National Climate Change and Green Economy Learning Strategy

Strategy to Advance Climate Change and Green Economy Learning, Skills Development, and Public Awareness in Ghana.

Ministry of Environment, Science, Technology, and Innovation, 2016

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Ministry of Environment, Science, Technology, and Innovation (MESTI)
June, 2016

Address: P. O. Box M 232, Accra.
Telephone: 0302 660005

Authors:
Institute of Green Growth Solutions
www.igreengrowthsolutions.com
info@igreengrowthsolutions.com
iggsolution@gmail.com

Reviewers:
Ministry of Food and Agriculture
Ministry of Environment, Science, Technology and Innovation
Environmental Protection Agency
Ministry of Health/Ghana Health Service
Ministry of Finance
Ministry of Power
Ministry of Education/Ghana Education Service
National Development Planning Commission
NADMO
Private Enterprise Federation (PEF)
Energy Commission
Forestry Commission
Centre for Scientific and Industrial Research
Civil Society Organisations (CSOs)
Lands and Forestry Committee, Parliament of Ghana

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Institute of Green Growth Solutions

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The One UN Climate Change Learning Partnership

UN CC: Learn

At the 20th Conference of Parties (CoP 20) in Lima, Peru, Ghana received approval to develop a National Climate Change Learning Strategy under the second phase of the One UN Climate Change Learning Partnership (UN CC: Learn) with the objective of designing and implementing action plans through a country-driven process to strengthen learning and skills development to address climate change in Ghana.

UN CC: Learn is a collaborative initiative involving 33 multilateral organisations. The partnership supports countries to design and implement ambitious, country-driven, results-oriented and sustainable learning actions to address climate change by supporting knowledge sharing, promoting the development of common climate change learning materials, and coordinating leaning interventions through the collaboration of UN agencies and other partners.

The initiative also supports the implementation of Article 6 of the UNFCCC on training, education and public awareness-raising, and the Doha Work Programme. UN CC:Learn involves three inter-related programme areas, i.e. a) Knowledge management and networking; b) Development of a One UN climate change learning package; and c) Strengthening of human resource capacities in partner countries.

UN CC: Learn has completed a three year pilot phase (2011-2013) in five countries (Malawi, Indonesia, Benin, Dominican Republic, and Uganda). The second phase of the initiative runs from 2014 to 2017 with Ghana as one of the beneficiary countries. Other beneficiary countries include Burkina Faso, Ethiopia, Kazakhstan, and Niger[1].

[1] See http://www.uncclearn.org/about-un-cclearn. Accessed on 21/11/2015

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The Strategy was authored by the Institute of Green Growth Solutions under the leadership of a team of consultants who worked tirelessly to compile all stakeholders' inputs, assisted in facilitating the various stakeholder engagements, and designed the outline of the strategy.

The priority action plans within the strategy were identified with the input and valuable contributions of officials from the following institutions – National Theatre; Abibiman Foundation; Environmental Protection Agency; University of Development Studies; Ghana Education Service; Private Enterprises Federation (PEF); Association of Ghana Industries (AGI); National Disaster Management Organisation; Ghana Association of Writers; Climate Action Network – Ghana; Global Environment Facility (GEF) CSO Network; Creative Storm; Environmental Justice – Ghana; Ghana Youth Integrity Campaign; Curriculum Research and Development Division of Ghana Education Services; Community and Family Aid Foundation; Ghana Health Service; Concern Health Education; Centre for Scientific and Industrial Research – Water Research Institute; Centre for Scientific and Industrial Research – Science and Technology Policy Research Institute (STEPRI); Inspire Africa; National Traditional Council; Ghana Cultural Forum; Ghana Media Forum; Christian Council of Ghana; Islamic Council of Ghana; Ministry of Education; Ghana Education Service; Ghana Farmers Association; University of Ghana; Energy Foundation; University of Ghana; Forestry Commission; Energy Commission; Water Resource Commission; Ministry of Finance; West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL); Ghana Climate Innovation Centre; Coalition of NGOs in water and sanitation (CONIWAS); Centre for Energy Economics and Policy (CEEP); Abantu for Development; Friends of the Earth; National Development Planning Commission; Ministry of Food and Agriculture.

We also extend our profound gratitude to all participants of the regional, national, and institutional heads validation workshops for the critical inputs that were made to the draft strategy.

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Signature
Dr. Emmanuel Tachie-Obeng
National Focal Person (UNFCCC Article 6)

Picture

Foreword

Climate change is a developmental challenge that transcends borders and affects every aspect of society including economic development, health, infrastructure, energy, agriculture, human settlement, social equity, natural resources, ecosystems and biodiversity. The phenomenon which first took centre stage in international dialogue at the 1992 Earth Summit has become the world's greatest risk to development and future investment. In Ghana, the critical aspects of the nation's economy – energy systems, agriculture, industry and natural resources are all vulnerable to climate variability. It therefore presents a developmental challenge that has the potential not only to debilitate Ghana's growth trajectory towards becoming a fully-fledged middle income country, but also erode the modest gains made towards economic growth.

In June 2014, Ghana's National Climate Change Policy (NCCP) was launched to serve as the blue print for Ghana's climate action, and to facilitate a green economy transition in a holistic, ambitious, and results oriented manner. With the vision of ensuring a climate-resilient and climate-compatible economy while achieving sustainable development through equitable low-carbon economic growth for Ghana, the National Climate Change Policy signifies Ghana's resolve to take bold steps to address the developmental challenges of climate change as well as contribute to international climate action. This learning strategy will be an avenue to implement learning and capacity building actions towards achieving

the objectives of the National Climate Change Masterplan and by extension, the National Climate Change Policy.

As reflected in the Ghana Shared Growth and Development Agenda and the anticipated forty year development plan currently under preparation, mainstreaming climate change and green economy principles into our development agenda is high on the country's priorities, and the NCCP serves as the reference point and provides the policy direction for these mainstreaming efforts.

Capacity building, skills development and education on climate change and green economy principles has been identified as critical tools to ensure a sustained climate action and a green economy transition to catalyse sustainable development. Acknowledging this, capacity building is therefore one of the key pillars of the National Climate Change Policy. As a party to the United Nations Framework Convention on Climate Change (UNFCCC), Ghana is also expected to design and implement country-driven and result oriented strategies on climate change education, training, and public awareness on the effects of climate change and how to effectively address them.

This National Climate Change and Green Economy Learning Strategy which has been developed through nation-wide stakeholder consultation under the One UN Climate Change Learning Partnership will ensure that ambitious, results oriented and country driven action plans are implemented to build a sustainable pool of human capital with the requisite skills and knowledge to address climate change through learning at all levels of education, technical skills training, and public awareness. By developing human resource, this strategy will therefore promote the mainstreaming of climate change and green economy principles into national decision making and serve as a critical tool in the implementation of the country's Nationally Determined Contributions (NDCs) presented at the recent 21st Conference of Parties in Paris.

As said by Mr. Ban Ki-moon[2], we are the last generation that can take steps to avoid the worst impact of climate change, and this National Climate Change and Green Economy Learning Strategy presents a set of ambitious and bold action plans Ghana will implement for the next ten years towards that ambition.

Signature

Name

[2] United Nations Secretary General, 2016

Picture

Preface

Climate change presents a major risk to development, as it poses one of the biggest long-term threats to investments especially for developing countries. However, with the appropriate action and political will, the impacts of climate change can be adequately mitigated. Ghana has demonstrated its commitment to addressing climate change to first and foremost, mitigate its impacts on the nation's growth, make its economy climate resilient, and compatible and to secondly, contribute to global climate action. This is made evident in the various efforts to mainstream climate change into national decision making and development efforts. Today, climate change and green economy principles are very critical components of national, sectoral and local development planning. This is to ensure that appropriate steps are taken to mitigate the developmental risks posed by climate change, as well as gradually transform Ghana's economy into a green economy.

The United Nations Framework Convention on Climate Change (UNFCCC) acknowledges that, to sustain the climate action in the medium to long term, Parties to the convention need to develop and implement country-driven and result oriented strategies on climate change education, training, and public awareness on the effects of climate change and how to effectively address them. At the just ended Conference of Parties in Paris, yet another

bold step was taken in the international climate negotiations towards dealing with the risks of climate change. This therefore lays the foundation for countries, especially developing countries like Ghana to take even more ambitious steps towards climate change mitigation and adaptation. While these actions will ensure a climate-resilient economy, it will also create an enabling environment for sustainable development, which is the new global development paradigm.

Ghana's Nationally Determined Contributions (NDCs) that were presented at the 21st Conference of Parties represents the country's ambitious actions towards climate change mitigation and adaptation. Given that a sustainable pool human resources with the requite skills and knowledge is immensely critical to sustain the climate action and green economy transition agenda, this strategy will play a very important role in Ghana's quest to transform its economy into a climate resilient, compatible and green economy. This learning strategy will also be implemented from 2020 in tandem with the implementation of the National Determined Contributions, with initial preparatory activities undertaken within the period from 2016 to 2019. This initial pre-implementation period will also see the implementation of some action plans identified as needing urgent implementation to create the necessary foundation for the implementation of all the other priority action plans.

This strategy also presents ambitious, innovative, and country-driven action plans to build a sustainable pool of human resources with the requisite technical skills and knowledge through holistic training across all levels of education, non-formal education, and general public awareness. These action plans have been developed based on sectoral and national priority areas after cross sectoral nationwide consultations under the leadership of the Ministry of Environment Science, Technology, and Innovation and technical assistance by the Environmental Protection Agency.

Signature

Name

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Acronyms & Abbreviations

AAA	Accra Agenda for Action
AAP	African Adaptation Programme
ACPC	African Climate Policy Centre
AfDB	African Development Bank
AGI	Association of Ghana Industries
ALP	Adaptation Learning Programme
BRT	Bus Rapid Transit
BRRI	Building and Road Research Institute
CBA	Community Based Adaptation
CCA	Climate Change Adaptation
CC-DARE	Climate Change Adaptation and Development Programme Initiative
CCFG	Climate Change Finance in Ghana
CDKN	Climate and Development Knowledge Network
CDM	Clean Development Mechanism
CoP	Conference of Parties
CRDD	Curriculum Research and Development Division
CRIG	Crop Research Institute of Ghana
CSIR	Council for Scientific and Industrial Research
CSOs	Civil Society Organisations
DANIDA	Danish International Development Agency
DFID	Department for International Development
DFI-MoELR	Department of Factories Inspectorate-Ministry of Employment and Labour Relations
DRR	Disaster Risk and Response
ECN	Energy Research Centre of the Netherlands
EE	Environmental Education
EFR	Ecological Fiscal Reform
EIA	Environmental Impact Assessment
ENAPT	Environmental Applications and Technology
EPA	Environmental Protection Agency
EWS	Early Warning System
FARA	Forum for Agricultural Research in Africa
FASDEP II	Food and Agriculture Sector Development Policy II

FCPF	Forest Carbon Partnership Facility
FOAT	Functional Organisational Assessment Tool
FORIG	Forest Research Institute
GAEC	Ghana Atomic Energy Commission
GAPTE	Greater Accra Public Transport Executive
GASIP	Ghana Agricultural Sector Investment Programme
GCF	Green Climate Fund
GE	Green Economy
GEF	Global Environment Facility
GES	Ghana Education Service
GHG	Green House Gas
GHS	Ghana Health Service
GIDA	Ghana Irrigation Development Authority
GMet	Ghana Meteorological Agency
GNCCP	Ghana National Climate Change Policy
GoG	Government of Ghana
GSGDA II	Ghana Shared Growth and Development Agenda II
HEISS	Health and Environment Integrated Surveillance System
HESA	Health and Environment Strategic Alliance
IIPAC	Innovative Insurance Products for Adaptation to Climate Change
IIR	Institute of Industrial Research
ILO	International Labour Organisation
INBAR	International Network for Bamboo and Rattan
INC	Initial National Communication
INDCs	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
KSNR	Kogyae Strict Nature Reserve
LCDS	Low Carbon Development Strategy
LCG	Low Carbon Growth
MDAs	Metropolitan and District Assemblies
MESTI	Ministry of Environment, Science, Technology and Innovation
METASIP	Medium-Term Agriculture Sector Investment Plan
MLGRD	Ministry of Local Government and Rural Development
MLNR	Ministry of Lands and Natural Resources

MDAs	Ministries, Departments, and Agencies
MMDAs	Metropolitan, Municipal and District Assemblies
MoF	Ministry of Finance
MoFA	Ministry of Food and Agriculture
MoH	Ministry of Health
MoRH	Ministry of Roads and Highways
MRV	Measurement, Reporting And Verification
MWRWH	Ministry of Water Resources, Works and Housing
NAB	National Accreditation Board
NADMO	National Disaster Management Organisation
NAMA	National Appropriate Mitigation Actions
NASA	National Aeronautics and Space Administration
NCCAS	National Climate Change Adaptation Strategy
NCCC	National Climate Change Committee
NCCE	National Commission for Civic Education
NCCP	National Climate Change Policy
NCCSAP	Netherlands Climate Change Studies Assistance Programme
NCRC	Nature Conservation Research Centre
NCTE	National Council for Tertiary Education
NDPC	National Development Planning Commission
NEAP	National Environmental Action Plan
NEP	National Environment Policy
NGOs	Non-governmental Organisations
NSA	National Sports Authority
NOAA	National Oceanic and Atmospheric Administration
NYA	National Youth Authority
PAGE	Partnership for Action on Green Economy
POTAG	Polytechnic Teachers Association of Ghana
PWDs	Persons with Disability
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RELBONET	Religious Bodies Network on Climate Change
R-PP	National REDD+ Preparation Proposal
SARI	Savanna Agricultural Research Institute
SBI	Subsidiary Body of Implementation
SD	Sustainable Development

SEA	Strategic Environmental Assessment
SNC	Second National Communication
SRI	Soil Research Institute
STEPRI	Science and Technology Policy Research Institute
TCPD	Town and Country Planning Department
TLM	Teaching and Learning Materials
UN CC: Learn	One UN Climate Change Learning Partnership
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Scientific, and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UN-ISDR	United Nations International Strategy for Disaster Reduction
UNU-INRA	United Nations University Institute for Natural Resources in Africa
UTAG	University Teachers' Association of Ghana
WRI	Water Research Institute
WASCAL	West Africa Science Centre on Climate Change and Adapted Land use
WHO	World Health Organisation

Strategy Overview

Today, climate change and other environmental risks have become a major hindrance to sustained economic and social development across the world, especially in developing and least developed countries. Consequently, there has been increased awareness about the effects of climate change on economic and infrastructural development, and human existence. This development has resulted in global policy dialogues and negotiations to provide an international framework for climate action and mainstreaming of green economy principles into national development. Twenty years after the Earth Summit, which saw the establishment of the United Nations Framework Convention on Climate Change (UNFCCC), the Rio +20 Conference set the stage for a new paradigm in development planning that ensures economic development for the present generation without jeopardising the development and well-being of future generations. This new development paradigm has seen a shift in emphasis from economic development to green economy in the context of sustainable development.

