance; • developing public participation mechanisms (e.g. durbars, town hall meetings) and mechanisms that are fair, transparent, non-political and effective and which will promote the participation of marginalized	EPA, MEST, NCCE, MMDAs, MC, FC, MLNR, NGOs, CSOs, MoFA, GES, GHS MoE ,MoH, LC, GNFS, Wildlife Division, Ghana Maritime Authority, CoM, MoFEP, MLGRD, NDPC, CSIR, Town & Country

POLICY FOCUS	POLICY OBJECTIVE	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES
		sectors of society; • allocating government resources, financial and human, to build institutional capacity at the national, regional, district and local levels for effective management and participation of the marginalized in society; • ensuring that national communication strategies address public participation needs; • Encouraging alliances between government and all interested and affected persons and parties.	Planning, AGs Department, TAs, Academia, Print & Electronic Media, Other relevant institutions
ENVIRONMENTAL EDUCATION, AWARENESS AND COMMUNICATION	Promotion of Environmental Awareness creation and Empowerment	• Education and empowerment of all Ghanaians by increasing their awareness of, and concern for environmental issues • Pursuit of Special programmes to develop the local knowledge systems, skills, values and commitment required to achieve overall sustainable development.	EPA, MEST, NCCE, MMDAs, MC, FC, MLNR, MLGRD, NGOs, CSOs, MoFA, GES, GHS MoE ,MoH, LC, GNFS, Wildlife Division, Ghana Maritime Authority, CoM, MoFEP, NDPC, CSIR Town & Country Planning, AGs Department, TAs, Academia, Print & Electronic Media, Other relevant institutions.
ENVIRONMENTAL INFORMATION MANAGEMENT	Increase access to environmental information	• Resource relevant state and private sector institutions to develop and sustain mechanisms to increase access to environmental information • Develop and improve existing environmental information management systems to supply reliable data and information • conduct an information audit through the Ghana Statistical Service with the aim of developing an effective information management system to meet user needs • establish appropriate environmental indicators which will facilitate informed decision making, measure progress in policy implementation and support public	MEST, EPA, FC, NDPC, GSS, ISD, CSIR, MLGRD, MoFA, Universities and Research Centres, NGOs

POLICY FOCUS	POLICY OBJECTIVE	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES
		participation in environmental governance • strengthen and optimize the capacity of government agencies to collect, analyse and use relevant information for environmental management • disseminate information through formal and informal avenues including the mass media • enjoin the EPA to periodically report on the State of the environment	
INTERNATIONAL COOPERATION	To enhance International Cooperation	• ensure adequate opportunity for consultation with all interested parties before negotiating, entering and implementing international agreements • meet all requirements arising from these international agreements and obligations • cooperate internationally on shared environmental concerns, with particular reference to the ECOWAS Region • ensure that international trade does not lead to wasteful use of natural resources or interfere with their conservation or sustainable use • take appropriate measures to prevent damage to or depletion of stratospheric ozone	MEST, Min. of Foreign Affairs, EPA, Law Enforcement Agencies, Min. of Justice & Attorney General's Dept.

8.2.5 Civil Service Improvement Programme (1995)

Office of the Head of Civil Service (OHCS)

Directorates

To ensure the efficient performance of its core functions as HR managers of the Ghana Civil Service, the OHCS has the following directorates:

RTD: Recruitment, Training and Development Directorate.
PSD: Policies and Standards Directorate
PMD: Performance Management Directorate
RSIM: Research, Statistics and Information Management Directorate
CMD: Career Management Directorate
F&A: Finance and Administration Directorate

Contact Information: www.ohcs.gov.gh/Contacts.html

New Reform Initiatives and the Way Forward

In view of the limited success of previous reforms, new initiatives aimed at further reforming the Ghana Civil Service have been launched to enable the Ghana Civil Service to position itself to deliver the country's governance and development agenda. These include:

- Review of skills mix in the Ghana Civil Service to ensure optimal staffing using approved organisational structure of MDAs
- Re-centralization of training, recruitment, promotion and related budgets to ensure equity, transparency and a uniform standard
- Undertaking accelerated training for Civil Servants especially for the leadership of the Service
- The development of service delivery standards
- Reform and improvement of pay and pensions programme
- Improvement in the condition of work of Civil Servants
- Implementation of a robust performance management system
- Review of the Ghana Civil Service law, rules and regulations/Administrative Instructions and code of conduct
- Using ICT Systems to speed up data handling and communication
- Review and simplification of processes and improvement in the mode and form of storage of files, folders and data
- Inculcation of strong professional code of ethics into the mind-sets of Civil Servants

Vision and Mission

The Vision

A client-oriented human resource management organisation, offering excellent services and supportive leadership

The Mission

The Office of the Head of Civil Service exists to provide dynamic leadership for the efficient management of human resources and the promotion of effective organisational development for the Ghana Civil Service

Core Values

In furtherance of its vision, mission, and corporate image, the OHCS is guided by the following core values:

- Professionalism
- Meritocracy
- Customer sensitivity
- Integrity
- Accountability

8.3 Selected Legislation with Relevance to Environmental Matters

Administration of Land Act, 1962 (Act 123)
Administration of Stool Lands Act 1994 (Act 481)
Administration of Lands (Amendment) Decree 1979 (A. F. R. C. D. 61)
Arbitration Act, 1961 (Act 38)
Concession Ordinance (Cap 136)
Concession (Amendment) Ordinance (Cap 136a)
Concession (Amendment) 1953 (No 11)
Concession (Amendment) Ordinance 1955 (No 21)
Concession (Ashanti) Ordinance (Cap 146)
Control and Prevention of Bush Fires Law, 1990 (P. N. D. C. 229)
Conveyance Decree, 1973 (N. C. R. D. 175)
Courts Act, 1993 (Act 459)
Courts (Amendment) Act 1993 (Act 464)
Environmental Protection Agency Act, 1994 (Act 490)
Farm Land (Protection) Act, 1962 (Act 107)
Forest Improvement Fund Act 1960 (Act 121)
Forest Improvement Fund (Amendment) Act 1962 (Act 121)
Forest Ordinance (Cap 157)
Forest Protection Decree, 1974 (N. R. C. D 243)
Forest Protection (Amendment) Law 1986 (P.N. D. C. L. 142)
Forest Product Inspection Bureau Law, 1985 (P. N. D. C. L. 117)
Forest Fees Regulation, 1976 (L. I. 1089)
Forest Fees (Amendment) Regulation, 1993 (L. I. 1576)
Fisheries Law, 1991 (P. N. D. C. L 256)
Fisheries Commission Act, 1993 (Act 457)
Ghana Water and Sewerage Corporation Act 1965 (Act 310)
Ghana Water and Sewerage Corporation Act 1965 (Amendment) Decree 1968 (N. L. C. D. 247)
Ghana Water and Sewerage Corporation Act 1965 (Amendment) Decree 1969 (N. L. C. D 391)
Irrigation Development Authority Decree, 1977 (S. M. C. D. 85)
Irrigation Development Authority (Amendment) Decree, 1977 (S. M. C. D. 89)
Irrigation Development Authority (Amendment) Decree, 1977 (S. M. C. D. 127)
Irrigation Development Authority Regulation 1897, L. I. 1350
Land Planning and Soil Conservation Ordinance, 1953 (No 32)
Land Planning and Soil Conservation (Amendment) Act 1957
Land Registry Act, 1962 (Act 122)
Land Title Registration Law, 1986 (P. N. D. C. L. 152)
Lands Commission Act, 1994 (Acts 483)
Lands (Miscellaneous Provisions) Act, 1963 (Act 161)
Lands (Statutory Wayleaves) Act. 1963 (Act 186)
Local Government Act, 1993 (Act 462)
Maritime Zones (Delimitation) Law, 1986 (P. N.D. C. L. 159)
Minerals Act and Regulation (Amendment) Decree, 1968 (N. L. C. D. 308)
Minerals Act and Regulation (Amendment) (No 2) Decree, 1968 (N. L. C. D. 315)
Minerals Act and Regulation (Amendment) Decree, 1969 (N. L. C. D. 344)
Minerals Commission Act, 1993 (Act 475)
Mineral Export Duty (Abolition) Law, 1987 (P.N. D. C. L. 182)
Mineral and Mining 1986 (P. N. D. C. L. 153)
Mineral and Mining (Amendment) Act 1994 (Act 475)
Mining Health Areas Ordinance (Cap 150)
Mining Operations (Government Participation) (Repeal) Act, 1993 (Act 465)
Mineral Right, Licences and Certificate (Imposition of Fees) (Consolidated Amendments) Law, 1993 (P.N. D. C. L. 67)
Mineral Rights Regulation (Amendment) Ordinance, 1957 (No 31)
National Development Planning Commission Act, 1994 (Act 479)
National Development Planning (System) Act, 1994 (Act 480)
Office of Administrator of Stool Lands Act, 1994 (Act 481)
Pesticides Control and Management Act, 1996 (Act 528)

Selected Legislation with Relevance to Environmental Matte (continued)