Capacity building, skills development and education on climate change and green economy has been identified as critical tools to ensure a sustained climate action and promotion of green economy principles for sustainable development. Article 6 of the UNFCCC therefore calls on governments to educate, empower and engage all stakeholders and the general public in the climate process.

International effort to promote climate change and green economy learning includes UNESCO's Climate Change Education for Sustainable Development (ESD) programme which aims at promoting awareness by expanding non-formal climate change education activities through media, networking and partnerships. Through the Partnership for Action on Green Economy (PAGE), technical support is provided to partner countries towards capacity building to help align economic policies to greener and more inclusive action. More recently, the Paris Agreement reached at CoP 21[3] and the first forum on green economy learning provided further impetus for capacity building. Since 2009, the UN CC: Learn[4] project has assisted beneficiary countries including Ghana to develop result oriented and country driven strategies to promote climate change learning and capacity building.

This Climate and Green Economy Learning Strategy presents Ghana's strategic plan to promote climate change and green economy learning with the vision to "*Create a sustainable pool of human resource with the necessary technical expertise and a general public equipped with basic climate change and green economy knowledge towards achieving a climate resilient and low carbon economic growth in Ghana*"

Strategy Vision:
"Create a sustainable pool of human resource with the necessary technical expertise and a general public equipped with basic climate change and green economy knowledge towards achieving a climate resilient and low carbon economic growth in Ghana"

[3] 21st Conference of Parties

[4] One UN Climate Change Learning Partnership

The National Climate Change and Green Economy Learning Strategy has been developed to advance the overall vision of the National Climate Change Policy through climate change and green economy learning and capacity building and will seek to achieve the following objectives – assess existing capacity to address climate change within key sectors; foster systematic and country-driven process to enhance climate and GE learning and implementation of the priority action plans; a tool to implement Ghana's Nationally Determined Contributions; strengthen institutional capacity for good governance, institutional coordination, science and innovation, and accountable monitoring and reporting; identify and prioritise actions to enhance climate change and green economy learning through existing national education and training systems; link climate change and green economy learning to the objectives of the National Climate Change Policy and to help achieve sustainable development through capacity building and knowledge enhancement; help mobilise resources for training, education, public awareness; and capacity building from national budget and other internal and external sources; ensure the creation of a sustainable pool of human resource base with the requisite skills to address climate change and catalyse the transition to a green economy.

Strategy Priority Areas:

1. Agricultural and Food Systems
2. Disaster Preparedness and Response
3. Natural Resource Management
4. Equitable Social Development
5. Energy, Industrial and Infrastructural Development
6. General Education and capacity Building

The action plans in this strategy have been developed to address the capacity building and learning components of the National Climate Change Policy and will be a critical tool in implementing Ghana's National Climate Change Masterplan (2015-2020) and the Nationally Determined Contributions from 2020. The priority areas of this strategy correspond with the priority areas of the National Climate Change Policy with an additional priority area for general education and capacity building and reflects Ghana's priorities for mainstreaming climate change into development efforts identified in the National Climate Change Policy, with an additional priority area for capacity building within the formal and non-formal educational system of the country. The action plans for learning and capacity building were also informed by the skills gap identified in the Green Economy Learning Assessment. This is to ensure the strategy is relevant to the unique climate change and green economy capacity building needs of Ghana.

The priority action plans were identified through a multi-stakeholder and multi-sectoral approach to ensure the critical and urgent capacity building needs across all sectors of the Ghanaian economy are addressed within the learning strategy and to ensure stakeholder ownership for implementation.

The Ministry of Environment, Science, Technology, and Innovation (MESTI) will lead the implementation of the strategy by coordinating with all other relevant sector ministries, departments and agencies to ensure a cross-sectoral implementation of actions. On-going learning and capacity building actions will be monitored and reported on under this strategy with new and additional priority actions being incorporated into the annual plans

and budgets of implementing institutions. Technical support for implementation will however be provided by the Environmental Protection Agency. Specifically, the National Focal Person for climate change education and awareness creation (Article 6 of UNFCCC) at the Climate Change Unit of the Environmental Protection Agency will lead the process of implementing the strategy action plans.

The Climate and Green Economy Learning Strategy will be implemented for a ten year period from 2020 to 2029[5] with an estimated investment requirement of USD 103,073,000. The estimated budget needed for implementation will be sourced from the Government of Ghana and international climate financing sources. Funds needed for the pre-implementation activities will however be sourced from the UN CC: Learn Project partners. The pre-implementation activities will comprise of the critical next steps identified and the action plans needing immediate implementation.

A total investment of USD 103,073,000 is needed to implement the National Climate Change and Green Economy Learning Strategy for a ten year period from 2020 to 2029 with a pre-implementation period from 2016 to 2019.

Critical immediate next steps that will be undertaken will be a thorough institutional needs assessment to ensure that all necessary structures and support mechanisms are put in place. Through this activity, implementing and M&E institutions will be equipped with requisite capacity to successfully implement and monitor the priority action plans. A study to establish baseline data for all action plans will be done at the preliminary stages of the strategy implementation. This will ensure that all action plans are adequately tracked under the MRV activities. Additionally, a thorough gender vulnerability analysis will be undertaken at the preliminary stage.

Thirteen (13) priority action plans have been identified as needing urgent implementation to create the foundation for the implementation of the other priority action plans. Implementation of these action plans will commence soon after the official launch of the National Climate Change and Green economy Learning Strategy.

ES 1: Actions for immediate implementation

Actions for Immediate Implementation
1. Train farmers and fishermen and present information on conservation agriculture, climate smart cropland management, and other climate smart agricultural and aquaculture practices in simple language for easy appreciation
2. Train on the principles for the design, management and operation of climate-resilient infrastructure
3. Institute Climate Change and Green Economy Festival / Week with programmes at the National, Regional, District, and community levels
4. Develop manuals and train on gender and social inclusion on Climate change and Green Economy

[5] This is to synchronise the implementation of this strategy and Ghana's Nationally Determined Contributions

Actions for Immediate Implementation
5. Initiate activities to incorporate climate change and green economy learning into the educational curricula across all disciplines at all levels of education, bearing in mind the flow of learning from pre-school to the tertiary level.
6. Establish Climate Information Centres to facilitate easy access to agro-met information and early warning system for disaster risk reduction
7. Develop and implement climate change and health training programmes for clinical health workers in order to identify and effectively manage climate change related health conditions
8. Train on implementing an efficient health surveillance system at the district level
9. Train business leaders on the challenges and opportunities associated with climate change.
10. Provide technical and financial assistance to businesses to undertake viable pilot initiatives.
11. Provide technical content and support for media campaigns and related activities designed to raise awareness among the general public
12. Train on public finance for funding the green economy transition for MoF staff
13. Provide introductory training on climate change and green economy concepts for relevant public institutions and officials

1. Introduction

1.1 International Development in Climate Change and Green Economy

At the "Earth Summit" in Rio de Janeiro, the United Nations Framework Convention on Climate Change (UNFCCC)[6] was adopted as the framework to galvanise international and national climate action towards the now dual ambition of holding global average temperature increase below 2 ^{O}C[7] above pre-industrial levels, as well as pursue efforts to limit temperature increase to 1.5 ^{O}C above pre-industrial levels.

The Convention seeks to achieve stabilisation of greenhouse gas (GHG) concentrations in the atmosphere at a level that will prevent dangerous interference with the climate system, within a time frame to allow ecosystems to adapt to climate change and ensure food security as well as economic development in a sustainable manner. Furthermore, the Convention, in its principles, calls on parties to take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects.

In the last decades, majority of investments have gone into physical capital (e.g. infrastructure) human capital (e.g. employment) and financial capital (e.g. shares) with the aim to increase economic growth. On the other hand, relatively small amounts were invested in natural capital (e.g. investments in renewable energy, energy efficiency, sustainable agriculture, ecosystem and biodiversity protection, and land and water conservation). The rapid accumulation of physical, financial and human capital at the expense of natural capital has contributed to the manifestation of several crises in the areas of climate, biodiversity, energy, food, water, poverty etc.

In an effort to reverse the growing environmental and climatic risks caused by the pursuance of economic growth, the concept of green economy has evolved from the area of environmental economics into mainstream policy discussion at the international level. The emphasis has therefore shifted from economic development to achieving sustainable development through the transition to a green economy[8]. The stage for the green economy discourse was set by Rio +20 which provided the vision, international framework, and

[6] The UNFCCC was adopted on the 9th of May 1992 and entered into force on the 24th of March, 1994. There are currently 197 Parties (196 States and 1 regional economic integration organisation) to the Convention. See http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php

[7] The Inter-governmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC, 2007) estimates that a concentration limit of 450 ppm of CO_2 equivalent is needed to maintain a global rise in temperature below 2^{o}C

[8] UNEP, 2011

multilateral machinery to achieve a sustainable future. A Green Economy is an economy that aims at achieving economic development while promoting environmental, ecological, and social wellbeing. Practically, it involves changes in production, consumption and lifestyle towards economic activities that use natural resources efficiently, enhance and preserve environmental quality, and remove social inequalities[9].

According to the United Nations Environment Programme, green economy results in improved human well-being and social equity while significantly reducing environmental scarcities[10].

1.2 Learning and capacity building

Article 6 of the UNFCCC (on education, training and public awareness), calls on governments to educate, empower and engage all stakeholders and the general public in the climate process. Specifically, the article defines activities in six priority areas that are determined by the UNFCCC as critical for involving all levels of society in the climate change process[11].

The parties are obliged to "promote and facilitate at the national, and as appropriate, sub-regional and regional levels, and in accordance with national laws and regulations within their respective jurisdictions" They are also to:

1. develop and implement climate change related educational programmes at the primary and secondary levels;
2. participate in awareness campaigns on climate change and its effects;
3. provide public access to relevant information on climate change and its effects;
4. participate in addressing climate change and its effects and developing adequate responses;
5. train scientific, technical and managerial personnel; and
6. cooperate and promote, at the international level, and, where appropriate, using existing bodies through the following among others:
    - the development and exchange of educational and public awareness material on climate change and its effects; and
    - the development and implementation of education and training programmes, including the strengthening of national institutions and the exchange or secondment of personnel to train experts in the field of climate change, in particular for developing countries.

[9] Partnership for Action on Green Economy (PAGE), 2015

[10] UNEP, 2010

[11] See http://article6.rec.org/. Assessed on 15/11/2015

Decisions adopted at the sixteenth Conference of Parties (CoP 16), also known as the Cancun Agreements, recognise that "addressing climate change by all countries, requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development, based on innovative technologies and more sustainable production and consumption, while ensuring a just transition of the workforce that creates decent work and quality jobs"[12]

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) and subsequent international agreements recognised that education is an essential element for mounting an adequate global response to climate change. Education is critical in helping communities understand and address the impacts of climate change and encourage the changes in attitudes and behaviour needed to address the causes of climate change. Also, it can contribute to the adoption of more sustainable lifestyles and development of skills that support different modules of economies, to adapt to the impact of climate change. In particular, education can enhance the resilience of vulnerable groups and communities, especially in developing countries such as Ghana, who are disproportionately affected by these changing conditions.

Since 2013, UNESCO's work on Climate Change Education (CCE) which aims to make education a more central part of the international response to climate change, has worked with national governments to integrate Climate Change Education into national curricula and to develop innovative teaching and learning approaches for doing so (UNESCO, 2015). The UNESCO Climate Change Education for Sustainable Development programme (ESD) also aims to help people understand climate change by expanding CCE activities in non-formal education through media, networking and partnerships. ESD adopts a holistic approach to incorporate key sustainable development issues such as climate change, and disaster risk into education, in a way that addresses the *interdependence of environmental sustainability, economic viability and social justice*. It promotes participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development.

UNESCO has developed five climate change learning focus areas at the Global level for policy-makers on how climate and green economy learning and education for sustainable development (ESD) can be integrated at the national level:

- **Policy development:** ESD is an interdisciplinary, cross-sectoral approach, which aims to prepare people for change by equipping them with a broad base of knowledge, skills, dispositions and values. Governments need to integrate ESD and CCE into all levels and types of education and across the curriculum.

- **Governance and resources**: Integrating climate and green economy learning into national systems requires high-level support from the government, with cross-sectoral coordination and harmonisation. A clearly defined national coordination

[12] See https://sustainabledevelopment.un.org/partnership/?p=497. Accessed on 19/11/2015

structure will ensure the success of climate and green economy learning and ESD programmes.

- **Curriculum development**: The Curriculum Research and Development Division of the Ghana Education Service, the Ministry of Education and education planners should review, develop and strengthen their curriculum framework to ensure that climate and green economy education and education for sustainable development (ESD) feature at all levels of the educational system. This will entail creating new work units for teachers, and developing new pedagogical approaches, especially project-based learning, with greater emphasis on critical thinking and problem-solving skills. New curricula should be flexible enough to be adaptable to the local Ghanaian context.

- **Capacity-building of teachers and education planners**: Teachers and non-teaching staff need to understand climate change, and have sufficient, locally-adapted materials for classroom use.

- **Public awareness, communication and stakeholder involvement:** Governments should support non-formal education opportunities provided by communities, civil society and the media, to convey information about climate change mitigation and adaptation.

1.3 Climate Change and Green Economy learning

Inadequate human resources and suitable skills to propel and sustain economic development has been a major challenge especially to developing countries. The UNFCCC recognises this human resource challenge and calls on developed country parties to provide support to developing countries especially least developed countries (LDC) in that regard. This is even more crucial because maintaining global climate action calls for a robust response and sustained action to develop human resources and to promote the advancement towards a green economy which has in recent times, been regarded as a catalyst for achieving sustainable development.

Achieving a Green Economy for sustainable development creates a range of opportunities, however these opportunities require appropriate learning and capacity building for them to be harnessed. The challenge for most developing countries including Ghana, is developing the requisite human resource to take advantage of the opportunities a green economy presents for sustainable development through deliberate, focused, results oriented, and ambitious efforts.

The skills gap is therefore identified as a major bottleneck in the attainment of a green economy and subsequently, sustainable development. The International Labour Organisation (ILO) has emphasised that capacity gaps undermine the potential for any nation to achieve a green, low-emission and climate-resilient economy. It must therefore be noted that, whereas climate change poses an enormous challenge to sustainable development, it also presents a new opportunity for countries to re-think their

development pattern and to take advantage of new and emerging technologies and services that promote low carbon green economy and sustainable development. To be able to take advantage of these emerging opportunities, appropriate skills need to be developed.

This emerging new capacity needs, together with the current gaps has necessitated the need for sovereign states to review the entire educational curriculum to align it with global and national socio-economic needs. For instance, some of these emerging opportunities have given rise to a new set of emerging opportunities generally referred to as "green jobs", and skills development for these new jobs. Specifically, Ghana identifies the following as priority skills development areas in the National Climate Change Policy[13], which also forms the basis for the learning strategy:

Climate smart innovations and technological improvements;

1. Product and service innovation and diversity
2. Technology adaptation and access
3. Climate-smart agriculture

Value Chain Financing and Insurance for climate smart business innovations;

4. Business capacity building and market integration
5. Technical capacity in market norms and standards
6. Commodity exchanges and active futures markets
7. Market information and access
8. Infrastructure investment
9. Carbon trading

Energy Generation, saving and efficiency;

10. Waste to energy by pyrolysis
11. Gas capture from landfills
12. Renewable energy technologies, equipment and services

Education and training and Advocacy;

13. Lecturers and trainers for climate related courses in institutions of higher learning
14. Peer educators and trainers for non-formal training and advocacy on climate change

In 2009, the One UN Climate Change Learning Partnership was launched to support countries to design and implement ambitious, country-driven, results-oriented and sustainable learning actions to address climate change by supporting knowledge sharing, promoting the development of common climate change learning materials, and coordinating leaning interventions through the collaboration of UN agencies and other partners. The UN CC: Learn includes the following closely linked three programme areas;

i. Knowledge management and networking
ii. Development of a One UN Climate Change Learning Package

[13] Ministry of Environment, Science, Technology, and Innovation, 2013

iii. Strengthen human resource capacities in partner countries

The Partnership for Action on Green Economy (PAGE) offers technical support and analysis to its partner countries to help build capacity and align economic policies towards greener and more inclusive action. Similarly, the recent adoption of the Paris Agreement on Climate Change and the first forum on green economy learning at CoP 21 provides further impetus for countries to transform societies, including important new measures on enhancing capacity building in the areas of climate change and green economy. The global action to promote green economy learning is anchored on principles that seek to influence attitudes, stimulate behavioural change and promote system-wide and nationally appropriate learning strategies and delivery mechanisms. It provides a set of principles and a reference point for decision makers, learning institutions and professionals in the following four inter-related areas:

1. The meaning and value of Inclusive Green Economy (IGE) learning
2. Increasing effectiveness and sustainability in IGE learning
3. Promoting IGE learning at national and local level
4. Scaling up IGE for impact

1.4 Organisation of the National Climate Change and Green Economy Learning Strategy

The strategy has been organised into eight chapters. The first chapter introduces the strategy by discussing climate change learning at the global level and the need to ensure climate change capacity building for both institutions and individuals to sustain national and international climate change action in the long term.

Chapter two gives a background to climate change developments in Ghana, the risks and impacts, as well as institutional and policy framework relating to climate change. Chapter two also analyses Ghana's Climate Change Policy with emphasis on the priority areas. The third chapter analyses existing systemic, institutional, and individual capacity.

The strategy development process, vision and objectives of the National Climate change Learning Strategy, and principles that guided the development of the strategy are discussed in chapter four, with proposed action plans for implementation presented in the fifth chapter.

Chapters six discusses implementation of the strategy. Specifically, the chapter addresses coordination and communication strategy, and financing, while chapter seven focuses on monitoring and evaluation of the strategy.

Chapter eight identifies potential implementation barriers and policy recommendations as well as immediate next steps to ensure successful implementation of the strategy. The chapter also identifies priority capacity building actions needing immediate implementation.

2. Background

2.1 Ghana's response to climate change

Ghana's vulnerability to climate change is made evident in the fact that key sectors of the country's economy including agriculture (which is estimated to provide employment directly and indirectly to about 70% of the population through fisheries, crop and animal farming etc.), forestry, and energy production are all sensitive to climate variability.

The Government of Ghana (GoG) recognises the social and economic impacts, and the developmental challenge arising from climate change and as a result, has shown commitment to mainstreaming climate change into key planning processes at the national, regional and local level (MEST, 2010). The Country's medium term development framework, the Ghana Shared Growth and Development Agenda II (2014-2017) avidly demonstrates this commitment.

The Ghana Shared Growth and Development Agenda II (GSGDA II) acknowledges climate change as a major threat to national development and emphasises that the challenge is to turn climate change and variability into an opportunity to expand national output and productivity and embark on systemic protection programmes. Having moved from a Low Income to a Lower Middle Income country (as defined by the World Bank), the country has been put on a high growth trajectory which comes with an associated increase in energy demand both for domestic and industrial use. It has however become evident that climate change and the cost of climate change response pose a significant threat to maintaining this growth paradigm.

2.2 Climate Change Impacts

Globally, there is abundant evidence to support the fact that historical patterns in climate have changed, mostly caused by human activity. The Intergovernmental Panel on Climate Change (IPCC) succinctly puts it this way; "*Warming of the climate is unequivocal, as is now evident from observations of the increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level*". The NASA reports that NASA has also reported that there has been an average rise in the earth's surface temperature of about 1 ^{o}C[14] since the late 19th century. [15]

[14] See http://www.giss.nasa.gov/research/news/20150116/. Accessed on 14/11/2015

[15] Intergovernmental Panel on Climate Change 4th Assessment Report.

The year 2015 has been reported as the warmest year since modern record keeping began in 1880, breaking the 2014 record by an average temperature of 0.13 ºC according to independent analyses by the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) Scientists[16]. NASA has further reported that average temperatures recorded in 2016 continue to break the record with each of the first six months being recorded as the warmest respective month globally[17].

In Ghana, the vulnerability to climate change is spatially and socially differentiated[18]. Each ecological zone has peculiar physical and socio-economic characteristics that define its sensitivity and resilience to climate change impacts to a great extent, defined by exposure to the various climatic impacts with droughts, floods and sea erosion as the main drivers. Historical data from the year 1961 to 2000 shows a progressive rise in temperature and decrease in mean annual rainfall in all the six agro-ecological zones in the country. Specifically, climate change is manifested in Ghana through:

- Rising temperatures
- Declining total rainfall and increased variability
- Rising sea levels and increased coastal erosion
- High incidence of weather extremes and disasters
- Increasing greenhouse gas emissions and loss of carbon sinks
- Inconsistent rainfall that has over the years, undermined Ghana's power generation potential as the contribution of hydro to electricity generation continues to decline. For example, the contribution of hydro to Ghana's power generation mix declined from 640.46 MW in April 2016[19] to barely 367.66 MW in June 2016[20], representing 57% and 37% of generation mix respectively.

In all agro-ecological zones, mean annual temperatures are predicted to increase by 0.6°C, 1.02°C, 2.0°C and 3.9°C for the years 2020, 2040, 2050 and 2080 respectively. Within the same period, average annual total rainfall is estimated to decline by 1.1% to 20.5%. It is also estimated that mean minimum temperatures over the Coastal Savannah Zone are to increase by 1.1°C, 2.5°C, 1.9°C, by 2040, 2060 and 2080 respectively. Mean monthly maximum temperature is expected to increase by 1.2°C and 2.1°C by 2040 and 2060[21].

Based on the historical rainfall patterns (1980-2010), rainfall across the country has been projected to decrease by 2.9% in the near future (2040), a slight increase in the mid future

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[16] See http://www.nasa.gov/press-release/nasa-noaa-analyses-reveal-record-shattering-global-warm-temperatures-in-2015. Accessed on 24/06/2016

[17] See http://www.giss.nasa.gov/research/news/20160719/. Accessed on 24/06/2016

[18] Yaro *et al*, 2010.

[19] Wholesale Electricity Market Bulletin, Issue 4. April 2016. See http://www.energycom.gov.gh/files/WEM%20April%202016.pdf. Accessed on 01/08/2016

[20] Wholesale Electricity Market Bulletin, Issue 6. June 2016. See http://www.energycom.gov.gh/files/WEM%20JUNE%202016.pdf. Accessed on 08/08/2016

[21] Ghana's Third National Communication to the UNFCCC

(2060) by 1.1% and later decrease in the far future (2080) by 1.7%. This observation is a reflection of the uncertainty associated with rainfall in Ghana.

Historical climate data observed by the Ghana Meteorological Agency (GMet) from 1960 to 2000, also shows a perceptible rise in temperature with accompanying variability in rainfall. Sea levels are predicted to rise 5.5cm, 16.5cm and 34.5 cm by 2020, 2050 and 2080 respectively.

These climatic impacts have the potential of having both direct and indirect impacts on the country, especially with respect to agriculture and energy sectors, water, natural resources, and the country's social fabric. These in turn, have detrimental effects on the dynamics of three key elements of Ghana's socio-economic development (*human communities and livelihoods*; *natural resources*; *infrastructure*) as well as general economic development.

2.3 Climate Change and Green Economy mainstreaming efforts in Ghana

The Government of Ghana (GoG) recognises the increasing need to transform the Ghanaian economy into a green one to effectively address the social, economic, and development challenge arising from climate change[22]. In line with the Africa Consensus Statement to the Rio +20 Conference, Ghana considers Green Economy (GE) as a catalyst for achieving sustainable development (SD)[23]. The country with the support of UNEP has therefore identified Green Economy transition in the areas of budgeting, agriculture, energy, forestry, water, transport, environmental management, roads, building, industry, finance, manufacturing, and tourism. It was equally identified in a consensus by Government of Ghana after the RIO +20 Conference that to effectively address the challenges to a GE transition, it is crucial to develop long term development strategy which integrates SD pillars. Subsequently, the Ghana Shared Growth and Development Agenda II[24] mainstreams climate change and GE principles in all its thematic areas. The nation's 40 year development plan which is currently under preparation also pays critical attention to GE principles. The country is currently implementing a national project supported by the Partnership for Action on Green Economy (PAGE)[25] which aims at supporting a Green Economy transition in Ghana. Under the auspices of PAGE, UNEP[26], and UNECA[27], a number of studies have also been conducted towards a green economy transition in Ghana. These studies include the following;

[22] MEST, 2010.

[23] United Nations Economic Commission for Africa, 2015

[24] The country's current medium term development plan.

[25] The PAGE is a collaboration between the International Labour Organisation (ILO), United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), United Nations Industrial Development Organisation (UNIDO), and United Nations Institute for Training and Research (UNITAR).

[26] United Nations Environment Programme

[27] United Nations Economic Commission for Africa

- Ghana's Transition to a Green Economy: A stocktaking report
- Green Economy Scoping Study
- Green Economy Fiscal Policy Scooping Study
- Inclusive Green Growth in Ghana: Selected Case Studies
- Ghana: Green Industry and Trade Assessment

Further to the various policies that promotes climate change mainstreaming, the government through the Ministry of Finance (MoF), Environmental Protection Agency (EPA), and the National Development Planning Commission (NDPC), has taken a number of measures to reflect the climate change mainstreaming efforts in budget formulation, implementation, monitoring and evaluation in line with medium term climate change objectives. These measures include:

- Incorporating climate change into the 2011 and 2012 National Planning and Budgeting Guidelines by MoF and NDPC. In line with this, Metropolitan, Municipal, and District Assemblies (MMDAs) and Ministries, Departments, and Agencies (MDAs) were required to be steered by these two guidelines in the preparation of their annual sector plans.

- The NDPC and MoF with the support of EPA, have developed indicators on climate change for the Districts known as the Functional Organisational Assessment Tool (FOAT). This tool uses several guides, including indicators on climate change mitigation and adaptation to determine the amount of funds released to the districts. This has been mainstreamed into the national monitoring and evaluation (M&E) plan to guide the implementation of sector and district (M&E) plans.

- NDPC and EPA have developed a guidebook for mainstreaming climate change and disaster risk reduction into District Medium Term Development Plans.

- The MMDAs have been trained on the use of the Guidebook for mainstreaming climate change into planning and budgeting.

- High level awareness creation programmes has been done for Members of Parliament, Members of Council of State, Economic Management Team, Chief Directors of key Ministries, District Chief Executives and Regional Coordinating Directors on mainstreaming climate change and disaster risks management into planning and budgeting at the sector and district levels.

- Policy briefs have been developed on various climate change themes including development planning, agriculture, education, forestry, health, tourism, transport, human settlement disaster risk management, coastal zone and resources, water resources, energy, private sector finance, public finance, opportunities, gender, indigenous knowledge, capacity and technology.

- Introduction of the Ecological Fiscal Reform (EFR) that seeks to modify taxes and public expenditure such that sustainable development, environmental protection, climate change and green economy principles are appropriately considered.

Other initiatives to build capacity, and mitigate the effects of climate change include the following;

- The launch of the REDD-Readiness framework[28].

- Nationally Appropriate Mitigation Actions (NAMA) under the Low Emissions Capacity Building Project and the Natural Resource and Environmental Governance Programme.[29,30]

- Plans to build the largest solar power plant (155 megawatts) in Africa in Ghana[31] as the government of Ghana hopes to achieve its target of 10% of electricity generation from renewable energy sources under the United Nations Decade of Sustainable Energy for All (SE4All) which runs from 2014 to 2024

- Plans to build a new University in Ghana to focus on climate science which will also help address pertinent issues concerning the environment, food security and youth employment.[32]

[28] UNESCO, 2013

[29] See IISD Learning Centre. Developing Financeable NAMAs webinar series (http://www.iisd.org/learning/cources/category.php?id=a8)

[30] Some NAMAs undergoing preparation / implementation in Ghana include:
- The sustainable charcoal supply chain NAMA;
- Access to clean energy through establishment of market-based solutions;
- Promotion of biogas for private use and in public institutions like school and hospitals;
- Integration of renewable energy systems into households and commercial activities.