Public Conveyance Act, 1965 (Act 302)
State Lands Acts, 1962 (Act 125)
State Lands Acts, (Amendment) Decree, 1962 (N. L. C. D. 234)
State Lands Acts, (Amendment) Decree, 1974 (N. L. C. D. 307)
State Lands Acts, (Amendment) Decree, 1979 (A. F. R. C. D. 62)
State Lands Acts, (Reversing) Decree, 1979 (S. M. C. D. 227)
Survey Act, 1962 (Act 127)
Survey Act (Amendment) Decree, 1974 (N. L.C. D.283)
Survey (Approval of Plans) Regulation In 1988 (L. I. 144)
Timber Export Development Board Law, 1988 (L. I. 144)
Timber Lands (Protected Areas) Regulation, 1958 (L .I. 311)
Timber Resources Management Act, 1997 (Act 547)
Timber Leases and Licences Regulation, 1962 (L. I. 229)
Towns Ordinance (Cap 86)
Town and Country Planning Act, 1958 (30)
Town and Country Planning (Amendment) Act, 1960 (Act 33)
Town and Country Planning Ordinance (Cap 84)
Tree and Timber Decree, 1974 (N. R. C. 274)
Tree and Timber (Amendment) Act, 1994 (Act 493)
Tree and Timber (Property Marks) Regulations, 1950 (L. I. 19)
Tree and Timber (Control of Cutting) Regulations, 1958 (L. I. 368)
Tree and Timber (Control of Measurement) (Amendment) Regulation, 1976 (L. I. 1090)
Tree and Timber (Control of Export of Logs) Regulation, 1961 (L. I. 130)
Tree and Timber (Chain Saw Operations) Regulation, 1991 (L. I. 1518)
Water Resources Commission Act, 1996 (Act 522)
Wild Animals Preservation Act 1961 (Act 43)
Wildlife Conservation Regulation, 1971 (L. I. 685)
Wildlife Conservation (Amendments Regulations) L. I. 1452
Wildlife Preserve Regulations, 1971 (L. I. 1452)

9 OTHER APPENDICES

9.1 Study Methodology/Work Plan

During the mission, the Team undertook the following:

Document Review
Previous studies, relevant literature and any available environmental performance indicators to assess the state of the environment for the areas listed in the ToR were reviewed.

Consultations
Discussions centred on:

- Environmental policy, legislation, strategies, plans; strengths, weaknesses and effectiveness
- EIA/SEA requirements, environmental auditing, sustainable use and conservation of natural resources, forestry, pollution control and land tenure;
- Provision for public participation in environmental issues, procedures for public participation in development control, environmental planning, and public access to environmental information;
- Institutional framework (structure and responsibilities) roles of national, provincial, local authorities;
- Integration of environmental concerns in other sectors, such as poverty and development, and the main economic sectors, such as fisheries, agriculture, forestry, energy, mining, industry, transportation, and tourism; and,
- Current and planned projects or strategies by other donors or development partners.

Field Visits
A field visit was undertaken to Kakum National Park and a sand mining area along the Cape Coast.

Reporting
The following deliverables were produced:

- Technical Meeting Presentation
- Aide Memoire
- Draft Final Report (following the format provided in ToR)
- Final Report

Indicative Steps
The overall indicative steps in the assignment were:

- Briefing meeting with the EU Delegation in Accra
- Receipt of documents (ongoing throughout)
- Consultations with key stakeholders including relevant NGOs and development partners
- Preparation of the Technical Meeting presentation
- Technical Meeting: preliminary findings, recommendations, seek stakeholders' feedback
- Debriefing with Aide Memoire
- Submittal of Draft Final Report
- Receipt of comments, revision and submittal of Final Report

Key Stakeholder Consultations

A list of key stakeholders and talking points is provided below.

Stakeholder	Talking Points
Ministry of Environment, Science and Technology Environmental Protection Agency Climate Change Unit Ministry of Lands and Natural Resources Fisheries Commission	• Climate Trends, Greenhouse Gas Emissions • Forest, Vegetation, Exploitation, Hunting • Ecosystems, Biodiversity, Wildlife • Landscape • Water Use and Management • Land Use and Management • Agriculture, Fisheries • Regulatory Framework • Institutions with environmental responsibilities • Public Participation • Environmental Services and Infrastructure, Monitoring System
Minerals Commission National Petroleum Authority	• Mining Regulations and Enforcement Registration and regularisation of small scale artisanal mining to address illegality and environmental degradation • Mineral Resources and Geology • Mining, extraction of hydrocarbons • Water Use and Management • Land Use and Management • Energy Production and Use • Urbanisation, Infrastructure and Industry • Waste Disposal and Management • Public Participation, Living Conditions in Human Settlements
Water Resources Commission	• Energy Production and Use • Urbanisation, Infrastructure and Industry • Waste Disposal and Management • Water supply and sanitation • Coastal areas protection and infrastructure management
Land Commission Ministry of Finance and Economic Planning	• Mineral Resources and Geology • Climate Trends, Greenhouse Gas Emissions • Forest, Vegetation, Exploitation, Hunting • Ecosystems, Biodiversity, Wildlife • Mining, extraction of hydrocarbons • Water Use and Management • Land Use and Management • Agriculture, Fisheries • Energy Production and Use • Urbanisation, Infrastructure and Industry • Waste Disposal and Management
CARE International Forest Watch KASA Initiative	• Mineral Resources and Geology • Forest, Vegetation, Exploitation, Hunting • Ecosystems, Biodiversity, Wildlife • Landscape, Living Conditions in Human Settlements • Mining, extraction of hydrocarbons • Water Use and Management • Land Use and Management • Agriculture, Livestock, Fisheries • Energy Production and Use, Urbanisation, Infrastructure, Industry • Waste Disposal and Management • Public Participation
EU Delegation Embassy of the Kingdom of the Netherlands French Development Agency High Commission of Canada Canadian International Development Agency Royal Norwegian Embassy Embassy of Switzerland	• Ongoing programmes and projects, future programmes and projects • Extent of co-ordination • Declines in economic production or productivity • Threats to human health; exposure to environmental disasters • Conflicts and security issues • Poverty, differentiated impact on women/men, vulnerable groups (including children and indigenous peoples) • Sustainability of resource use

The following schedule was based on the ToR and indicates the timing of activities and milestones

Activity	Description
Travel to Ghana	Senior Expert (Team Leader)
Briefing at EU Delegation	▪ Discussed requirements and expectations in detail ▪ Discussed methodology and work plan ▪ Established common understanding ▪ Clarified open issues (e.g. date of technical meeting and invitations, extent of field visits)
Desk Review Developed list of key stakeholders to be consulted	▪ Reviewed relevant literature, evaluation reports, environmental policy and legislation framework, legislation, regulations, enforcement relating to environmental issues, action plans and progress and so on ▪ Reviewed reference documents ▪ Completed list of key stakeholders
Consultations with key stakeholders	▪ Preliminary discussions with selection of national and local authorities, communities/CBOs/NGOs, donors, non-state actors, development partners and other stakeholders ▪ In-depth consultations with selected key stakeholders ▪ Receipt of further documents
Fieldwork	▪ Kakum National Park and Cape Coast
Preparation for and delivery of Technical Meeting	▪ Presentation of Aide Memoire ▪ Presentation of the key findings, including recommendations ▪ Obtained stakeholders' opinions and feedback
Preparation of Aide Memoire and De-Briefing	▪ Presentation of the key findings, including recommendations ▪ De-Briefing at EU Delegation
Travel from Ghana	Senior Expert (Team Leader) departs

9.2 Consultants' Itinerary

DATE	ACTIVITY	COMMENT/ORGANISATIONS MET
29 Jul	Travel	Team Leader travels to Ghana
30 Jul	Meetings Desk	EU Delegation to Ghana, MOFEP, Forestry Commission, CARE (for Forest Watch), Tropenbos International Arranging meetings Document receipt and review
31 Jul	Meetings Desk	EPA Arranging meetings Document receipt and review
1 Aug	Meetings	MOFEP, MEST, Forestry Commission, Kasa Ghana, Care International in Ghana, Religious Bodies Network on Climate Change
2 Aug	Meetings	Minerals Commission, EU Delegation, MLNR, EPA, Energy Commission, National Petroleum Authority
3 Aug	Meetings Desk	Embassy of the Kingdom of the Netherlands Arranging meetings Document receipt and review
4 Aug	Field Work	Kakum National Park and Cape Coast
5 Aug	Desk	Document receipt and review
6 Aug	Meetings Desk	Royal Norwegian Embassy French Development Agency Biological Filters and Composters Limited, TREND
7 Aug	Meetings Desk	World Bank, Water Resources Commission, Fisheries Commission, UNDP Document receipt and review
8 Aug	Meetings Tech. Meeting	CIDA, High Commission of Canada Venue Arrangements
9 Aug	Desk	Document receipt and review
10 Aug	Desk	Document receipt and review
11 Aug	Desk	Document receipt and review/drafting
12 Aug	Desk	Document receipt and review/ drafting
13 Aug	Desk	Drafting/Preparation of Aide Memoire/Preparation for Tech. Meeting
14 Aug	Meetings Tech. Meeting	Embassy of Switzerland, EU Delegation, Fisheries Commission, Land Commission, MOFEP (NREG) EUD Transport Study Consultants Venue Arrangements
15 Aug	Desk	Drafting/Preparation of Aide Memoire/Preparation for Tech. Meeting
16 Aug	Desk	Drafting/Preparation of Aide Memoire/Preparation for Tech. Meeting
17 Aug	Desk	Drafting/Preparation of Aide Memoire/Preparation for Tech. Meeting
18 Aug	Tech. Meeting	Preparation of Aide Memoire/Preparation for Technical Meeting
19 Aug	Tech. Meeting	Preparation of Aide Memoire/Submittal of Aide Memoire
20 Aug	Meeting	EUD: Review of Aide Memoire
21 Aug	Tech. Meeting	Presentation and discussion of findings
22 Aug	De-Briefing Departure	EU Delegation to Ghana/Presentation of Conclusions & Recommendations; Team Leader departs Ghana