[31] See http://tv3network.com/all-news/news/local/africa-s-largest-solar-power-plant-to-be-built-in-ghana.html

[32] See http://citifmonline.com/2015/06/09/new-climate-change-university-will-help-solve-flooding-problem-mahama/#sthash.HEJLOc8i.dpuf

2.4 Roles of Key Institutions in the Climate Response and Green Economy Transition

By coordinating with the Ministry of Environment, Science, Technology and Innovation and other key stakeholders, the following institutions will be crucial to the successful implementation of the strategy through the execution of their natural roles.

2.4.1 Ministry of Environment, Science, Technology and Innovation

The Ministry of Environment, Science, Technology and Innovation (MESTI) has undergone re-structuring in order to respond to the need for the integration of science, technology and innovation into national development policies[33]. The ministry's mandate include overseeing the protection of the environment through policy formulation; setting standards and regulate activities regarding the application of science and technology; and planning urban and rural areas, and coordinate and supervise sustainable development activities and the mainstreaming of green economy practices.

MESTI operates through its key agencies which are; the Environmental Protection Agency (EPA); the Council for Scientific and Industrial Research (CSIR); the Ghana Atomic Energy Commission (GAEC); and the Town and Country Planning Department (TCPD). It is the lead institution for climate change activities in Ghana, serving as the Designated National Authority for the Clean Development Mechanism (CDM) under the Kyoto Protocol through the EPA[34].

2.4.2 The Environmental Protection Agency (EPA)

The EPA's role with respect to climate change and the transition to a green economy primarily, is to coordinate the implementation of technical activities through its Energy and Climate Change Unit. This unit serves as the technical hub for climate change and green economy as well as the link for international cooperation programmes. This unit also doubles as the focal points for the United Nations Framework Convention for Climate Change (UNFCCC), the IPCC, Education, Training and Public Awareness and coordinates the preparation of national communications report to the UNFCCC[35]. It also acts as the focal point for the implementation of green economy and climate change related policies and programmes[36].

2.4.3 Ministry of Finance

The Ministry of Finance (MoF) created the Natural Resources, Environment and Climate Change Unit under the Real Sector Division in 2010 to oversee, coordinate and manage the financing of, and support to natural resources and climate change activities. Through this unit, the MoF is mandated to coordinate all support (from both domestic and international

[33] MESTI, 2009.

[34] Climate Change Finance in Ghana (CCFG), 2015.

[35] Benefoh and Nelson, 2012.

[36] MESTI, 2013.

sources) to climate change related activities in Ghana in a bid to avoid potential overlaps and duplication of efforts. The Real Sector Division of the Ministry of Finance also acts as the National Designated Authority for the Green Climate Fund (GCF). As NDA, the ministry oversees the disbursement and monitoring of funds for climate action through the GCF.

2.4.4 National Development Planning Commission

The National Development Planning Commission (NDPC), as the national institution responsible for development planning among others, provides support for the institutional setup involved in green economy and climate change activities in Ghana. NDPC through collaboration with MESTI, EPA and MoF, has ensured that the medium-term development policy framework (the Ghana Shared Growth and Development Agenda II) has the principles of green economy and climate change mainstreamed into all of its thematic areas.

NDPC has also translated climate change issues into planning guidelines and subsequently built the capacity of the Metropolitan, Municipal and District Assemblies (MMDAs) in developing climate change-smart development plans (MESTI, 2013).

The African Adaptation Programme (AAP) at the EPA has developed indicators through the collaborative effort of NDPC and the Fiscal Decentralisation Unit at MoF for climate change in 2011. The Commission also carries out monitoring activities (in collaboration with all MDAs and MMDAs) by overseeing the mainstreaming of indicators, including those for climate change, into the national monitoring and evaluation plan to guide implementation.

2.4.5 Ministry of Local Government and Rural Development

The Ministry of Local Government and Rural Development (MLGRD) promotes the establishment and development of a decentralised government system, ensuring good governance and balanced rural development. The MLGRD, with support from the NDPC, plays an important role in the mainstreaming processes of climate change and green economy practices into local-level development programmes and projects. The MLGRD contributed to the formulation of the NCCP.

2.4.6 Ministry of Health

The Ministry of Health (MoH) provides support to integrate climate change into the management of priority health risks in Ghana, in harmony with national health development priorities. Several major diseases are believed to be exacerbated by climate change, particularly malaria, diarrhoeal diseases, meningococcal meningitis and infectious respiratory diseases (Ministry of Health, 2010)[37]

[37] See http://www.undp.org/content/dam/ghana/docs/Doc/Susdev/UNDP_GH_SUSDEV_Climate%20change%20and%20health%20project.pdf

2.4.7 Ghana Health Service

The Ghana Health Service is responsible for the coordination and implementation of disease surveillance and control. It is also responsibility for public health emergency preparedness and response systems nationwide, which are key to effectively coping with disease outbreaks and the effects of extreme weather events that climate change has the potential to engender.

2.4.8 Ministry of Water Resources, Works and Housing

The Ministry of Water Resources, Works and Housing (MWRWH) has the responsibility of overseeing the development of Ghana's infrastructure in relation to public works, housing, water supply and sanitation, and hydrology. The ministry's mandates are strongly related to climate change and environmental management. Through its agencies (the Departments of Hydrology, Public Works, and Rural Housing) the MWRWH carries out climate response measures for coastal protection and drainage works[38]. The mandate of the ministry also has strong linkages between climate change and water security.

2.4.9 Ministry of Food and Agriculture

The Ministry of Food and Agriculture (MoFA) is responsible for all food security and agricultural related activities in the country. Currently, MoFA is spearheading the implementation of the national Food and Agriculture Sector Development Policy (FASDEP II) including its investment plan, the Medium-Term Agriculture Sector Investment Plan II (METASIP II) being implemented from 2014 to 2017, the National Climate Smart-Agriculture and Food Security Action Plan (2016 – 2020) to facilitate and operationalise the NCCP for effective to integration of Climate Change into Food and Agriculture sector development policies, and programmes.

With the support of the International Fund for Agricultural Development (IFAD), the Ministry also launched and began implementing in 2015, the Ghana Agricultural Sector Investment Programme (GASIP) – a demand driven value chain development programme that mainstreams climate change with the aim of enhancing the climate resilience of small holders to ultimately, promote climate smart agriculture.

2.4.10 Ministry of Petroleum

The Ministry of Petroleum is Ghana's public institution charged with formulating, monitoring and evaluating petroleum related policies. Given that energy is critical to the climate change discussion, this Ministry's role cannot be overemphasised. The Ministry

https://www.google.com.gh/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwj-nOfsz7_JAhUDXhoKHRHQDZ8QFggsMAI&url=http%3A%2F%2Fwww.moh-ghana.org%2FUserFiles%2FClimateHealthProject.ppsx&usg=AFQjCNFuVmL-zWh7tqnZ7gL9K9Dx7ZKOVQ
Accessed on 03/12/2015

[38] Climate Change Financing in Ghana, 2015.

which was previously the Ministry of Energy developed an Energy Policy Document in 2010 with the aim of contributing to climate change mitigation measures and initiatives to promote clean energy with less use of wood fuel and charcoal to safeguard the nation's forests that are important carbon sinks.

2.4.11 Ministry of Power

The Ministry of Power was formed in 2014 out of the previous Ministry of Energy and Petroleum with the mandate to lead policy formulation and implementation in the power sector. As the ministry with oversight responsibility over Ghana's power sector, its activities have strong linkages with GHG emissions and climate change. The Ministry is represented on the National Climate Change Committee.

2.4.12 Energy Commission

The Energy Commission of Ghana was established by the Energy Commission Act, 1997 (Act 541) by the Parliament of Ghanaian. As part of its mandate, the Commission regulates and manages the development and utilisation of energy resources in Ghana as well as provides the legal, regulatory and supervisory framework for all providers of energy in the country. The Commission grants licenses for the transmission, wholesale, supply, distribution and sale of electricity and natural gas as well as the promotion of renewable energy and energy efficiency.

2.4.13 Ministry of Lands and Natural Resources

The Ministry of Lands and Natural Resources (MLNR) is mandated to oversee the management of Ghana's land, forest, wildlife and mineral resources. It works in conjunction with the Forestry Commission and Forestry Research Institute of Ghana in the execution of its activities. The MLNR is represented on the NCCC and has also been contributing to the climate change response since the 1990s.

The MLNR is the lead national entity responsible for the oversight and direction of 'Reducing Emissions from Deforestation and Forest Degradation (REDD+) activities in Ghana. Hosted by the Forestry Commission, the REDD+ Secretariat serves as the secretariat for the National REDD+ Working Group and coordinates the implementation of REDD+ readiness activities, as outlined in the National REDD+ Preparation Proposal (R-PP), with support provided by the Forest Carbon Partnership Facility (FCPF) of the World Bank (MESTI, 2013).

2.4.14 Forestry Commission

The Forestry Commission of Ghana is established by Act 571 of 1999 and is responsible for regulating the utilisation of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them. The Commission manages the nation's forest reserves and protected areas and develops forest plantations for the restoration of degraded forest areas towards expanding the nation's

forest cover. The Commission has a Climate Change Unit which doubles as the National REDD+ Secretariat and coordinates Ghana's ongoing REDD+ process.

2.4.15 Ghana Meteorological Agency

The Ghana Meteorological Services Department was established after independence in 1957 under the Ministry of Communications[39], later becoming the Ghana Meteorological Agency (GMet) in 2004. The Agency provides information/weather services through the collection, processing, storage and dissemination of meteorological data to end users. This plays a vital role in the day-to-day activities of both individuals and institutions (with regard to climate change) since it provides information necessary for enhancing and ensuring proper climate change adaptation measures.

2.4.16 Ministry of Roads and Highways

The Ministry of Roads and Highways (MoRH) is charged with the provision and maintenance of an integrated, cost-effective and sustainable road transport network. The ministry is currently supervising the implementation of the Bus Rapid Transit (BRT) system within Accra. When successfully implemented, the BRT system will lead to a more environmentally friendly and sustainable means of transport which will help address the heavy vehicular traffic in the city, and thereby reduce the volume/amount of transport-related greenhouse gas emissions.

2.4.17 Ministry of Gender, Children, and Social Protection

The Ministry of Gender and Social Protection has among its objectives, the formulation of policies and programmes to advance the well-being of women, children, and the marginalised in society. The Ministry also advocates women empowerment and is represented on the NCCC, as women and children are considered to be the worst affected by climate change. The National Gender Policy is also specific about activities to "Engender climate change processes and facilitate the participation of CSOs, famer-based organisations to ensure that agricultural practices and other livelihood practices comply with acceptable standards[40].

2.4.18 Ministry of Youth and Sports

The Ministry of Youth and Sports is established by the Civil Service Law, Act 327 of 1993. It oversees the development and implementation of youth and sports related policies in response to the inherent advantages in the affinity and synergies between youth and sports as an instrument for national development – a trend which emerged in the early 2000s among countries worldwide, especially Commonwealth Nations. The Ministry executes its

[39] See http://www.meteo.gov.gh/website/index.php?option=com_content&view=article&id=61&Itemid=59. Accessed on 23/05/2016

[40] National Gender Policy, Page 26

mandate in order to achieve national integration and international recognition; promote youth empowerment and self-development; and provide an enabling environment for sports development, organisation and promotion.

2.4.19 National Youth Authority

The National Youth Authority (NYA) is an agency of the Ministry of Youth and Sports and was established in 1974. The Authority is mandated to undertake programmes focused on youth empowerment by through the Youth Leadership and Skills training Institutes. It organises programmes to sensitise and inform the youth on critical matters including governance, civic responsibilities, career development, ethical leadership, among others.

2.4.20 National Sports Authority

The National Sports Authority organises, promotes and manages competitive and social sports with the objective of promoting health fitness, recreation, national cohesion and professionalism. The Authority will be a critical institution in executing the youth and sports related action plans of the strategy.

2.4.21 Council for Scientific and Industrial Research and Other Research Institutions

The Council for Scientific and Industrial Research (CSIR) was established in its present form by the National Liberation Council (NLC) Decree 293 in 1968 and re-established by the CSIR Act 521 in 1996. The Council is mandated to carry out scientific and technological research for national development. Beyond the CSIR, other national, regional, and international research institutions have been key in the climate change and green economy related research. All these institutions will play a key role in future research in the context of this learning strategy.

2.4.22 Tertiary Institutions

Tertiary institutions play a key role in the general socioeconomic development of any country as they are critical in the training of human resource in the various sectors of national development. Tertiary institutions are instrumental in the design and development of courses, programmes and research in the subject of climate change and green economy. Additionally, tertiary institutions are key players in the formulation of policies and programs related to climate change adaptation and resilience and the green economy transition.

2.4.23 National Disaster Management Organisation (NADMO)

The National Disaster Management Organisation is responsible for promoting Disaster Risk Reduction (DRR) and Climate Change Management countrywide. The organisation achieves this by building the capacity of staff and other stakeholders and engaging in public awareness campaigns, among others. The activities of NADMO are strongly related to climate change as it is believed that about 80% of disasters in Ghana are climate related.

2.4.24 Parliament of Ghana

The state acting through parliament is required by the constitution to take appropriate measures to enact laws that seek to protect and preserve the national environment for future generations. Parliament as a body is also responsible for the approval of projects and contracts that pertain to the granting of rights to the allocation and exploitation of natural resources. These responsibilities are enshrined in Articles 36 (9) and 268 (1) of the 1992 Constitution of Ghana. In executing this mandate, Parliament ensures that agreements regarding natural resource allocation, exploration and exploitation, show a commitment to climate change resilience as part of requirements for parliamentary approval. Generally, parliamentarians performing the fiduciary duty of preserving the environment on behalf of the citizenry need to be sensitive to issues of climate change and green economy as it transcends other areas of legislature. Regarding environmental, climate change, and green economy issues, the parliaments executes its function primarily through the Science and Environment and the Lands and Forestry Committees.

2.4.25 Ministry of Education/Ghana Education Service

The Ministry of Education and Ghana Education Service are responsible for formulating and implementing policies and programmes to ensure quality and accessible education to all Ghanaians. This will help promote human development, good health, poverty reduction, national integration, international recognition, among others. Children and youth are vulnerable to the impact of climate change but can also be agents of change in the fight against climate change. Realising this, the MoE/GES is committed to implementing climate and green economy education for sustainable development through curriculum development as well as ensuring child friendly and safe schools.

Currently, the MoE/GES is reviewing its sector development plan up to 2030. The plan sets out eight strategic objectives including curriculum review for the pre-tertiary and tertiary education curriculum. This initiative is a response to global concerns in achieving the Sustainable Development Goals 4 and13 which are to “promote equitable, quality, and inclusive education and lifelong learning” and “take urgent action to combat climate change and its impact” respectively.

2.2.26 National Commission for Civic Education

The National Commission for Civic Education (NCCE) is constitutionally mandated to develop programs aimed at realising the objectives of the 1992 Constitution at national, regional and district levels. The Commission also creates awareness among the citizenry of their civic rights and responsibilities.

2.2.27 The Chieftaincy Institution

The chieftaincy institution is a critical leadership structure within the social structure of the Ghanaian society and wields an enormous influence within the country’s political economy. The 1992 Constitution acknowledges and guarantees the chieftaincy institution together with its traditional councils and further establishes the National and Regional

House of Chiefs. The chieftaincy institution also represents a symbol of traditional authority, unity, and cohesion in their respective communities and will be an effective tool to reaching their constituents with the climate change and green economy awareness.

2.4.28 Civil Society Organisations

Civil Society organisations have in recent times become very active in promoting the adoption of climate smart approaches in response to climate change. This has been seen across a number of sectors, most especially in agriculture, energy, health and education. CSOs will continue to be a key partner in advancing climate change and green economy awareness due to their expertise in the field and the depth of engagement they are able to achieve at the local level whilst being able to contribute productively at the policy making level.

2.4.29 The Media

The media plays an important role in informing and educating the general public on all subject matters. In many countries, the media is regarded as the fourth arm of government due to the role they play in national development. The media will therefore be a critical institution in the general awareness creation for climate change and green economy issues. The media will also be instrumental in monitoring the implementation of the learning strategy as well as be a platform for creating the needed publicity for the National Climate Change and Green Economy Learning Strategy.

2.4.30 Religious and Faith Based Organisations

Religion is an integral part of Ghana's society, with 93.3% of the Ghanaian populace estimated to belong to one religion or the other[41]. Religious leaders and bodies are therefore effective tools in creating awareness among the populace generally, and specifically, their congregation on very pertinent issues.

The Religious Bodies Network on Climate Change (RELBONET) was formed as a faith based organisation dedicated to working to address the effects of climate change. RELBONET has the membership of all religious groupings and bodies in Ghana and has been active in the climate change and sustainable development advocacy since its formation in 2010[42]. Together with other faith based organisations, RELBONET will be a critical entry point to reach the general public on climate change and green economy awareness.

[41] Ghana Living Standards Survey Round 6, 2014

[42] See http://www.relbonet.org/about-us/

2.5 National Laws, Regulations and Policy Initiatives

2.5.1 The 1992 Constitution

The 1992 Constitution of Ghana is the cornerstone of natural resource governance in the country. Through numerous acts, laws and decrees, the constitution empowers or sets up relevant institutions under section 2.4 whose roles are critical in Ghana's climate action and green economy transition. Furthermore, through Directive Principles of State Policy established under article 41(K) the constitution establishes that the exercise and enjoyment of rights and freedoms cannot be separated from the execution of duties under the law. Thus it states that, "it shall be the duty of every citizen to protect and safeguard the environment"

2.5.2 EPA Act 490

The EPA Act 490 of 1994 is an act of parliament that established the Environmental Protection Agency as the lead institution for improving, conserving and promoting the country's environment and striving for environmentally sustainable development with sound, efficient resource management. The Agency operates under the Ministry of Environment, Science, Technology and Innovation. Together with the MESTI, the EPA was responsible for the coordination efforts that led to the development of the National Environment Policy and the National Climate Change Policy. The EPA Act also sets out the Agency's organisational structure, the modalities for the establishment and management of an Environmental Protection Fund.

2.5.3 Local Government Act

The Local Government Act 1993 (or Act 462) is the Act of parliament that establishes local government institutions. The act sets out the administrative structure, functions, and planning functions, among others. Based on this act, MDAs have the responsibility of being the main planning authority for their jurisdictions. Local governments through this mandate MMDAs have the power to plan spatial and socioeconomic development activity of their jurisdictions. In recent times MMDAs have become more conscious of climate change and adaptation and are working towards adopting policies and designs that will make their respective towns and cities more resilient.

2.5.4 NDPC Act

The National Development Planning Commission was established by Articles 86 and 87 of the 1992 constitution of Ghana. The institution acting with other departments of state has the responsibility to: "advise the President on development planning policy and strategy" and, "at the request of the President or Parliament, or on its own initiative," do the following; a) study and make strategic analyses of macro-economic and structural reform options; b)make proposals for the development of multi-year rolling plans taking into

consideration the resource potential and comparative advantage of the different districts of Ghana; c) make proposals for the protection of the natural and physical environment; d) make proposals for ensuring the even development of the districts of Ghana by the effective utilization of available resources; and e) monitor, evaluate and coordinate development policies, programmes and projects.

In executing its mandate, the NDPC leads or gives guidelines to institutions in preparing public policies and regulations aimed at achieving sustainable economic growth. An example of this is the GSGDA I and II, which have as one of its themes the adoption of environmentally friendly principles in national development planning, mainstreaming climate change and green economy principles into national development planning, and the capacity building of some state departments and agencies to be more sensitive to climate related issues.

2.5.5 40 Year Development Plan

The National Development Planning Commission is currently leading the process of developing a 40 year development plan which will have at its core, issues of sustainable development, as well as climate change and green economy mainstreaming including capacity building of relevant institutions to promote Ghana's green economy transition.

2.5.6 The Ghana Shared Growth and Development Agenda (GSGDA II, 2014-2017)

The Ghana Shared Growth and Development Agenda II acknowledges climate change as a major challenge that has the potential not only to erode the development gains made, but also hinders further growth and sustainable development. Climate change affects livelihoods, and almost every aspect of society, from health and food supplies, to business and national economies[43].

The priorities of the GSGDA II (2014-2017) are is core to the government's efforts to pursue sustainable and equitable economic growth which is in itself enshrined de jure in the provisions of the Directive Principles of State Policy (Article 36 (9)) of the 1992 Constitution of the Republic of Ghana. A key strategy identified to promote economic growth in the GSDA II is the adoption of green economy principles in national development planning. The GSDA II also focuses on enhancing the capacity of the relevant agencies to adapt to climate change impact, mitigate the impact of climate variability and generally promote a green economy.

2.5.7 Nationally Determined Contributions

Ghana presented its Nationally Determined Contributions (NDCs) at the 21st Conference of Parties (CoP 21). Within the NDCs, Ghana has put forward 20 mitigation and 11 adaptation programme of actions in 7 priority sectors for a ten (10) year implementation period (2020-2030). The priority economic sectors that Ghana's NDCs cover are: Sustainable land use including food security; Climate proof infrastructure; Equitable social development;

[43] UNESCO Series on Journalism Education. Climate Change in Africa: A Guidebook for Journalists, 2013

Sustainable mass transportation; Sustainable energy security; Sustainable forest management; and Alternative urban waste management. These priority economic sectors are in tandem with Ghana's medium term development agenda (Ghana Shared Growth and Development Agenda II), the 40 year development plan under preparation, and the universal Sustainable Development Goals (SDGs). Ghana intends to use this learning strategy as a tool to build the needed skills and knowledge to ensure the successful implementation of the NDCs.

2.5.8 National Climate Change Policy

The vision of the Ghana National Climate Change Policy (NCCP) is "*to ensure a climate resilient and climate compatible economy while achieving sustainable development through equitable low carbon economic growth for Ghana*" The policy was developed to serve as the country's integrated response to climate change and to provide clearly defined pathways for dealing with the challenges of climate change within the context of Ghana's sustainable socio-economic development, as well as identify opportunities and benefits of a green economy (Ghana National Climate Change Policy, 2012).

The policy also identifies the significant development benefits that climate change related opportunities such as low carbon economic growth has for the country. Other benefits that may be derived from mainstreaming climate change into development include the opportunities for new business models and innovations, new sustainable development paradigm, and new and scientific ways for indigenous knowledge to have an impact in the quest for sustainable development. The National Climate Change Policy identifies Ghana's priority areas regarding climate change and is the reference point for all climate change related efforts.

2.5.9 National Environment Policy

The National Environment Policy (NEP) acknowledges capacity building as a major step towards the realisation of a desired environment. Capacity building and education is a major focus area through which the National Environment Policy seeks to promote attitudes and values that influence environmentally-ethical behaviour by developing understanding and skills. Building capacity also enables citizens to be informed and actively participate in the quest to develop an ecologically sustainable and socially just society (National Environment Policy, MESTI, 2013). Among other goals, the NEP seeks to achieve the following:

a. Improve the commitment to environmental objectives, policies and interventions;

b. Create an understanding of the nature and causes of environmental problems among the public;

c. Define the national environmental agenda, linking it to economic growth, poverty reduction, as well as legal and institutional capacity;

d. Improve environmental quality monitoring programmes to ensure that the appropriate mitigation measures are implemented;

e. Take appropriate measures to control pollution and the importation and use of potentially hazardous and toxic chemicals;

f. Take appropriate measures to protect sensitive ecosystems;

g. Improve collaborations and coordination among Metropolitan and District Assemblies and other key actors (National Environmental Policy).

2.5.10 Low Carbon Development Strategy

The Low Carbon Development Strategy (LCDS) re-affirms Ghana's commitment to mainstream climate change into development efforts. The overarching objective of the LCDS is to provide a framework that will ensure climate-resilient, equitable, low-emission economic growth, and to provide opportunities for Sustainable Development (SD) and poverty reduction in a cost effective manner. Ultimately, this will promote a vibrant climate compliant economic development that ensures both intra-generational and inter-generational equity. The specific objectives of Ghana's Low Carbon Development Strategy include:

- Assess the current climate change mitigation policies/strategies and challenges;
- Provide a clear picture of the current situation with regards to major emission sources;
- Provide a clear picture of future emissions based on the current situation (business as usual scenario);
- Identify, analyse and develop long-term mitigation scenarios based on cost efficiency and effectiveness, and on national development aspirations;
- Assess the potential barriers to implementing these strategies and recommendations for improvement;
- Develop institutional framework to support the implementation of the strategies;
- Develop action plans for the implementation of strategies in key sectors;
- Identify opportunities for appropriate financial and economic policy initiatives that will enhance implementation of the strategies.

2.5.12 National Climate Change Adaptation strategy

To effectively streamline climate change adaptation efforts, the National Climate Change Adaptation Strategy (NCCAS) was developed to define the strategic blueprint for adjusting Ghana's economy to expected climatic stimuli and their effects for the period 2010-2020. To help achieve its primary objective which is "*to enhance Ghana's current and future development by strengthening its adaptive capacity with regard to climate change impacts and building the resilience of the society and ecosystems*", the NCCAS has formulated some programmes to minimise vulnerability and increase resilience to climate change impacts, and enhance national capacity to adapt to climate change. The objectives of the NCCAS include the following:

- Ensure a consistent, comprehensive and targeted approach to increasing climate resilience and decrease the vulnerability of the populace;
- Deepen the awareness and sensitisation of the general populace and of policy makers in particular about the critical role of adaptation in national development efforts;
- Position Ghana to draw funding for meeting her national adaptation needs;
- Strengthen international recognition to facilitate action;
- Facilitate the mainstreaming of climate change and disaster risk reduction into national development; and
- Stress the linkages between adaptation and mitigation activities by harmonising and creating synergy among different sectors.

2.5.13 Ghana National Youth Policy

The vision of the Ghana National Youth Policy of 2010 is '*empowering the youth to impact positively on national development'*. The policy also has environment as one of its focus areas, with the objective of improving the youth's knowledge on sustainable environmental practices, which in a broader context, includes climate change education and capacity building.

2.6 National Priorities of the National Climate Change Policy (NCCP)

In order to develop a climate resilient and compatible green economy while achieving sustainable development through equitable low-carbon economic growth, five critical priority areas have been identified within Ghana's National Climate Change Policy. These priority areas are;

i. Agriculture and Food Systems
ii. Disaster Preparedness and Response
iii. Natural Resource Management
iv. Equitable Social Development
v. Energy, Industrial, and Infrastructural Development

2.6.1 Agriculture and Food Systems

The Intergovernmental Panel on Climate Change (IPCC) has estimated that up to 250 million Africans are likely to suffer from food insecurity as a result of climate-driven consequences by 2020.[44] Climate change and variability are continuously becoming a major constraint to the development of the food and agriculture sector (including fisheries) in Ghana, with its impacts manifested through increasing variability of rainfall. In the area of fisheries development, increasing numbers of coastal communities continue to experience a reduction in lands available for agriculture due to sea erosion caused by rising sea levels.

According to the Ministry of Environment, Science, Technology and Innovation (MESTI), Ghana's agricultural sector and food production systems are largely based on exploitation of natural resources, with extensive crop and livestock production systems, rain-fed agriculture, hunting, and fishing from natural water bodies.[45] (MESTI, 2014). The focus of the agriculture and food systems priority area is to *develop a climate-resilient agriculture and food systems for all agro-ecological zones.*

2.6.2 Disaster Preparedness and Response

Infrastructure plays a critical role in building the resilience of a town or community to climatic events and climate change[46]. The damaging impacts of climatic conditions on infrastructure such as roads, dams, power distribution lines, homes, settlements, and sea defence walls can potentially erode economic gains made in the country with associated loss of lives in the event of disasters.

[44] See the UNEP Factsheet *Climate Change in Africa - what is at stake?* (http://www.unep.org/roa/amcen/docs/AMCEN_Events/climate-change/2ndExtra_15Dec/FACT_SHEET_CC_Africa.pdf)

[45] National Climate Change Policy

[46] National Climate Change Policy

2.6.3 Natural Resource Management

Ghana's natural resources are essential for providing important goods and services for social and economic development. As natural sinks and stores of carbon, these ecosystems contribute to the biological mitigation of greenhouse gases (GHGs) through sequestration. Improving ecosystems and environmental management practices through a deliberate climate change learning and capacity building strategy has the potential of providing economic gains as well as the additional benefits of a greater agro-biodiversity and increased carbon sequestration.

2.6.4 Equitable Social Development

Climate change is influenced by social processes that relate to the way society evolves through time. There is ample evidence that human activities are a major driving factor of climate change. Over time, how effective the society in general is able to adapt to climate change as well as mitigate its effects is largely influenced by physical, technological, gender, and socio-economic factors.