9.3 Persons/Organisations Contacted/Consulted

NAME	ORGANISATION	FUNCTION	EMAIL
EU Delegation			
Bart Missinne	European Union Delegation to Ghana	1st Secretary	bart.missinne@eeas.europa.eu
Herve Delsol	European Union Delegation to Ghana	Progr. Officer, Infrastructure & Sustainable Development	herve.delsol@eeas.europa.eu
Government			
Joseph K. Essandoh-Yeddu	Energy Commission	Chief (Strategic Planning and Policy)	essandohyj@energycom.gov.gh
Christina Asare	Environmental Protection Agency	Chief Programme Officer	christina.asare@yahoo.com
Daniel S. Amlalol	Environmental Protection Agency	Ag. Executive Director	damlalo@yahoo.co.uk
Boadi Kyekyeku Yaw Oppong	Environmental Protection Agency	Chief Programme Officer (EPA) & Nat. Focal Point	koppongboadi@yahoo.com
Emmanuel Tachie-Obeng	Environmental Protection Agency	Senior Programme Officer	Etachieobeng@gmail.com
AmoahAntwi-Boasiako	Environmental Protection Agency	Senior Programme Officer	aantwib@gmail.com
Winfred A. Nelson	Environmental Protection Agency	Project Manager	winfrednelson@yahoo.co.uk
Daniel Tutu Benefor	Environmental Protection Agency	Climate Change Unit	daniel.benefor@epa.gov.gh
John Boateng Addae	Environmental Protection Agency	Principal Programme Officer	addboat@yahoo.com
Afua Prempeh	Environmental Protection Agency	Programme Officer	akotoprempeh@gmail.com
Samuel Quatey	Fisheries Commission	Executive Director	samquaaley@yahoo.com
Nemorius N. Peng-yir	Fisheries Commission	Deputy Director ~ Admin	npengyir@yahoo.com
Moses Rofi Sam	Forestry Commission	Regional Manager (Wildlife Div)	osmo288@yahoo.com
Oppon Sasu	Forestry Commission	Head, Donor Relations/Projects	sasuoppon@yahoo.com
Dr Wilfred Anim-Odame	Lands Commission	Acting Executive Secretary	animodame@hotmail.com
Jerry Ahadjie	Minerals Commission	Principal Sectoral Policy Planning Officer	jahadjie@gmail.com
Franklin Ferdinand Ashiadey	Ministry of Finance and Economic Planning	Principal Economist, Coordinator NREG/GHEITI	fashiadey@yahoo.com
Kipo Cosmos Iddrisu	Ministry of Finance and Economic Planning	Desk Officer, NAO	ckipo@mofep.gov.gh
Benedicta Agbano	Ministry of Finance and Economic Planning	Project Officer, NAO	benenya2003@yahoo.com
Salimata Abdul-Salam	Ministry of Environment, Science and Technology	Chief Director	n/a
K A Tabi	Ministry of Environment, Science and Technology	Director, Res. Stats, Info, Management	kwasitabi@yahoo.com
Fredua Agyeman	Ministry of Environment, Science and Technology	Director, Environment	Kwame.freduaboakye@gmail.com
Nicholas K. Iddi	Ministry of Environment, Science and Technology	National Project Coordinator	nicho2007@hotmail.com
Mathew Ababio	Ministry of Land and Natural Resources	Director, Policy Planning M & E	ababmath@gmail.com
Tabi Agyarko	Ministry of Land and Natural Resources	Principal Programme Officer	Tabimnf16@yahoo.com
Johannes Agordjo	Ministry of Land and Natural Resources	Financial Controller	n/a
Esther Anku	National Petroleum Authority	Chief Inspector/Director	eanku@npa.gov.gh

NAME	ORGANISATION	FUNCTION	EMAIL
Adwoa Paintsil	Water Resources Commission	Water Quality Specialist	himapaintsil@yahoo.com
Development Partners			
Loree Semeluk	High Commission of Canada	2nd Secretary –Development	Loree.Semeluk@international.gc.ca
Romeo Adomah-Darteh	Canadian International Development Agency	Senior Environmental Analyst/Adviser	romeo.darteh@psu-ghana.org
Ton Van Der Zon	Embassy of the Kingdom of the Netherlands	1st Sec. Env & Water Advisor	ton-vander.zon@minbuza.nl
Seth Adjei Boye	Embassy of Switzerland in Ghana	Infrastructure Specialist	seth.adjaiboye@eda.admin.ch
Atse Yapi	FAO	Environment	Atse.Yapi@fao.org
Florent Clair	French Development Agency	Project Officer	clairf@afd.fr
Konlansamson	JICA	Environment	konlansamson.gn@jica.go.jp
Reidar Grevskott	Royal Norwegian Embassy	Counsellor for Env and CLIMATE CHANGE	reidar.grevskottmfa.no
Brigitte Cuendet	Swiss Economic Development Cooperation	Environment	Brigitte.cuendet@eda.admin.ch
Joseph Appiah-Gyapong	UNDP	Programme Specialist (Env. Energy & Climate Change)	Joseph.Appiah-Gyapong@undp.org
Jeremais Blaser	UNDP	Senior Programme Specialist	jeremias.blaser@undp.org;
Nino Nadiradze	USAID	Senior Environmental Specialist	nnadiradze@usaid.gov
Justice Odoi	USAID	Environmental Specialist	jodoi@usaid.gov
Flavio Chaves	World Bank	NRM Specialist	fchaves@worldbank.org
Non-Governmental Organisations			
M. Baba Tuahiru	Care International in Ghana	Advocacy & Strategic Partnership Manager	baba.tuahiru@co.care.org
Albert Katako	CARE (for Forest Watch)	Programme Coordinator	albert.katako@co.care.org
Zakaria Yakubu	KASA Ghana	Programme Coordinator	yakubu.zakaria@co.care.org
Alhassan Zariatu	KASA Ghana	Project Manager	alhassan.zariatu@co.care.org
Charles Agboku	Religious Bodies Network on Climate Change	Coordinator	relbonet@gmail.com
Eugene Larbi	Training Research and Networking for Development	Managing Director	eugenelarbi@yahoo.co.uk
K. S. Nketiah	TROPENBOS INTERNATIONAL	Programme Director	ksnketiah@yahoo.com
Academia			
Prof Chris Gordon	University of Ghana	Institute of Environment and Sanitation	cgordon@ug.edu.gh
Private Sector			
Kweku A. Anno	Biological Filters and Composters Ltd.	Director	kaannoeng@yahoo.com
Ben Idun	Elmina Bay Resort	Director	elminabayresort@gmail.com
Consultants			
Clare Brogan	IDL Group	Consultant	clare.brogan@theidlgroup.com
Mike Head	Euronet Consulting	Consultant	mikehead7@gmail.com

9.4 Documentation Consulted

YEAR	ORGANISATION	TITLE
European Union		
2003		Protected Area Development Programme (PADP) Phase II TAPs
2003		Protected Area Development Programme (PADP) Phase II Annexes
2006		Country Environmental Profile of Ghana
2008		Country Strategy Paper and National Indicative Programme
2009		Joint Annual Report EU – Ghana Cooperation
2009		Implementation of the Africa-EU Joint Strategy & Action Plan Partnership on the Millennium Development Goals
2009		FLEGT Voluntary Partnership Agreement between Ghana and the European Union: Briefing Note
2010		NREG Base Tranche
2011		Africa-EU Joint Strategy & Action Plan 2011-13
2011		EU Agenda for Change
2011		NREG Performance Tranche
2010		Final Evaluation Mining Sector Support Programme(MSSP)
2012		Ghana Climate Change Profile
2012		Aide Memoire: Fourth Mission of the Joint Monitoring and Review Mechanism
2012		Preparation of Transport Sector Research Strategy, Climate Change Strategy and Costed Implementation Plan, Ghana: MoM Initial Briefing
2012		Preparation of Transport Sector Research Strategy, Climate Change Strategy and Costed Implementation Plan, Ghana: Draft Inception Report
2012		Preparation of Transport Sector Research Strategy, Climate Change Strategy and Costed Implementation Plan, Ghana: Draft Analysis Report
Government of Ghana		
1989		Small-Scale Gold Mining Act
2006		Mineral and Mining Act
2006	Energy Commission	Strategic National Energy Plan: 2006 - 2020
2006	Energy Commission	Strategic National Energy Plan: Energy Demand ~ Sectors
2006	Energy Commission	Strategic National Energy Plan: Energy Supply ~ Petroleum
2006	Energy Commission	Strategic National Energy Plan: Energy Supply ~ Electricity
2006	Energy Commission	Strategic National Energy Plan: Energy Supply ~ Wood and Renewables
2009	Energy Commission	Medium Term Energy Sector Strategy and Development (2009-20015)
2010	Energy Commission	Draft: Bioenergy Policy for Ghana
2011	Energy Commission	Work Programme 2012
2012	Energy Commission	2012 Energy (Supply and Demand) Outlook for Ghana

YEAR	ORGANISATION	TITLE
2012	Energy Commission	Sustainable Energy for All Country Action Plan to 2030
2008	EPA	Mining Sector Support Programme National : EIA & SEA Project –SEA Report
2008	EPA	Mining Sector Support Programme National : EIA & SEA Project : EIA Report
2011	EPA	National Greenhouse Gas Inventory Report for 1990 – 2006 Volume 1: Synthesis Report
2011	EPA	Second National Communication to the UNFCCC
2012	EPA	New Institutional Design for Building Domestic MRV for Climate Change Mitigation Actions in Ghana (National System for Greenhouse Gas Inventory)
2012	EPA	Third National Communication to the UNFCCC Work Plan
2012	EPA	Climate Change Adaptation, Mitigation and Information and Communication Technologies: the case of Ghana
2012	EPA	NREG –EPA Status Report
2012	EPA	EPA Medium Term Expenditure Framework (MTEF)
2012	EPA	Climate Change Activities
2009	Forestry Commission	Letter concerning GSBA swaps
2010	Forestry Commission	Readiness Preparation Proposal
2011	Forestry Commission	Environmental and Natural Resources: Annual Sector Review Summit Report 2011 (with Minerals Commission and EPA)
2003	MEST	Ghana: Climate Change; Technology Needs Assessment
2009	MEST	National Environmental, Economic and Development Study (NEEDS) for Climate Change:
2010	MEST	NAMAs submission to UNFCCC
2011	MEST	Response to Questionnaire on Implementation of Sustainable Development Agenda, Submittal to UN Commission on Sustainable Development
2011	MEST	National Climate Change Adaptation Strategy (NCCAS)
2012	MEST	National Environmental Policy Draft
2012	MEST	NREG Budget Integrated into the MTEF Sector Budget
2010	MoEn	National Energy Policy
2010	MoEn	Energy Sector Strategy and Development Plan
2010	MLNR	Environmental and Natural Resources Annual Sector Review 2010
2011	MLNR	Environmental and Natural Resources Annual Sector Review Summit, 2011
2012	MLNR	Medium Term Expenditure Framework (MTEF) 2012-2014
2012	MLNR	Ghana Forest Investment Programme
2009	MOFA	Food and Agriculture Sector Development Policy (FASDEEP II)
2010	MOFA	Medium Term Agriculture Sector Investment Plan (METASIP), 2011-2015
2010	MOFA	Agriculture in Ghana: Facts and Figures 2009
2011	MOFA	Agriculture in Ghana: Facts and Figures 2010
2010	MOFEP	Integrated Transport Plan for Ghana Volume 1: Transport Plan 2011-2015
2007	MWRWH	National Water Policy
2010	NCCC	Ghana Goes for Green Growth: National Engagement on Climate Change

YEAR	ORGANISATION	TITLE
2010	NCCC	Climate Change Activities Matrix
2011	NCCC	Diagnostic on Climate Change and Development Research in Ghana
2010	NDPC	Report on Ghana's Mining Sector for the 18th Session of the UN Commission on Sustainable Development
2010	NDPC	Medium Term National Development Policy Framework: Ghana Shared Growth and Development Agenda, 2010 – 2013. Vol.1: Policy Framework
2010	NDPC	GHANA Millennium Development Goals Report
2011	NDPC	GSGDA: Annual Progress Report
2012	NDPC	Achieving the MDGs with Equity in Ghana: Unmasking the issues behind the averages
2010	SADA	A Sustainable Development Initiative for Northern Savannah, Strategy and Work Plan (2010 – 2013)
Development Partners		
2012	Anon	DP Inflows and Matching Fund Requirements for 2012
undated	AFD	Capacity Building for the Assessment and Monitoring of the Costs of Environmental Degradation in Ghana: ToR
undated	AFD	Capacity Building for the Assessment and Monitoring of the Costs of Environmental Degradation in Ghana
2010	AFD	Conference on Lessons Learnt from Support Programmes to Smallholders
2012	AFD	Programme for the Promotion of Perennial Crops in Ghana
2012	AFD	Rubber Outgrowers Plantation Project - Phase IV
2005	DANIDA	Strategic National Energy Plan 2005 - 2020
2010	DFID/Netherlands	Policy Briefing: Low Carbon Growth for Ghana
2011	DFID/Netherlands	NAMAs and the Ghana Shared Growth and Development Agenda 2010-2013
2011	DFID/DEFRA/DECC	Ghana Climate Change Programme: UK International Climate Fund – Approved Concept for Circulation
2011	DFID	Climate Change and Environmental Governance Support to Ghana in 2011/12 ToR
2012	DFID	Operational Plan 2011-2015
2012	DFID	Agenda for Climate Change Sub Working Group
2012	DFID	"Fixing the wheel for tomorrow's generation" Parliamentarians Examine Climate Change with the UK
2012	DFID	Migration and Global Environmental Change Workshop, 19th-20th March
2012	DFID	Informal Note on Forming a Climate Change Sub Group of ENR Sector Working Group
2010	ERCN (Netherlands)	Policy Brief: Low Carbon Growth for Ghana
2011	ERCN	Policy Brief: NAMAs and the Ghana Shared Growth and Development Agenda 2010 – 2013
2011	ENR Sector WG	MoM: Review of Sector
2002	IFAD	Environment and Natural Resource Management
2008	JICA	Participatory Forest Resource Management Project
2009	JICA	Project for Sustainable Development of Rain-Fed Lowland Rice Production in the Republic of Ghana
2012	Netherlands	Ghana: Scoping Mission
2009	NORAD	Clean Energy for Development
2012	Swiss Econ Coop	Ghana Country Strategy 2009-12

YEAR	ORGANISATION	TITLE
2011	USAID	Ghana Climate Change Vulnerability and Adaptation Assessment
2011	UNDAF	UNDAF Action Plan, Republic of Ghana 2012-2016
2005	UNDP	Ghana's National Capacity Self-Assessment Report: Capacity needs for Global Environmental Management
2012	UNDP	Ghana Cooperation Programme 2012
2003	UNFCCC	Ghana's Climate Change Technology Needs and Needs Assessment Report
2011	UNFCCC	The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention
2009	USAID	Integrated Coastal and Fisheries Governance (2009-2013)
2010	USAID	Our Coast - Western Ghana: Building Capacity for Adapting to a Rapidly Changing Coastal Zone
2011	USAID	Climate Change Vulnerability and Adaptation Assessment
2006	World Bank	Ghana Country Environmental Analysis
2009	World Bank	Ghana Economics of Adaptation to Climate Change
2010	World Bank	Economics of Adaptation to Climate Change
2011	World Bank	Natural Resources and Environmental Governance (3rd Operational Plan)
2011	WFP	Northern Ghana Food Security Bulletin
Research		
2001	KITE	Implementation of Renewable Energy Technologies – Opportunities and Barriers
2012	University of Ghana	Green Economy Scoping Study (Institute of Statistical, Social and Economic Research)
Non-Governmental Organisations		
Undated	Anon	3rd CSOs Annual NRE Sector Review Process
Undated	CEIA	Effects of Oil and Gas Exploration at the Jubilee Field on Water Quality in Oil Rich Coastal Communities in the Western Region, Ghana.
2011	CARE	Governance Initiative for Rights and Accountability in Forest Management: Proposals, Reports and Annexes
2010	Conservation Alliance	Establishment of Baseline & Potential Effects of Oil & Gas Exploration on Flora & Fauna in the Jomoro, Ellembelle and Nzema East Districts
2009	Forest Watch	GSBA Swaps for Logging (letter)
2008	IIED	Developing Legal Tools for Citizen Empowerment: Social Responsibility Agreements in Ghana's Forestry Sector
2012	IIED	Policy Briefing: Preparing Parliament for the Climate Challenge in Ghana
2011	KASA	2nd CSO Annual Review of ENR Governance in Ghana: Poverty Reduction through Civil Society Advocacy in ENR Governance in Ghana
2009	SYND	Policy Brief: National Environmental Policy
2009	Tropenbos	Thematic Programme for Environment and Sustainable Management of Natural Resources, including Energy: Proposals
Miscellaneous		
2008	Anon	Accra Agenda for Action
2009	Wuppertal Institute	Transport in Developing Countries and Climate Policy: Suggestions for a Copenhagen Agreement and Beyond
2010	Paris Declaration	Update
2012	Economist	Cost of Environmental Degradation in Ghana
2009	Ghana Gazette	FLEGT and VPA Special Edition

YEAR	ORGANISATION	TITLE
2011	MCM Associates	Synthesis of Government of Ghana and Development Partner Strategies, Plans, Sector and DP Engagement
2012	Ospina *et al*	Climate Change Adaptation, Mitigation and Information and Communication Technologies: the case of Ghana
Private Sector		
2011	Anon	2010 Population and Housing Census
2008	Energy Changes	Combined Margin Emission Factor of Ghana's Electric Power System; UNFCCC "Tool to calculate the emission factor for an electricity system"
2011	ECOECON Consult	Draft National Assessment Report on Achievement of Sustainable Development Goals and Target for Rio +20 Conferences submitted to MEST
2011	GRIDCO	Generation Master Plan Study for Ghana
Presentations		
2010	MDBS Communication Group	Multi-Donor Budget Support Principles and Processes: Introduction
2010		Multi-Donor Budget Support Principles and Processes: Part 2
2012	FARA	System-wise Practical Solutions for Adaptation to Climate Change in Sub Saharan Africa: Orientations for Partnerships
2012	EU	EU Transport Sector Research Strategy and Climate Change Strategy: Stakeholder Meeting Recommendations