It is also a well-known fact that children, women, and marginalised groups such as persons with disability (PWDs) are the worst affected by climate change. UNESCO succinctly puts it this way; "*Climate Change is a global phenomenon; as such, all people are vulnerable to its impacts. And yet, one major demographic in particular, disproportionately bears the brunt of shifting weather patterns: women*"

A climate change learning effort targeted at children, women, and the marginalised in society is therefore well placed to ensure that the effects of climate change on these groups of people are substantially mitigated. This learning strategy therefore targets children and women in all relevant activities bearing in mind gender equality and women's empowerment issues.

2.6.5 Energy, Industrial, and Infrastructural Development

The energy, industrial and infrastructural development priority area has the single strategic focus of minimising greenhouse gas emissions. The National Climate Change Policy acknowledges that the increasing greenhouse gas emissions from fuel consumption, for power and transport, agricultural soil, waste, burning of biomass, and other land use activities must be addressed in the nation's near-to-medium term development agenda. To effectively do this, stakeholders' capacities need to be adequately developed through among others, appropriate climate change learning initiatives.

2.7 Past and On-going Climate Change and Green Economy Learning Initiatives

There are a number of climate change related educational efforts targeted at the formal and informal segments of the society. Most of these educational programs do not only focus on increasing public awareness on climate change, but also place emphasis on behavioural change and community action. With the support of the UN Institute for Training and Research (UNITAR) a Green Economy Learning Assessment has been done to support a strategic approach to Green Economy Learning. The objective of the assessment was to identify priority green economy areas for awareness, develop knowledge and skills of key decision makers and managers in the public and private sector and civil society to advance a Green Economy transition in Ghana.

Formal climate and green economy learning focuses on the review of school curriculum to include climate change and green economy principles at all levels of the educational system. At the tertiary level, climate change and green economy related subjects have either been integrated into existing courses or special graduate courses have been designed. Tables 1, 2, 3 and 4 presents past and current formal, and informal educational, and research programmes on climate change and green economy. Leveraging on the success and results, the courses or research programmes can be re-designed, and re-packed or new courses designed entirely to accommodate new and emerging concepts in climate change and green economy.

Table 1: Climate Change and Green Economy Research Institutions

Institution/Research Centre	Research/Initiative
CSIR-Crop Research Institute, KNUST, WASCAL, University of Cape Coast, Forum for Agricultural Research in Africa (FARA), ISSER, West Africa Regional Office - International Network for Bamboo and Rattan (INBAR)	*Improving food security in Africa through increased system productivity of biomass-based value webs (BiomassWeb):* Ghana is one of three African Countries participating in the BiomassWeb research with funding from the German Government. BiomassWeb aims to provide concepts to increase the availability of and access to food in Ghana through more and higher-value biomass for food and non-food purposes in the next decades. BiomassWeb is structured around the analysis of biomass demand, supply and related value webs, research innovations, and implementation including capacity and network building. In Ghana, the research study sites are located in Ashanti Region, Brong-Ahafo Region, and Upper East Region. The research is running from 2013 to 2018.
CECAR-Africa - (United Nations University Institute for Natural Resources in Africa)	*Enhancing Resilience to Climate and Ecosystem Changes in Semi-Arid Africa: An Integrated Approach:* The goal of the CECAR-Africa Project is to enhance resilience to climate and ecosystem changes in Semi-Arid Africa, with a particular focus on the northern part of Ghana. UNU-INRA undertakes research and implements capacity development programs for local residents and professionals in Northern Ghana (social institutions, technical capacity development) in collaboration with UNU-ISP and UDS. Other partner institutions on the project include: University of Tokyo and Kyoto University in Japan and University of Ghana and Ghana Meteorological Agency in Ghana. This 5-year project (2012-2016) is funded by Japan Science and Technology Agency (JST) and Japan International Cooperation Agency (JICA) through a scheme called SATREPS.
CSIR-Crop Research Institute	*CLIMAFRICA:* CLIMAFRICA is an EU sponsored research program in which Ghana is participating with 10 other European and 8 African Countries. The research focuses on developing improved climate prediction on seasonal to decadal climatic scales; assessing impacts in water and agriculture sector of the economy; evaluating vulnerability of the ecosystems and civil population; suggest and analyse new adaptation strategies; develop a new concept

Institution/Research Centre	Research/Initiative
	monitoring and forecasting warning systems. The research site is the communities around Ankasa Forest Reserve. The project run for the period 2010 – 2014. The other partners are CSIR Soil Research and Forestry Research Institute of Ghana.
CSIR-WRI, in collaboration with international and regional partners, is implementing 4 major climate change adaptation projects in the Volta River Basin, namely, WISE-UP to Climate, VOLTRES, ICT-IRRIWEST, and RWH4GHANA.	
CSIR-Water Research Institute (WRI) Project Partners: International Union for Nature Conservation (IUCN), African Collaborative Centre for Earth System Science (ACCESS), International Water Management Institute (IWMI), Overseas Development Institute (ODI), University of Manchester (UoM), Basque Centre for Climate Change (BC3), Volta Basin Authority (VBA)	*WISE UP to Climate:* *WISE-UP to Climate (Water Infrastructure Solution from Ecosystem Services Underpinning Climate Resilient Policies and Programmes)* is a project that demonstrates natural infrastructure as 'nature-based solution' for climate change adaptation and sustainable development. The project is developing knowledge on how to use portfolios of built water infrastructure (eg. dams, irrigation channels) and natural infrastructure (eg. wetlands, floodplains, watersheds) for poverty reduction, water-energy-food security, biodiversity conservation, and climate resilience. WISE-UP to Climate is a 4-year project (2013-2017) funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.
CSIR-Water Research Institute Project Partners Partners: Aahus University, Denmark	*VOLTRES:* *VOLTRES (Effects of Climate Change on Lake Volta Resources) is a 3-year project (2013-2016)* is funded by the Danish Ministry of Foreign Affairs through DANIDA with the objective of (i) improving the understanding of the physical and biogeochemical functioning of Lake Volta and the response of the Lake, together with its fishery resources, to climate change; (ii) strengthening local research capacity through the use of new research approaches such as ecosystem and biophysical modelling; and (iii) supporting effective management of the Lake through sharing and dissemination of vital climate change related information and data for planning appropriate responses to climate change effects in the Lake environment.
CSIR-Water Research Institute	*ICT-IRRIWEST:* ICT-IRRIWEST (ICT tools for the enhancement of irrigation efficiency in West Africa) is aimed at enhancing the use of ICT tools and innovative irrigation technologies in agriculture in order to

Institution/Research Centre	Research/Initiative
Project Partners: NEIKER (Spain), INKOA (Spain), CORAF/WECARD (Senegal),ISRA (Senegal)	optimize water resources management and increase agricultural productivity in the face of climate change. This is a 4-year project (2013-2016) funded by the African Union grant, with support from European Union.
CSIR-Water Research Institute Project Partners: CSIR-STEPRI, SINTEF Technology (Norway), CSIR-COTVET	*RWH4GHANA:* *RWH4GHANA (Rainwater Harvesting for Climate Change Adaptation) aimed at designing and implementing standardized rainwater harvesting systems for climate change adaptation in Ghana. This project is funded by the Nordic Climate Facility/CSIR-COTVET and spanned 4 years (2013-2016)*
CSIR-Forestry Research Institute of Ghana (FORIG)	*Does shifting Carbon Use Efficiency determine the growth rates of intact and disturbed tropical forests? Gathering new evidence from African forests:* This was a joint research between FORIG and University of Oxford with funding from the Government of the United Kingdom through the Natural Environment Research Council. It started in 2011 and ended in 2014. The research sites were Bobiri Forest Reserve and Kogyae Strict Nature Reserve (KSNR).The research aims to address fundamental hypotheses on the relative importance of photosynthesis and autotrophic respiration in determining forest function in intact and disturbed tropical forests.
CSIR-Forestry Research Institute of Ghana (FORIG)	*Savannah forest boundary transition in West Africa - Coupling the energy balance and hydrology and carbon cycles across the biome:* This research is sponsored by the European Union and focuses on assessing the energy balance and carbon fixation regime in savannah vegetation in the forest savannah zone of tension. The research partners are FORIG and Wageningen University.
CSIR-Forestry Research Institute of Ghana (FORIG)	*Water Stress, Ecosystem Function and tree functional diversity in tropical African forests:* This is a collaborative research between FORIG and University of Oxford, and is being funded by *The Leverhulme Trust - Royal Society of United Kingdom (A130026)*. It started in January 2014 and expected to end in December 2016. It seeks to test the following hypothesise: 1. The increasing drought resilience of trees as we move along the wet-dry gradient will be characterised by shifts in leaf and wood hydraulic properties.

Institution/Research Centre	Research/Initiative
	2. Leaf venation characteristics and osmotic potential will be adequate descriptors of the drought resilience of tropical trees 3. Forest tree species with greater intraspecific variability in hydraulic traits will be able to occupy a broader range of the rainfall gradient than trees with less variability 4. The project sites are along climate gradient, from Forest-Savannah Transition (Kogyae Strict Nature Reserve), Moist Semi-deciduous forest (Bobiri) to Wet Evergreen forest (Ankasa).
CSIR-Forestry Research Institute of Ghana (FORIG)	*The multi-year impacts of the 2015/2016 El Niño on the carbon cycle of tropical forests:* This is a collaborative research between FORIG and University of Oxford, with other partners from institutions in Africa, Asia, South America. It is being funded by Natural Environment Research Council of the United Kingdom. It started in 2016 and expected to end in 2018. Earth is currently experiencing its strongest El Niño for many decades. Such events lead to a carbon source in the tropical land biosphere, but the exact mechanism of this carbon source is poorly described and quantified. A unique global network of tropical forest monitoring sites that are able to track the carbon cycle impacts of this event at monthly or seasonal resolution are currently being operated. A systematic analysis of the impacts of this event, tracking the productivity and respiration at seasonal resolution until the end of 2017 to understand the multi-year impacts will be conducted. This study would provide the clearest picture yet available of the main mechanisms of carbon cycle perturbation within intact tropical biomes, information that will be used to directly inform and test carbon cycle sensitivities in global biosphere models.
CSIR-Forestry Research Institute of Ghana (FORIG)	*Impact of Selective Logging on Plant diversity, Natural Recovery and Vegetation Carbon Stock: The case of Bobiri forest reserve:* The study examined the effect of selective logging on the floristic composition and structure and the vegetation carbon stock recovery of a moist semi-deciduous forest in Ghana. It was carried out in the *Bobiri* Forest Reserve, which is in the moist semi-deciduous southeast sub-type, in southern Ghana. Sites were selected chronosequentially. The research sought to answer the following questions: (i) Is the forest able to naturally recover with respect to floristic composition and vegetation carbon stock? *(ii)* Is there a build-up or a decline in carbon stock with time after selective logging?

Institution/Research Centre	Research/Initiative
	(iii) What role do species with various ecological guilds play in carbon stock recovery after logging? It commenced in 2009 and ended in 2015.
CSIR-Forestry Research Institute of Ghana (FORIG)	*Management of forests established through rehabilitation of degraded forests by local communities in Ghana:* It is being implemented by FORIG in collaboration with KNUST, Local communities and Forest Services Division of the Forestry Commission of Ghana. The funding came from International Timber Organization (ITTO). The project sites are located in the Pamu Berekum forest reserve in the Dormaa Forest District, Afrensu-Brohuma Forest reserve in the Offinso Forest District and Southern Scarp Forest Reserve in the Begoro Forest District. It began in 2012 and ends in 2016. The project aims at contributing to rural livelihood by improving benefits from forests established by local communities through rehabilitation of degraded forests. The specific objective is to develop models, identify strategies and use them for management of forests established by local communities through the rehabilitation of degraded lands leading to enhance conservation, provision of goods and services. It is also to determine mechanisms for payment of the services to ensure improved livelihood of local communities.
Nature Conservation Research Centre (NCRC)	*Payment for Watershed Services on the role forest in generation of rainfall in Ghana:* The research is a collaboration of NCRC, FORIG, WRC and University of Oxford which seek to assess the ecosystem limits for poverty alleviation. The research is part of the global project on ecosystem service for poverty reduction (ESPA). The government of United Kingdom provided funding.
West Africa Science Centre on Climate Change and Adapted Land use (WASCAL)	WASCAL is a large-scale research-focused Climate Service Centre mandated to help tackle the challenges of climate change in West Africa. Funding is from Government of Germany. Ghana is among the ten West African Nations benefiting from WASCAL and hosts the headquarters (CSIR Head Office) and the Land use Centre (KNUST). WASCAL is organised around three main components namely – (a) Competence Centre and Observation Network, (b) Core Research Program and (c) Graduate Studies Program. The activities of the WASCAL Core Research Program are grouped into six research clusters: (a) climate and weather; (b) landscape dynamics,(c) agricultural systems; (d) markets and

Institution/Research Centre	Research/Initiative
	livelihoods; (e)risk management; and (f) integrated assessment. The research Program cluster has produced extensive datasets and peer reviewed papers on vegetation structure, hydrology, farming systems and innovations, soils, landscape dynamics etc. These products are useful to support evidence-based policy and practice on climate change. WASCAL is running until the end of 2018.