9.5 Consultants' *Curricula vitae*

9.5.1 Richard Pagett

1. **Family name:** PAGETT
2. **First names:** Richard
3. **Date of birth:** 26 February 1953
4. **Nationality:** British
5. **Education:**

Institution [Date from - Date to]	Degree(s) or Diploma(s) obtained:
University of London 1975 - 1978	Ph.D. [*Ecology, Chemistry and Physiology*]
University of London 1972 - 1975	BSc (Hons) Zoology, Upper Second

6. **Language skills:** Indicate competence on a scale of 1 to 5 (1 - excellent; 5 - basic)

Language	Reading	Speaking	Writing
English (mother tongue)	1	1	1
French	3	4	4
Russian	4	4	4
Arabic	5	4	5

7. **Membership of professional bodies:**
   Environmental Auditors Registration Association: *Registered Environmental Auditor*
   Chartered Institution of Water and Environmental Management: *Chartered Scientist (CSci)*
   Chartered Environmentalist (CEnv)
   Institute of Biology: *Chartered Biologist (CBiol)*
   Society for the Environment: *Approved Auditor*
   Science Council: *Approved Auditor*
8. **Other skills:**
   Computer Literacy: *Office Suite (Word, Excel, PowerPoint, Publisher, Access, Front Page) HTML*
   Technical Courses: *University of Bradford (1988): Flow and Water Quality Modelling*
   WS Atkins (1993): Internal Quality Auditing; Det Norske Veritas (1997): Certification of EMS
   Administration: *Established two environmental divisions in corporate consultancies (1990 and 1992)*
   Established a renewable energy company (2007); Established carbon offset scheme (2007)
9. **Present position:** Independent
10. **Years within the firm:** 30+: Corporate (15) Independent (15+)
11. **Key qualifications:**
    - **BSc and PhD (ecology, natural resources, chemistry, geology) with special reference to the region** since 1992 including reviews of governance, institutions, policies, environmental legislation, and environmental monitoring
    - **12 years of specific experience in west Africa** environmental and biodiversity issues, including institutional aspects, socio-economic aspects, environmental policies and management natural resource management, renewable energy, environmental impact assessment and strategic environmental assessment techniques and experience in rapidly assessing information and developing recommendations
    - **Briefed main line ministries on climate change (climate change seminar, Ghana)** and due to **facilitate two-day workshop in Accra (in October) for the Africa Task Force of the International Federation of Surveyors** on Sustainable Land Management, Climate and Future Scenarios
    - **Proven knowledge and experience of EC Project Cycle Management** approach to project design and implementation; with assignments in all aspects including: project fiche development, drafting of ToRs, **project formulation and financing, log-frames, monitoring and mid-term and post- project evaluation, Country Environmental Profiles (Guyana, Uganda 2005 and 2010 updated for climate change)** Country Strategy Papers, and an Regional Environmental Profile (Asia) including specific experience, via several assignments, of 7th, 8th, 9th and 10th EDF and funding modalities (project and budget support, and variations; targeted, earmarked *etc*)
    - **Experienced in** participatory planning, consideration of gender, HIV/AIDS, environmental mainstreaming
    - **Drafted the new EC guidance on integrating climate change into CEPs and CSPs**
    - **Have reviewed dozens of CEPs during many years of development cooperation technical assistance**
    - **Familiar with** REDD+ and FLEGT and have developed agro-forestry, community-based schemes in adjacent Burkina Faso and Senegal. **Familiar with sub-Saharan Africa (rural development, agriculture and forestry projects in several countries)** Extensive experience of extractive industries generally, **including mining (especially in Liberia) and currently environmental advisor to the Kazakhstan Mining Sector (assessing sector master plan); and addressed mining sector in CEP for Guyana. Direct tropical forest experience** in several countries including: Belize, Brazil, Dominica, Guyana, Madagascar **Extensive technical assistance provided to institutions within many host government ministries**
12. **Regional Experience:** Algeria, Benin, Botswana, Burkina Faso, Ethiopia, Ghana, Kenya, Liberia, Libya, Madagascar, Malawi, Mauritania, Mauritius, Morocco, Namibia, Nigeria, Senegal, South Africa, Tanzania, Uganda

9.5.2 Philip Acquah

1. **Family name:** ACQUAH
2. **First names:** PHILIP
3. **Date of Birth** 28 December 1952
4. **Citizenship:** Ghana
5. **Education:**

Institution ((Date from - Date to)	Degree(s) or Diploma(s) obtained:
Royal Melbourne Institute of Technology (RMIT), Australia, 2000 - 2001	**Master in Engineering (M.Eng.)**
University of Science & Technology, Kumasi. Ghana, 1973 - 1977	**BSc. Chemical Engineering** (process control, mineral processing, petroleum technology)
United Nations Industrial Organisation (UNIDO). Vienna. Austria, 2004	**Cleaner Production** for Directors of National Cleaner Production Centres (NCPCs) in Africa, Asia-Pacific, and Eastern Europe and South America
Environment Protection Authority, Victoria, Australia, 2001 - 2002	Attachment to the Business Sustainability Division on policy development and **business approach to environmental management**
Environment Protection Authority (EPA) Melbourne, Australia, 1998	**Environmental Monitoring, Assessment, and Compliance and Enforcement Course**
Air Pollution Control Technologies (APCT), at Environmental Testing Services (ETS), Ronoake, South Carolina. USA, 1996	Investigation, monitoring, assessment and permitting; and **clean technologies, pollution prevention and control** in the utility (energy) industry sector
University of Bradford Development and Project Planning Centre at GIMPA, 1994	General and Project Management
Ghana Institute of Management and Public Administration (GIMPA), 1988	Project Planning and Management

6. **Language skills:** Indicate competence on a scale of 1 to 5 (1 - excellent; 5 - basic)

Language	Reading	Speaking	Writing
English	1	1	1

7. **Key qualifications:** (Relevant to the project)
   - Environmental Expert with specific experience in **environment policy development**, **national communication, greenhouse gas emissions inventory, Climate Change mitigation and adaptation policy dialogues, dissemination and policy dialogue in Ghana**
   - International Expert in **Environment Policy analysis**, **policy dialogues**, and dissemination of **sectoral policies and measures (PaMs) in climate change mitigation and adaptation strategies** of Reports of Demonstrable Progress of Annex 1 Parties to the UNFCCC and the Kyoto Protocol
   - Member of UNFCCC roster of experts in the review of **national communications, national greenhouse gas inventories**, reports of demonstrable progress of Annex 1 Parties (review of policy and measures to respond to CC) and review of national communication of Non-Annex 1 Parties to the Convention and the Kyoto Protocol.
   - Experience in the preparation of **Environmental Impact Assessments (EIA)**
   - Longstanding experience in the **preparation and implementation of development projects in Ghana**
   - Several years of professional experience in an **institutional environment in Ghana**, especially in close cooperation with **Ministry of Environment, Science and Technology** and the **Environmental Protection Agency**
   - **Former Director of the Environmental Protection Agency** responsible for environmental management in industry including inspection, investigation, compliance promotion and enforcement, compliance network.
   - Profound knowledge of **environmental and climate change issues in Ghana** and experience with **environmental and climate change analyses** in the country.
   - Familiar with **participatory planning processes** and **gender issues**.
   - Hands-on **training in environmental policy development and business sustainability in mining and industry** in the Environment Protection Authority, Victoria, Australia (EPAV)
   - National Consultant of the World Bank Country Studies in "**Economics of Adaptation to Climate Change**" for 5 African Countries, 2009 – 2010
   - National consultant, UNEP **project development for** "**Mainstreaming Climate Change adaptation in Ghana's Poverty Reduction Strategy (GPRS)**"
   - Longstanding experience in **ca**pacity building including Regional experts in Africa, South America and the Caribbean, Asia-Pacific in national greenhouse gas inventories and Non-annex Parties to the UNFCCC

9.6 Technical Meeting Attendance

NAME	ORGANISATION	FUNCTION	EMAIL
Bart Missinne	European Union Delegation to Ghana	1st Secretary	bart.missinne@eeas.europa.eu
Herve Delsol	European Union Delegation to Ghana	Progr. Officer, Infrastructure & Sustainable Development	herve.delsol@eeas.europa.eu
Eric Ofori-Nyarkodu	Energy Commission	On behalf of Chief (Strategic Planning and Policy)	Ofori-nyarko@energycom.gov.gh
Wilfred Anim-Odame	Lands Commission	Acting Executive Secretary	animodame@hotmail.com
Jerry Ahadjie	Minerals Commission	Principal Sectoral Policy Planning Officer	jahadjie@gmail.com
Moses Kofi Sam	Forestry Commission	Regional Manager (Wildlife Div)	osmo288@yahoo.com
Oppon Sasu	Forestry Commission	Head, Donor Relations/Projects	sasuoppon@yahoo.com
Daniel S. Amlalol	EPA	Ag. Executive Director	Daniel.amlalo@epa.gov.gh
AmoahAntwi-Boasiako	EPA	Senior Programme Officer	aantwib@gmail.com
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9.7 Terms of Reference

SPECIFIC TERMS OF REFERENCE FOR THE PREPARATION OF THE COUNTRY ENVIRONMENTAL PROFILE OF THE REPUBLIC OF GHANA
FWC BENEFICIARIES 2009
LOT N° 06: ENVIRONMENT
EuropeAid/ 127054/C/SER/multi
REQUEST N°: 2012/295-545 Version 1

1. Background Information

1.1 Beneficiary country

Republic of Ghana

1.2 Contracting Authority

The European Union on behalf of the Government of Ghana

1.3 Relevant Country background

Ghana is endowed with abundant natural resources, which have played a very important role in the agricultural and industrial development efforts of the country and its economic growth partly relies on services delivered by the agriculture, forestry, mining and energy sectors. However, as a result of over exploitation of these natural resources to meet certain socioeconomic aspirations, irreparable damage has been made to productive lands by deforestation, air and water pollution, desertification, overgrazing, and destruction of biodiversity that have made the country vulnerable to environmental degradation and increasing climate variability and change .

The fast growing population and intra-urban and rural migrations are presently exerting immense pressure on national resources, as well as creating waste management and sanitation problems in the major towns and cities. They also create challenges in accessing basic services and reflect weaknesses in employment opportunities and livelihood strategies.

National Environmental Outlook

Land degradation has been identified as one of the key environmental problems facing the country, resulting in declining productivity of the land in the face of mounting population pressure. This is particularly marked in the north but irreversible land use change is also locking in new patterns of vulnerability in growth poles in urban areas and in the Western Region. Ensuring that activities of new regional development authorities and growth corridors do not entrench patterns of vulnerability and inequity will be challenging.

There is also rapid loss of biological diversity and wildlife populations. Forests are threatened by cocoa farming, mining activities, and an under-regulated wood industry, particularly for the domestic market where chain-saw milling is the main source of supply. Soil fertility is threatened by erosion resulting from deforestation and bad agricultural practices; wetlands are threatened by deforestation and river and coastal pollution; fresh water resources are threatened by land degradation and desertification; the marine resources are threatened by over-fishing.

Many efforts have been made in the past to address environmental issues, including the ratification of a number of international conventions related to the environment and these have resulted in some limited success. However, few have had domesticated legislation and most efforts have been handled on "project-approach" basis with little sustainability. Indeed a

marked feature of Ghana is that repeated analyses highlight the same issues – lack of implementation of existing policies, poor data, weak monitoring and evaluation, limited financial resources (particularly in terms of allocation of resources and targeting of efforts beyond staff emoluments), limited capacity, weak institutions and limited inter-sectoral coordination. Experience in the past five years suggests that even intra-sectoral and intra-institutional coordination is challenged by high degrees of fragmentation in effort and overstretched absorptive capacity. Accountability for delivery appears to be a particular issue.

National Environmental Policies

Ghana's New Medium-Term Development Policy Framework for the period 2010-2013 - **the Ghana Shared Growth and Development Agenda** - has been adopted to provide a comprehensive solution and address the interlinked sectors of natural resources, environment and climate change. This includes dedicated attention to climate change for the first time in the national development plan but many of the proposed responses on natural resources and the environment are continuations of previous measures under the Ghana Poverty Reduction Strategy (GPRS) I and II.

Since 2010, Ghana has developed its National Climate Change Policy Framework (NCCPF) ensuring the basis for a climate resilient economy and promoting sustainable development through low carbon economic growth and effective social development. In 2010, the country produced a strategic document entitled *"Ghana Goes for Green Growth"* with the aim to further explore the needs to address low carbon growth, adaptation and social dimension of climate change. This is due to be finalised in 2012.

EC co-operation experience on the major environmental concerns and responses by the Government and/or other donors, the interest of the EC in integrating the environment in the CSP and the current timetable with respect to the Programming process

Under the 10th EDF and in the Ghana Country Strategy Paper (CSP) and National Indicative Programme (NIP) 2008-2013, the EC in conjunction with 4 other development partners have been providing sector budget support under the Natural Resources and Environmental Governance Programme (NREG) to address the environmental and natural resource concerns identified above. The EU has made available the amount of EUR 8.0 million (2 % of the total NIP) to address the challenges above in addition to those in the natural resources sector with the view to improve the management and governance of natural resources so as to contribute to growth and the sustainability of the government's development strategy.

Following the successful conclusion of Phase I of NREG, the EC is considering further financial support of EUR 7.0 million for the next 2 years.

A Country Environmental Profile was produced in August 2007 which formulated the following conclusions:

- Strengthening environmental governance is vital to ensuring that natural resources contribute to greater wealth and sustainable growth.
- Removing policy, regulatory, and institutional bottlenecks is crucial for reducing vulnerability of the poor in both rural and urban areas.
- Reinforcing coordination and dialogue to mainstream Environment and Natural Resource Management is critical.

2. Objective

The main objective of the Country Environmental Profile (CEP) is to identify and assess environmental and climate change issues to be considered during the programming process for the 11th EDF (2014-2020), which will directly or indirectly influence EC co-operation activities in Ghana for years to come, as well as for the identification and design of future 11th EDF support activities. The CEP could also be used as an input to the effort of Joint EU Programming, through which the EU Delegation in Ghana and the EU member states concerned strive to better coordinate their respective programmes in the related areas of intervention.

The CEP will provide decision-makers in the partner country and in the European Union with clear information on the key environmental challenges (including those resulting from increasing climate variability and climate change), the current policy, legislative and institutional framework and the strategies and programmes (including those of the EC and other donors) designed to address them.

This information will ensure that the EU co-operation strategies systematically integrate environmental and climate change considerations into the selection of focal sectors and cooperation objectives / strategies, and also establish the necessary environment safeguards for all co-operation activities undertaken in Ghana.

The CEP will also establish the key linkages between the environment, including climate change, and poverty reduction. It will constitute an important source of baseline information and contribute to focusing political dialogue and co-operation with the Republic of Ghana on key areas of concern including sustainable development as well as raising awareness among policy-makers.

3. Results

The profile will deliver the following results:

- An institutional overview of the different government institutions at centralised a decentralised levels
- An assessment of the state of the environment in Ghana and key environmental and climate factors and trends, including those related to climate change, influencing the Country's sustainable development and stability
- An assessment of the main links between the environment and human development in its multiple dimensions (income, consumption, health, security, vulnerability)
- An assessment of national environmental policy and legislation, institutional structures and capacity, and the involvement of civil society in environmental issues
- An assessment of the integration of environmental and climate concerns in development policy and sectors with key linkages with environmental issues
- An assessment of available analysis on the impact of increasing climate variability and climate change on different sectors and the strategies and processes in place or underdevelopment to respond to them
- An overview of past and ongoing international (including EC) co-operation in the environment sector
- An overview of national and international key NGOs or civil society groups active in the environment sector
- Recommendations and, as far as possible, guidelines or criteria for mainstreaming environmental concerns, particularly those concerning adaptation to increasing climate variability and climate change in co-operation areas

- Recommendations for mainstreaming environmental and climate change issues which could affect governance structures and public financial management in Ghana

These recommendations should support the 11th EDF (and EU Joint) Programming process, as well as the identification and design of new programmes, and include guidelines or criteria to be used for environmental mainstreaming in subsequent phases of the cycle of operations.

4. Issues to be assessed

The following issues should be assessed using existing sources of information and key stakeholder perspectives.

NB: it is not expected that the preparation of the profile will involve the collection of original environmental data.

4.1. The state of the environment, trends and pressures

This Chapter should identify the **state** and **trends** of key environmental resources or components in the country, including (as relevant), but not necessarily limited to:

Themes	**Aspects**
Mineral resources and geology	• Mineral resources • Geological risks (seismic, volcanic and related risks)
Land	• Soil erosion and degradation • Desertification • Land use, arable land, losses due to urbanisation or infrastructure building
Water	• Water regime • Ground water • Water quality
Air quality	• Urban air quality • Indoor air quality
Climate trends	• Temperature • Precipitation • Frequency of extreme weather events, natural climate-related • disasters • Potential climate changes and vulnerability
Forest, vegetation, Ecosystems	• Forest, vegetation, ecosystems • Forest cover and volume • Pastureland • State of particular ecosystems (e.g. savannahs, mangroves, etc)
Biodiversity, Wildlife	• Local status of globally threatened species / habitats • Alien invasive species • Fish stocks • Species with special value
Landscape	• Aesthetic and cultural value of landscape
Living conditions in human settlements	• Air and water quality • Sanitation • Slums • Health • Vulnerability to disasters

Pressures on the environment explaining the main negative trends should be identified, as well as pressures contributing to global environmental problems, using the following table as a guiding checklist.

Environmental pressure	**Possible aspects to consider**
Mining, extraction of hydrocarbons	• Extraction, treatment and transport of minerals and hydrocarbons, and the resulting pollution and waste
Water use and Management	• Water extraction (surface- and ground-water) • Waste water discharges, water treatment • Water use
Land use and management	• Land use planning including strategic environmental implications
Forest exploitation, hunting, fisheries, biodiversity	• Forest product extraction • Forest and fisheries management practices • Hunting and fishing activities, poaching • Use of NTFP (non-timber forest products) • Fires • Introduction of alien species
Livestock raising	• Overgrazing • Rangeland management, use of fire, water management • Livestock waste and pollution management
Agriculture	• Extension of agricultural land • Shifting cultivation • Intensification • Irrigation and water use • Pest control • Agricultural practices • Agricultural waste and pollution management
Energy production	• Sources of energy • Supply - and generation related waste and emissions • Energy consumption and associated emissions • Energy efficiency
Greenhouse Gas	• Emissions of main greenhouse gases and sources
Urbanisation, infrastructure and industry	• Urban growth and sprawl, urban planning, • dams, roads, major infrastructure, • polluting industries, tourism
Waste disposal and management	• Waste production • Waste management • Public behaviour and practices, existing systems, • Hazardous waste management • Solid waste disposal in urban areas • Electronic waste dumps
Atmospheric emissions	• Emissions of greenhouse gases and ozone-depleting substances • Air pollutants affecting local or regional air quality (point source • and non-point source emissions)
Transport	• Transport of goods • Transport of people

As far as possible the **driving forces** influencing these pressures should be identified, such as economic incentives, demographic pressure, access rights to natural resources and land tenure systems.