Source: Ghana's Third National Communication, 2015; Field Survey, 2016

Table 2: Climate Change related courses offered by tertiary institutions

Course/Program	Institution
MSc and MPhil in Climate Change and Sustainable Development	University of Ghana, Legon
Bachelor of Arts in Geography	University of Ghana, Legon
MSc. Climate Science and Meteorology	KNUST
MSc. Renewable Energy	KNUST
MSc. Natural Resource Management	KNUST
MPhil. Natural Resource and Environmental Governance	KNUST
MSc. Environmental, Science, Policy and Management	Institute of Local Government Studies, Accra and Tamale
Post-graduate studies	University of Ghana, Legon
Post-graduate studies	University of Ghana, Legon
MA in Environment and Resource Management	University of Development Studies
MA Geography and Regional Planning	University of Cape Coast
MSc Sustainable Energy Management	University of Energy and Natural Resources
Dual Degree Program in Master of Science in Bio-Economy and Natural Resources	University of East Finland in partnership with the Forestry Research Institute of Ghana
EIA training Programmes (Short Courses)	EPA Training School
MPhil/MSc Climate Change and Integrated Natural Resources Management	CSIR College of Science and Technology: Forestry Research Institute of Ghana

Course/Program	Institution
MA/MPhil/PhD in Population Studies, Environment & Development	Regional Institute for Population Studies-University of Ghana

Source: Ghana's Third National Communication, 2015; Green Economy learning assessment in Ghana, 2015; Field Survey, 2016

Table 3: Public awareness and training Programmes

Institutions	Public Awareness Program	Level/Target
Centre for African Wetlands, University of Ghana and Ghana Wildlife Society	Local community fora and stakeholder consultative meetings organised to seek and exchange views with communities concerning climate related issues.	Community and district levels
Crop research institute	CLIMAFRICA: Community members around the Ankasa forest reserves were involved in an awareness program on identification of climate change coping strategies and development of adaptation strategies	Community level
Nature Conservation Research Centre	Trainings, workshops, and capacity building events focused on climate change, REDD+, biomass sampling, biomass mapping, climate smart cocoa, and payments for watershed services.	Community and national level
The Swedish Environmental Institute, the United Nations International Strategy for Disaster Reduction (UN-ISDR) and UNU-INRA	Regional write-shop for Anglophone African Countries in Accra. This was a training workshop for scientific writing for publishing in the area of disaster risk reduction and climate change adaptation. The write-shop attracted 14 participants from 7 countries, namely Ethiopia, Ghana, Kenya, Malawi, Nigeria, Tanzania and Zimbabwe. UNU-INRA staff served as resource persons at the write-shop.	Sub-Saharan Africa Region
UNU-INRA and ADI/AfDB	Expert Meeting on 'Mainstreaming Energy, Climate Change and Green Economy Mechanisms in Private Financial Institutions in Africa'	Africa Region

Institutions	Public Awareness Program	Level/Target
Forestry Research Institute of Ghana (FORIG)	Fifty four communities around the Ankasa conservation area have been trained on forest carbon assessment	Community level
Forestry Research Institute of Ghana (FORIG)	Training workshop on *Forest Carbon Measurements and Monitoring for Carbon Sequestration Based Projects* under the Management of Conservation Territories in Africa (TC) Project partners' capacity building plan implementation at Damongo in 2015.	Arocha Ghana and NCRC Staff
CSIR-Forestry Research Institute of Ghana	Establishment of a Network of Experts on Permanent Sample Plots in West Africa: *Strengthening Regional Capacity in National Forest Carbon Inventory in West Africa"* Regional Technical Workshop within the UN-REDD Programme under the auspices of Food and Agriculture Organisation (FAO). Organised from 11th to-12th May, 2016 at FORIG.	Experts from 13 West African countries
CSIR-Forestry Research Institute of Ghana (FORIG)	Forest Biomass Assessment and Data Analysis: *Strengthening Regional Capacity in National Forest Carbon Inventory in West Africa"* Regional Technical Workshop within the UN-REDD Programme under the auspices of Food and Agriculture Organisation (FAO). Organised from 15th to 19th February, 2016 at FORIG.	Experts from 13 West African countries
CSIR-Forestry Research Institute of Ghana (FORIG)	Tree Volume and Biomass Allometric Equations in West Africa. Regional Technical Workshop within the UN-REDD Programme Under the auspices of Food and Agriculture Organisation (FAO). Organised from 4th to 7th August, 2014 at FORIG.	Experts from 13 West African countries
CSIR-Forestry Research Institute of Ghana (FORIG)	Training Workshop: Measuring and Assessing Carbon Stocks in Forest and Agro Ecosystems. Organised from 31st May to 5th June, 2010, at Asumura Training Camp, Goaso	Forestry Commission, FORIG, KNUST and NCRC Staff
CSIR-Forestry Research Institute of Ghana (FORIG)	*Reducing emissions from deforestation and forest degradation through collaborative management with local communities:* This project has been implemented by FORIG. The major collaborators were the local communities and Wildlife Division of the Forestry	Community Level

Institutions	Public Awareness Program	Level/Target
	Commission of Ghana. Funding came from the International Timber Organization (ITTO). It began in 2010 and ended in 2015 in the Ankasa Conservation area in the Western Region. The aim of the project was to contribute to sustainable management and conservation of Ankasa Conservation area to improve the provision of environmental services and reduce greenhouse gas (GHG) emissions. The specific objectives were i) to develop and implement participatory, good governance and management system for the Ankasa conservation area, ii) determine the financial value of the environmental services and iii) determine methods for measurement, assessment reporting and verification (MARV) for forest carbon.	
Forestry Commission	Series of sensitization workshops organized for various levels of stakeholders to enhance understanding of climate change issues targeting	Private sector, NGOs, CBOs, local communities and traditional authorities and Government agencies including the frontline staff of the forestry commission.
Environmental Protection Agency	- AAP high level awareness creation programme - District capacity programme - Environmental education in Schools programme - Environmental awareness in ICT	Chiefs, Parliamentarians , Second cycle institutions
	- Number of radio and TV interviews	General public
Ghana Wildlife Society and Environmental Protection Agency, Ghana Education Service and Wildlife Division	Developing manual on outdoor Environmental Education to complement the national curriculum for primary and Junior High Education with emphasis on emerging environmental challenges including climate change.	Primary and Junior High Education

Institutions	Public Awareness Program	Level/Target
	Train teachers in each school as wildlife club coordinators; establish zonal coordinators that help to supervise all coordinators within a town or zone.	Teachers
Regional Institute for Population Studies-University of Ghana	Annual International Climate Change and Population Conference organise to bridge the gap between policy, research and practice	Researchers, Policy-Makers, Private Sector, NGOs, MMDAs, CBOs, Farmer-based Organisations
Climate Action Network-Ghana	Develop Community based REDD+ Training Manual to be used as a learning tool to advance REDD+ implementation in Ghana	Forestry Commission, Farmer-based Organisations, CBOs, Traditional Authorities and Forest Dependent Local Communities
Energy Commission	Energy efficiency and conservation training and sensitization programmes for MDAs, District Assemblies, Hotels, and the general public	MDAs, Hotels, District Assemblies, public institutions, general public

Source: Ghana's Third National Communication, 2015; Field Survey, 2016

Table 4: Other Climate Change Capacity Building Initiatives

Initiatives	Objectives
Netherlands Climate Change Studies Assistance Programme (NCCSAP)	a) Raise awareness among decision-makers about climate change impacts and their management. b) Create a policy framework for climate resilient and low carbon economic growth that is compatible with, and integrated into, national development plans and budgeting processes. c) Provide a mechanism for implementing and financing the policy framework. d) Create the foundations for the development of detailed sector specific implementation plans. e) Link and harmonise existing climate change initiatives and opportunities.

Initiatives	Objectives
Adaptation Learning Programme (ALP) for Africa	a) Increase the capacity of vulnerable households in sub-Saharan Africa to adapt to climate change, focusing on communities in two districts in Ghana, b) Develop innovative approaches to community based adaptation (CBA), compile best practices, and empower local communities to have a voice in decision making on adaptation. c) Influence adaptation policies on all levels with a particular emphasis on gender equality and diversity
Africa Adaptation Program In Ghana	a) Capacity for long-term planning to manage both existing and future risks associated with climate change are enhanced b) Leadership and institutional framework to manage climate change risks and opportunities in an integrated manner at the local and national levels are strengthened c) Policies and measures that are durable and can withstand impacts are implemented for disaster early warning systems in Ghana d) Financing opportunities for adaptation at the regional, national, sub-national, and local levels are expanded e) Knowledge management systems and information sharing across all levels are built and widely disseminated
Capacity Building On Measurement, Reporting And Verification (MRV) Domestic Architecture	a) All participants/sectors will have a common understanding of the purpose, principles and practice of MRV applied to emissions, mitigation actions and climate support. b) All participants will understand the existing MRV architecture, roles and responsibilities for organisations and areas for improvement will be agreed. c) Ghana's planned activities and timelines for MRV related activities will be reviewed in light of the major tasks needed to operationalize an MRV system. This will ensure all aspects of the MRV system

Initiatives	Objectives
	are covered using a comprehensive approach, and all participants will understand what actions they need to participate in, to operationalise the MRV system.
Technical assistance for Sustainable National Greenhouse Gas Inventory Management Systems in West Africa (West Africa GHG Project)	a) Setting up national systems for preparing national GHG inventories: institutional, legal and procedural b) Enhancing the technical capacity of national experts involved in national GHG inventory for NCs and BURs, especially for the energy, agriculture and forestry sectors c) Improving the quality of national GHG inventory in energy, agriculture and forestry considering; - National circumstances -Reporting requirements - IPCC principles

Source: Ghana's Third National Communication, 2015

3. Existing Capacity

3.1 Systemic Capacity

Systemic capacity with reference to this strategy broadly refers to the existence of an enabling environment that facilitates climate change and green economy learning. It considers the capacity of the system in general and the prevailing conditions to support and or promote climate change and green economy learning by way of policy, regulatory, economic, and accountability frameworks within which institutions and individuals operate. Systemic capacity also refers to the overall capacity of the education and training system to support and deliver holistic, result oriented and effective climate change and green economy learning initiatives.

Over the years, various efforts have been made to build systemic capacity to promote climate change and green economy learning in Ghana. This is demonstrated by the deliberate efforts to mainstream climate change and green economy principles into the country's medium and long term development agenda as well as build capacity to implement climate change related activities. This has been made possible with the support of some Development Partners such as UNDP, UNESCO, World Bank, UNIDO etc., who have worked with relevant State Institutions to build Ghana's climate resilience and promote the transition to a green economy by integrating adaptation and mitigation strategies/practices into development policies, plans and programmes in a number of sectors[47] and to additionally, enhance climate change and disaster risk response.

Through the Africa Adaptation Programme (AAP), and similar programmes, various government and other high level officials were trained on the impacts of climate change and its implications are for development. These previous efforts have together created an enabling environment for implementing climate related interventions in Ghana at the level of national decision making and development planning. The National Climate Change Policy lays the framework for all climate change activities in Ghana.

[47] See https://unghana.org/site/index.php?option=com_content&view=article&id=128:climate-change-and-disaster-risk-reduction-drr&catid=88:thematic-area-2-sustainable-environment-energy-and-human-settlements&Itemid=509

3.2 Institutional Capacity

Capacity at the institutional level refers to the operational and technical capacity of institutions to deliver climate change and green economy learning. These institutions include among others, schools, universities, technical training institutions, media institutions, NGOs, and state institutions that coordinate climate change activities.

Under the supervision of the Ministry of Environment, Science, Technology and Innovation (MESTI), the Environmental Protection Agency (EPA) acts as the state institution responsible for coordinating all climate change and green economy learning and capacity building activities through its Energy and Climate Change Unit. This unit serves as the technical hub for climate change as well as the link for international cooperation programmes. To support budgetary purposes as well as ensure mainstreaming into national policies, a climate change desk has also been created at the Real Sector Division of the Ministry of Finance.

A National Climate Change Implementation Committee[48] was also inaugurated on the 12th of August, 2015 to oversee the implementation of Ghana's National Climate Change Policy within which learning and capacity building is a critical focus area. Members of this Committee are drawn from the Ministries of Environment, Science, Technology and Innovation, Power, Water Resources, Gender and Social Protection, Lands and Natural Resources, Food and Agriculture, Local Government and Rural Development, Health, Finance, and the Environmental Protection Agency, National Development Planning Commission and National Disaster Management Organisation

Regarding institutional capacity in the area of green economy, the green economy learning assessment revealed that there is sufficient human resource capacities and skills levels in institutions to advance green economy objectives. The assessment also emphasised that the multi-disciplinary nature of programming in most institutions provide a fertile ground for nurturing green economy issues. The assessment thus highlights the need for capacity building for institutions with the requisite background to implement green economy learning and related transformation issues.

To sustain and improve on institutional capacity, it is however necessary to ensure strong internal systems to retain institutional memory. The establishment of the national climate data hub under the auspices of the climate change unit of the EPA is therefore critical to enhancing capacity and knowledge sharing on issues regarding climate change and green economy.

The transformation to green economy must involve all sectors of Ghana's economy and it is therefore critical that institutions from all sectors are involved in climate change and green economy capacity building activities. Business institutions for example, need to know how climate change affects profits and the sustainability of their business in the long term, how energy efficiency reduces operational costs, and how to take advantage of carbon markets.

[48] Previously known as the National Climate Change Steering Committee.
See http://www.ghanaiantimes.com.gh/cttee-on-climate-change-inaugurated/#sthash.gG2cXpab.dpuf. Assessed on 15/11/2015

Businesses also need to understand the opportunities inherent in the transformation to a green economy and how they can be take advantage of it to meet social and developmental needs.

3.3 Individual Capacity

Individual capacity considers individual skills and attitudes that enhances the ability to effectively adapt to climate change and promote a green economy transition. Building individual capacity involves a process of changing attitudes and behaviours, usually through imparting knowledge and developing skills through training and education. This process is meant to influence individuals to adopt more climate-responsible behaviours as well as develop skills necessary for political and technical purposes including negotiations at the international level.

Currently, a number of climate change and green economy related courses are taught within Ghana's formal education system, especially at the tertiary level. At the non-formal and informal sectors, a number of initiatives have been made both at the regional and national levels to build individual capacity.

This document acknowledges that there has been a number of capacity building efforts in the past, however, much of these efforts have been targeted at parliamentarians, the media, and others already working in climate-related sectors. Given the wider impacts of climate change, and green economy, learning and capacity building initiatives need to be rolled out to include the wider society. Especially, there is the need to draw from the enormous wealth of traditional knowledge as well as translate complex climate science into simple messages that can be easily understood by the general public.

4. Strategy Objectives and Principles

4.1 Vision and Strategic Objectives.

4.1.1 Vision

The National Climate Change and Green Economy Learning Strategy has been developed to advance the overall vision of the National Climate Change Policy through climate change and green economy learning and capacity building.

The vision of the National Climate Change and Green Economy Learning Strategy is:

"Create *a sustainable pool of human resource with the necessary technical expertise and a general public equipped with basic climate change and green economy knowledge towards achieving a climate resilient and low carbon economic growth in Ghana*"

The vision of the National Climate and Green Economy Strategy will be achieved through;

- the provision of holistic learning and capacity building at all levels of education;
- technical skills training; and
- public awareness.