Environmental trends should be assessed with regard to their social and economic impact, including:

- Any declines in economic production or productivity (e.g. agriculture, forestry, fisheries);
- Threats to human health;
- Human exposure to environmental disasters (e.g. floods, drought);
- Conflicts and security issues;
- Impact on poverty, differentiated impact on women and men, impact on vulnerable groups (including children and indigenous peoples);
- Sustainability of resource use;
- Cultural values.

The concluding paragraphs of this Chapter should lead to the identification of problems, described in terms of situations or trends that are undesirable due to their current socioeconomic consequences (e.g. falling productivity, health problems, natural risks, social crises, conflicts), their future consequences (e.g. decline in natural resources, cumulative pollution) or their contribution to global environmental problems.

The main links between the environment and human development (in its multiple dimensions: income, consumption, health, security, vulnerability...) should be highlighted, possibly in the form of a matrix or 'problem tree'.

If appropriate the consultant could refer to appropriate environmental indicators in order to establish a consistent basis both for comparisons among countries and for monitoring changes in Ghana. Attention should be paid to the MDG 7 indicators (See http://www.undp.org/mdg/) and specific indicators related to the particular environmental issues of the country.

If appropriate, the information could be organised according to eco-geographical subdivisions with the scale (regional, national, local) of the issues indicated. A table with major issues by agro-ecological zone/administrative region might assist in targeting.

4.2. Environmental policy, legislation and institutions

A brief description and review should be provided of the main government responses to deal with environmental problems. This section should address the strengths and weaknesses of the following aspects, with their associated evaluation criteria given for guidance:

Aspects	**Examples of issues to consider / Evaluation criteria**
Policies	• Existence of national policies, strategies and action plans for the environment, including possible National Strategy for Sustainable Development (NSSD) and National Environmental Action Plans (NEAP). • Policy response to global issues, sustainability issues (depletion of natural resources), and specific environmental

	issues identified above. • Policies on gender and environment. • Consistency between policies. • Environmental integration in sectoral and macro-economic policies and existence of SEA of policies or strategies (especially the Poverty Reduction Strategy Paper if relevant). • Important measures taken by the Government to solve environmental concerns and types of policy instruments used for implementation. • Effectiveness in achieving targets.
Regulatory framework, including Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) Legislation	• Ratification status and implementation of Multilateral • Environment Agreements (MEAs) such as those concerning climate change, biodiversity and desertification (with reference to any official plans, programmes, communications or reports issued in the context of these conventions). • Adequacy of (current and in preparation) environmental legislation (including land tenure and land reform, access rights to natural resources, management of natural resources, requirements for environmental assessment such as for EIA and SEA, pollution control, development control). • Provision and procedures for public participation in environmental issues. • Effectiveness of legislation enforcement. • Use of other (non legislative) instruments, e.g. "green budgeting" (or Environmental Fiscal Reform) and market-based mechanisms, voluntary schemes (environmental management systems, environmental labelling, industry-government agreements). • Potential impact of non-environmental legislation.
Institutions with environmental responsibilities	• Identity, number and quality of institutions (involved in policy making, legislation, planning, environmental protection, monitoring and enforcement). • Level of co-ordination and decentralisation. • Strength and capacity of individual institutions. • Influence on other institutions. • Good governance practices. • Capabilities, means, functioning of environmental services. • Major NGOs, institutes or other organisations involved in environmental management or policy.
Public participation	• Transparency and access to environmental information. • Role of NGOs and civil society in environmental decision-making. • Effective participation. • Participation by women and traditionally less represented groups. • Access to justice in environmental matters.
Environmental services and	• Protected Areas: number, areas, relevance, and effectiveness.

infrastructures	• Sanitation and waste treatment infrastructure. • Disaster risk prevention and reduction systems. • Emergency response mechanisms.
Environmental monitoring system	• Relevance of selected indicators (with reference to MDG7). • Measurement of the indicators: periodicity, liability. • Integration in the general development indicators.

The analysis should both identify potential institutional / policy / regulatory causes of environmental pressures and the response by the government to solve the environmental problems.

4.3. Integration of environmental and climate concerns into the main policies and sectors

The assessment should examine the integration of environmental and climate change concerns in the overall development policy and in sectors / areas that have key linkages with environmental issues and which might be identified for EC support, taking into account the focal areas of the current CSP as well as and any pre-identified options for future cooperation.

This section should also examine whether there is a SEA (or similar assessment) for the national development strategy or the Poverty Reduction Strategy and for the sectors. If an SEA exists, it should provide a brief description of it, including its main recommendations. The main legislation and institutional arrangements and measures of the sector which address environmental issues, especially those identified in section 4.1 should be examined.

4.4. EU co-operation with the Country from an environmental perspective

This section should review the past and current experience relating to development cooperation interventions related to environmental and natural resource management including climate change as well as the steps taken to integrate the environment into other co-operation areas (e.g. SEA or EIA studies conducted in the context of EU-funded programmes / projects.

Where information is available, the environmental impacts or potential risks of past and ongoing EU co-operation should be identified for the benefit of future programmes. The results and conclusions of existing evaluations/reviews should be incorporated and lessons drawn for the future. The implications for the environment of budgetary support or sector wide approaches should be reviewed if these have been applied. The review should cover both geographical and thematic programmes.

4.5. Co-operation funded by other donors from an environmental perspective

This section should review the past and current involvement of other donors (in particular EU Member States, but other significant donors should also be included) and their experience in the Country, and include a list of recent and planned projects/programmes with an environmental and / or climate-related focus or anticipated impact. Co-ordination mechanisms between donors and the EC with respect to the environment should be assessed.

4.6. Implications of climate change

The CEP report should include an overall estimation of both vulnerability (identification of vulnerability factors) and capacity to respond to the consequences of climate variability and change.

Policies should be reviewed (e.g. climate-resilient development strategies, national adaptation programmes, low carbon development strategies), together with their institutional components. Sources of information may include National communications under the United Nations Framework convention on Climate Change (UNFCCC) and the National Adaptation Programmes of Action (NAPAs). Existing national or sub-regional studies on the expected effects of climate change should be considered including proposed responses, which may include technical, policy and institutional components.

This section of the report will highlight the effects of climate change in exacerbating existing pressures or impacts and the linkages between environmental degradation (ecosystem services) and vulnerability, with a focus on the poorest and most exposed social groups. The overall implications of climate change for the focal areas of cooperation should be assessed, including any safeguards or need for additional analyses to ensure that investments are adapted to increasing climate variability and predicted climate change effects.

5. Conclusions and recommendations

The key aspects of the state and trends of the environment in the Country, including policy, regulatory and institutional constraints and challenges, should be clearly stated. The implications of climate variability and climate change on vulnerability and adaptation strategies should also be included. These key aspects may be presented in a matrix, comparing environmental concerns and the main sectors or policies.

Based on a comprehensive assessment of the available information and on consultations with stakeholders, conclusions and recommendations should be made on how the Commission and the partner Government can best address identified environmental challenges (including climate-related ones) into 11th EDF programming, taking into account current areas of intervention and any pre-identified options for future cooperation, including, if possible, anticipated focal sectors.

Conclusions and recommendations should feed into the country analysis, response strategy and possibly the identification of focal co-operation sectors (taking into account that the other factors intervene in the choice of cooperation sectors, including past cooperation areas and the 'division of labour' between development partners in the context of the Paris Declaration.)

Recommendations should address (but not necessarily be limited to) the following:

(1) The need to mainstream climate change and environmental concerns by safeguards and complementary actions in other areas of cooperation, in order to address environmental constraints and opportunities as appropriate. Measures may include, for example, proposals for institutional strengthening and capacity building (including the enhancement of the regulatory framework and enforcement capacities) particularly in relation to environmentally sensitive sector programmes and budget support programmes. Opportunities may include supporting low-carbon development plans and programmes

(2) Recommendations to ensure that environmentally sensitive projects and programmes are adapted to increasing climate variability and the anticipated effects of climate change, and can thus deliver sustained developmental benefits. Information gaps preventing this work from being accomplished should be identified.

(3) Opportunities for co-ordination on environmental issues with other donors, seeking to achieve complementarities and synergies in order to more effectively deliver development objectives. A checklist for all donor projects in Ghana should also be developed.

(4) Proposals for environmentally-relevant indicators to be used in the 11th EDF MIP (Multiannual Indicative Programme) or to be considered during the formulation of a GBS or SPSP (if relevant). The proposed indicators should be chosen taking into account of the availability of data and actual capacity t monitor their evolution. The report should mention whether the proposed indicators are included in the performance assessment framework of national (e.g. poverty reduction strategy) or sectoral strategies / programmes.

(5) Opportunities to use EC horizontal budget lines (such as Environment and Tropical Forests) and facilities (EU Water Facility - EUWF and the EU Energy Facility - EUEF).

Individual recommendations should be clearly articulated and linked to the problems to be solved and grouped according to the sector concerned or institutional stakeholder. The relative priority of the recommendations and an indication of the challenges to their implementation should be given. Any constraints to preparing the profile resulting from limited information should be described.

6. Work plan

The work plan should include but not necessarily be limited to the following activities:

- Consultations with EC country desk officers and other relevant officials, EU Delegation, the national environmental authority and a selection of national and local authorities, key international donors, plus key national and international civil society actors operating in the environmental field
- Review of key documents and reports, including (*The Ghana Shared Growth and Development Agenda)* previous Country Environmental Profiles, the current EC Country Strategy Papers (Ghana CEA Report of August 2007); evaluation reports (NREG mid-term review; VPA Annual Reports, JMRM reports), existing Strategic Environmental Assessments (particularly those concerning potential focal sectors), EIAs of EC funded projects; environmental literature, environmental policy, environmental legislation and regulations, information on monitoring and environmental performance indicators.
- Field visits to sites of key environmental concern;
- A one day restitution workshop on the preliminary findings of the mission is included in the lists of activities to be carried out by the consultants. Fifty people made of representatives from the Government, academic and research institutions, international
- NGOs and civil society organisations will attend the workshop in Accra.
- On the basis of the outlined work plan and time schedule given in these Terms of Reference, a detailed work plan should be proposed.

7. Expertise required
The proposed mission shall be conducted by a team of (two) experts who should have the following profile:

Senior Expert, he/she will be the team leader:
Qualifications: The candidate must possess at least a Masters Degree in Environment or related fields or an equivalent professional experience of at least 12 years.

General experience: at least 10 years wide experience and broad knowledge of mining and forestry and in environmental issues, including institutional / governance aspects; international environmental policies and management; mainstreaming climate change and environmental concerns into policy; environmental assessment techniques, experience in rapidly assessing information and developing recommendations, and in evaluation/ implementation of Development Projects.

Specific experience: At least 3 years working in an institutional environment within a host Government Ministry;

Junior Expert:
Qualifications: The candidate must possess at least a Masters Degree in Environment with a focus in climate change or in related fields, or equivalent professional experience of 4 years.

General experience: He / She will have at least 3 years relevant professional experience in the evaluation / implementation of Development Projects

Specific experience: At least 1 year working in an institutional environment within a host Government Ministry.

In addition:

- Previous working experience in Ghana or the West African Sub-region is requested for at least one team member;
- Knowledge of the EU environment and development policies would be an asset.
- Experience in undertaking environmental and climate change analyses and preparation of development programmes would be an asset;
- Familiarity of the Senior Expert with Commission guidance on programming, country strategies, Project Cycle Management, policy mix and integration of environmental issues into other policy areas would be an asset;
- Experience of participatory planning processes and gender issues would be an advantage.
- Experience in producing a Country Environmental Profile would be an advantage.
- The experts must be fluent in English. All reporting will be done in English. Excellent written and oral skills are requested of both experts.

8. Reporting
Many of the issues to be addressed in section 4 should be assessed using existing sources of information and key stakeholder perspectives. The report should make clear where existing material has been used and acknowledge sources. Every effort should be made to avoid copy/pasting large amounts of text. Information should be presented succinctly. A list of source materials should be compiled. Wherever possible the source materials should be handed over to the Delegation for future reference purposes.

The focus of the consultants' work should be on the conclusions and recommendations section with targeted and detailed advice for the EU delegation on how to tackle the environment and climate change in its future programming under EDF 11.

The validation workshop held at the end of the assignment in Ghana will be contribute to validate or influence the conclusions made by the consultancy team and will be reverted in the final report.

8.1 Debriefing
At the end of their assignment in Ghana, the team shall prepare a concise Aide Mémoire and will present their major findings and conclusions at a detailed debriefing in Accra, attended by the EU Delegation, the National Authorising Officer of the EDF / Ministry of Finance and Economic Planning and other relevant stakeholders. Copies of the aide memoire will be prepared and files sent by email to all participants.

The results of the study should be presented in the Country Environmental Profile in the format given in Section 10 of these ToR.

8.2 Draft Final Report
A Draft Report shall be submitted to the EU Delegation in electronic copy not later than 30 days following the completion of the work in Ghana. Within (5) weeks, comments on the draft report will be received from the EC.

8.3 Final Report
The consultants will take account of these comments in preparing the final report (maximum 40 pages excluding appendices) and shall submit their Final Report in 4 hard copies and electronic version including all the annexes stored in a CR ROM disk not later than 21 days following the receipt of the comments on the report to the EU Delegation.

Final acceptance will be granted by the EU Delegation at the latest four weeks after receiving the final version of the report.

9. Indicative plan of activities and man-days requirements / Time schedule
It is foreseen that the assignment will be carried out during July – September 2012 in Ghana

Activity	**Expert I**	**Expert II**
1 International travel day (unless the expert can justify more than 2x12 flights hours)	*1*	*1*
Desk analysis, including briefing to the team leader in Accra	*4*	*1*
Field phase including travel and validation workshop (one day workshop held in Accra)	*20*	*20*
Report finalisation (draft) in Accra	*3*	*2*
Debriefing in Accra	*1*	*1*
Final report end	*1*	*1*
Total days	***30***	***26***

10. Report format for a Country Environmental Profile
Standard Report Format for a Country Environmental Profile:
Maximum length (excluding appendices): 40 pages.
The following text appears on the inside front cover of the report:

"This report is financed by the European Commission and is presented by (*name of consultant*) for the *Ghana Ministry of Finance and Economic Planning* and the European Commission. It does not necessarily reflect the opinion of the (*name of consultant*) or the European Commission".

1. Summary
The summary should succinctly and clearly present the key issues described in the profile following the order of headings 2 to 5 given below. The Summary should not exceed 6 pages.

2. State of the environment, trends and pressures
An assessment of the state and trends of the environment in relation to development, including an identification of the main environmental problems to resolve or avoid This section addresses the relationship between the environment and the social and economic situation, and more particularly between poverty and environment.

3. Environmental policy, legislative and institutional framework
3.1. Environmental policy
3.2. Environmental legislation and institutional framework
3.3. Integration of environmental concerns into the main sectors

A presentation of the main features of the institutional, policy and regulatory framework leading to the identification of weaknesses and constraints on the capacity to address main environmental concerns, including a review of the legislation and procedures regarding EIA and SEA A review of the international obligations undertaken by the country in the area of environmental protection. Also comments on developments since previous CEA and CEP would be helpful

4. Climate change implications
A review of any existing analysis of climate change implications including climatic trends, increasing climate variability and strategic responses to them The review should include the identification of key factors of vulnerability with regard to climate variability and climate change, and an assessment of the capacity to respond.

5. Integration of environmental concerns into the main policies and sectors
An identification of links between the main government policies (overall development policy, PRSP, sector policies) and environmental sustainability issues, providing indications on the extent of existing environmental mainstreaming and SEA, with a special attention paid to the "focal sectors" of EC intervention.

6. EU and other donor co-operation with the Country from an environmental perspective
A description of past and ongoing aid from the EC and other donors in the field of the environment natural resources and climate change, incorporating lessons learnt from major evaluations. Assessment of opportunities to collaborate with other donors in pursuing common goals and seeking complementarities

7. Conclusions and recommendations
Recommendations on how environmental and climate issues can be most effectively addressed by EC co-operation, their relative priority and the implementation challenges. These must particularly address environmental aspects to take into account under potential focal sectors, including additional studies (such as SEA), capacity building/institutional strengthening, and potential indicators to be used in the NIP. These environmental integration measures may go along with recommendations concerning specific actions targeting the environment as a "focal sector", i.e. having environmental improvements as the main objective.

8. Country Strategy Paper Environmental Annex Summary
Comprising the main issues presented in sections 2 to 6 above (excluding section 7) in not more than 4 pages.

9. Technical appendices
I. Environmental maps of the Country
II. Reference list of environmental policy documents, statements and action plans, and other relevant technical information.

10. Other appendices
I. Study methodology / work plan (1- 2 pages)
II. Consultants' Itinerary (1- 2 pages)
III. List of persons / organisations consulted with their affiliation and contact details (1- 2 pages)
IV. List of documentation consulted (1- 2 pages)
V. *Curricula vitae* of the consultants (1 page per person)
VI. Terms of Reference for the Country Environmental Profile
VII. List of participants in workshop

11. Administrative Information

Other relevant information

- The experts are informed that broad band connections will not be made available in all locations during their mission in Ghana. They will use Internet access through the existing wireless connections.
- Interviews with the proposed experts, if necessary, may be carried out during the evaluation.
- Subcontracting is not allowed.
- The budget will include:
  1. Two (2) international travel, included visa.
  2. Per diems for Ghana.
  3. Car rental for the mission outside Accra (up to 25 days.)
  4. 1 day workshop in Accra for an estimation of 50 people (this includes renting of premises and catering)
- This contract, established in EUR, is a global price contract
- The tax and customs arrangements are those set out in Article 31 of Annex IV to the Cotonou Agreement.
- In keeping with the European Commission's concern for and commitment to the environment all hard copies of reports must be printed retro verso (double sided) on recycled paper or paper obtained from a sustainable source (evidence to be provided).


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Ardanuy
AGEG
International Consulting Services
EURONET CONSULTING
HYDROCONSEIL
Consulting Engineer: water supply, environment, public services
CERC
ORBICON
LEIF HANSEN
NORDECO
Nordic Agency for Development and Ecology