4.1.2 Objectives

The specific strategic objectives of the National Climate Change and Green Economy Learning Strategy are:

- Assess existing capacity to address climate change within key sectors;
- Identify and prioritise actions to enhance climate change and green economy learning through existing national education and training systems;
- A tool to implement Ghana's Nationally Determined Contribution (NDC);
- Foster systematic and country-driven process to enhance Climate and Green Economy learning for in the implementation of the national actions;
- Strengthen institutional capacity for good governance, institutional coordination, science and innovation, accountable monitoring and reporting;

- Link climate change and green economy learning to the objectives of the National Climate Change Policy and to help achieve sustainable development through capacity building and knowledge enhancement;

- Help mobilise resources for training, education, public awareness, and capacity building from national budget and other internal and external sources;

- Ensure the creation of a sustainable pool of human resource base to address climate change and catalyse the transition to a green economy.

4.2 Guiding Principles

The principles that guided the development of this strategy was to ensure that it addresses national priorities as well as build on existing capacity while also meeting international conventions and standards.

4.2.1 The United Nations Framework Convention on Climate Change

Ghana is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) under which Party States recognise climate change as a major threat to development and human existence as well the need to promote green economy principles. At the various Conference of Parties (CoP) meetings, signatories to the Convention have committed to taking deliberate actions to address the effects of climate change, including fostering an enabling environment for and implementing actions to promote education, capacity building, public awareness, access to information, and public participation.

4.2.2 The Cancun Agreement

The Cancun Agreements were reached in December 2011 and marked a significant achievement for the UN climate negotiation process. Among the focus areas of the Cancun Agreement was capacity building under which the following targets were set[49]:

- Build up global capacity, especially in developing countries, to meet the overall challenge.

- Establish effective institutions and systems which will ensure these objectives are implemented successfully.

[49] See http://unfccc.int/key_steps/cancun_agreements/items/6132.php

4.2.3 Article 6 of the UNFCCC and the Doha Work Programme

Article 6 of the UNFCCC enjoins Party States to develop and implement country-driven, result oriented strategies on climate change education, training, and public awareness on the effects of climate change and how to effectively address them. The UNFCCC Doha Work Programme also mandates parties to prepare a national strategy on Article 6 of the Convention.

4.2.4 Article 10 (e) of the Kyoto Protocol

Article 10 (e) of the Kyoto Protocol emphasises the call on all Parties to cooperate in and promote at the international level, and, where appropriate, using existing bodies, the development and implementation of education and training programmes.

The Article also calls on Parties to take steps to strengthen human and institutional capacity, including technical training, as well as facilitate at the national level, public awareness of, and public access to information on climate change.

4.2.5 National Climate Change Policy

The National Climate Change Policy (NCCP) identifies capacity building, information, communication and education as key systemic pillars which must be built on in order to achieve the objectives of the policy. The National Climate Change and Green Economy Learning Strategy is designed to implement the learning and capacity building components of the National Climate Change Policy and Ghana's Nationally Determined Contributions

4.2.6 Multi-Sectoral and Multi-Stakeholder Collaboration

Considering that climate change affects stakeholders across different sectors, the process of developing this strategy maintained a multi-sectoral and multi-stakeholder approach to ensure that the strategy is not only cross-cutting and country-driven, but ensure ownership by all stakeholders. The Accra Agenda for Action (AAA) emphasises the need for National Climate Change Learning Strategies to be multi-sectoral to promote country ownership.

4.2.7 Green Economy Opportunities including 'Green Jobs'

Taking a climate action and the transition to a low-emission and climate-resilient green economy creates a new paradigm of opportunities including the demand for human resource and new technologies.

Ensuring a sustainable pool of human resource with the requisite technical skills to address climate change and related issues is therefore of extreme importance. The development of this strategy therefore considered strongly, existing and future trends in skills requirements. Emphasis have however been placed on the skills requirements identified by the National Climate Change Policy and the Green Economy Learning Assessment.

4.2.8 Strengthening the National Education and Training System

The UN: CC Learn calls on countries developing a learning strategy to make use of the existing educational structure and institutions to ensure sustainability in the long run. The Ghana Climate and Green Economy Learning Strategy is therefore built on strengthening the capacity of the national education and training system, especially at institutional levels to effectively support climate change and green economy learning.

4.2.9 Focus on Results

Developing a climate change learning strategy, and in fact, any strategy for that matter needs to be implementable and even more importantly, achieve the desired results. It is for this reason that the baseline situation (i.e. the human and institutional capacities and skills that exist), was established at the onset of the strategy development.

Clear cut objectives that define the desired outcome of the strategy upon implementation, action plans that define how the set objectives will be arrived at, and targets that define benchmarks for monitoring and evaluation have also been established.

4.2.10 Paris Agreement (Articles 11, 12 and 13)

The Paris Agreement established the Paris Committee on Capacity-building to address gaps and needs, both current and emerging, in implementing capacity-building in developing country Parties. The Agreement further enhances coherence and coordination in capacity-building activities under the Convention.

Article 11 of the Agreement stresses that capacity building should enhance the capacity and ability of developing country Parties, in particular countries with the least capacity to take effective climate change action. Article 11 of the Paris Agreement also emphasises that capacity building should be country-driven, based on and responsive to national needs, and foster national ownership and enhanced through appropriate institutional arrangements.

Article 12 of the Agreement calls on Parties to cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation, and public access to information.

Article 13 of the Paris Agreement emphasises a transparency framework under the Convention in respect with Parties reporting their climate actions in a transparent manner. In this regard, this strategy acknowledges the need for a transparent monitoring and evaluation system to appropriately report on all priority action plans.

4.2.11 First Global Forum on Green Economy Learning Agreements

At the First Global Forum on Green Economy Learning held during the CoP 21 in Paris, it was widely acknowledged that effective education, training and knowledge delivery can help bridge common disconnects along the research-policy-practice continuum, and stimulate action on the ground as far as green economy is concerned. As countries seek to translate international vision and intent into practice, requests for knowledge and skills development are multiplying, providing a motivating force for education and training institutions to scale up their efforts and be actively involved in transforming their national economies. The concept of Inclusive Green Economy (IGE) learning adopted at the First Global Forum on Green Economy Learning is anchored on principles that seek to influence attitudes, stimulate behavioural change and promote system-wide and nationally appropriate learning strategies and delivery mechanisms.

4.2.12 Sustainability

To ensure sustainability, a clear cut and robust implementation framework, including action plans, clear responsibilities for coordination and implementation, resource mobilisation, and monitoring and evaluation are essential.

The implementation framework, coordination, financing, and monitoring and evaluation for the strategy has also been designed bearing in mind the existing national education and training structure, and national institutions to ensure sustainability in the medium and long term.

4.3 The Strategy Development Process

The Ghana Climate and Green Economy Learning Strategy is a ten year strategy that specifies strategic short, medium, and long term sectoral and cross-sectoral action plans to build institutional and individual capacity through learning and skills development in climate change and green economy. Beyond the guiding principles identified in 4.2, the strategy development process was hinged on some of critical imperatives for climate and GE capacity building. The critical imperatives are (i) Effective grassroots participation including Community based organisations, civil society organisations, community leaders, and private sector and at design and implementation stage; (ii) Strengthen decentralised government administration and political processes for climate change and GE capacity building; (iii) Awareness and sensitization at the local level; (iv) Promotion of sustainable practices; and (v) Partnership and collaboration among key policy makers and institutions.

The preparation of the Ghana Climate and Green Economy Learning Strategy is also in fulfilment of the country's obligation under Article 6 of the UNFCCC that enjoins Parties to develop and implement climate change education, training, and public awareness programmes that reflect national priorities and initiatives.

Priority action plans for implementation in the Climate and Green Economy Learning Strategy were developed to meet capacity and skills development needs identified in the National Climate Change Policy and the Green Economy Learning Assessment. To ensure the strategy is country-driven and reflects the Ghanaian circumstance, the following was done in the development of this strategy;

a) Desk review of various national policy documents and literature including;
   - Background Report on climate change learning in Ghana,
   - The Green Economy Learning Assessment in Ghana
   - The Ghana Shared Growth and Development Agenda,
   - The National Climate Change Policy,
   - The National Climate Change Adaptation Strategy,

b) Stakeholder surveys;
c) Individual interviews;
d) Focus Group Discussions; and
e) Stakeholder Validation Workshops.

The strategy will be implemented with action plans focusing on the 5 priority areas of the National Climate Change Policy with an additional focus area for general education and capacity building. The strategy development processes are detailed below;

- The preparation of a background report on climate change learning in Ghana through desk review of literature, engagement with relevant stakeholder institutions, and surveys which are aimed at developing baseline information on climate change and green economy learning in Ghana.

- With the support of UN:CC Learn, UNITAR, and the UNDP Country Office, a kick-off workshop was organised to start the process of developing the strategy where the background report on climate change learning was presented to stakeholders. Stakeholders at the kick-off workshop were drawn from all sectors including academia, civil society, government institutions, local authorities, the Ghana Education Service, youth groups, financial institutions, private sector, etc. The kick-off workshop also created the platform to inform participants about the CC Learn project, and to share knowledge and ideas regarding the design and implementation of a climate change and green economy learning strategy. Also at the workshop were the Uganda Focal person on Article 6 and personnel from the UN: CC learn and UNITAR who shared insights into the process of designing and implementing a national strategy on climate change and green economy learning.

- A First National Coordination meeting was organised which also saw participation from all sectors of the Ghanaian society. Stakeholders were put into different working groups representing their respective sectors and then tasked to identify and propose possible

action plans under the various priority areas. Having constituted the groups, a period of three weeks was allowed for deliberations among the group members.

- A Second National Coordination meeting was then organised during which each working group was given the opportunity to present their proposed action plans, and objectives for the proposed action plans.

- A team of national consultants used output from the various working groups to develop a draft strategy and action plans.

- Two regional validation workshops were organised for the Northern and Southern sectors of the country to receive inputs from respective stakeholders regarding the strategy and action plans as well as MRV, coordination/communication, and financing mechanisms.

- A two day technical review meeting was held with key institutions across different sectors to review and provide final input into the draft learning strategy

- A national validation workshop was subsequently organised to make final input into the draft strategy and accept it as a national document.

- A consultation meeting was organised after the national validation workshop with Development Partners and Heads of Departments across various sectors and Ministries. This consultative meeting was aimed at soliciting input and ownership especially from the Departmental Heads as well as attract support form Development Partners.

4.4 Learning Priorities

The strategy has six priority areas. These priority areas include the national climate change priority areas with an additional priority for general education. Learning actions have been developed around these six priority areas which are;

i. Agriculture and Food Systems
ii. Disaster Preparedness and Response
iii. Natural Resource Management
iv. Equitable Social Development
v. Energy, Industrial, and Infrastructural Development
vi. General education and capacity building (Cross-cutting)

4.5 Learning Needs and Delivery Capacity

Learning needs as identified by the National Climate Change Policy and the Green Economy Learning Assessment are presented in the Table 6.

Table 5: Capacity Building Needs

Priority Area	Leaning Needs
Agriculture and Food Systems	• Build and strengthen the capacity of extension officers , CBOs and farmer based organisations in climate-smart agriculture • Promote awareness of climate change issues for fisher folks and farmers • Build capacity for community-level weather data collection, analysis, and dissemination for agricultural planning • Document and promote appropriate indigenous knowledge and best practices • Promote research on climate change resilient agriculture and the dissemination of same
Disaster preparedness and response	• Improve technical and institutional capacity through research support and training • Research on appropriate infrastructure design standards that meet higher requirements against extreme weather-related natural hazard events • Collect relevant data on coastal zone geomorphology, surface water flows and groundwater for modelling coastal flooding • Use ICT in monitoring climate events and providing an early warning system • Develop and implement strategies to change systems and make people adapt to climate change, e.g., harvesting rainwater and storage of grains can aid communities in adapting • Build local capacities especially that of women, PWDs, youth and children to reduce risk and vulnerability • Document and improve community-based early warning systems for natural disasters and effective dissemination, especially at the local level in local languages

	• Enhance access to public information • Improve awareness and provide skills training to ensure preparedness on climate change and adaptation strategies • Enhance institutional capacity of agencies in disaster risk management, especially the National Disaster Management Organisation (NADMO) • Improve technical capacity and facilities, as well as accessibility to communities, for rapid response to disasters and disaster management • Facilitate regular interactions between community members and the state and NGOs on emerging problems and best practice
Natural Resource Management	• Support awareness creation and dissemination programmes • Encourage and promote community based activities to improve land and water quality • Promote, through increased funding and opportunities, plantation development and management in off-reserve areas for private and public-private partnerships • Support scientific research, including traditional and indigenous knowledge, monitoring, and collaboration with national and international institutions • Improve knowledge and capacity for effective management of natural resources, for example, through sustained extension activities in soil and water conservation
Equitable Social Development	• Establish community health groups and development of capacity to identify health risks and facilitate access to services and decision-makers • Strengthen technical capacity to manage climate change related health risks • Strengthen disease surveillance systems through early warning

- Improve on data sharing and develop health information management systems for diseases including climate sensitive diseases at all levels of the health delivery system
- Map disease incidence and identification of vulnerable groups for climate-sensitive diseases
- Strengthen existing units within the health delivery system to manage climate related epidemics.
- Improve surveillance systems for existing and new disease risks and ensure health systems are geared up to meet future demands
- Mainstream climate change health risks into decision-making at local and national health policy levels.
- Identify, document and incorporate climate-relevant traditional knowledge into health delivery systems and practices
- Develop structures to effectively manage and disseminate information on climate change health risk.
- Develop rainwater harvesting and increased use of shallow wells, dugouts and dams for water use
- Build capacity in water resources management in relevant sectors
- Strengthen District Assemblies to assume a central role in supporting community management of water and sanitation facilities
- Generate gender-specific information including sex-disaggregated data for determining the gender impacts of climate change

	• Collaborate/Partner with CSOs, especially women's rights organisations and coalitions in climate change discussions and processes • Build the capacity of the relevant institutions to mainstream gender into climate change policy formulation, planning monitoring and evaluation • Identify and analyse gender-specific roles, needs, impacts, protection and support measures related to climate change and variability such as floods, droughts and diseases • Increase the resilience of vulnerable groups including women and children, through the development of community-led adaptation, livelihood diversification, better access to basic services and social protection (safety nets, insurance) and scaling up • Promote effective and equal participation of men and women in climate change policy and decision-making processes • Strengthen the implementation of gender responsiveness in disaster risk management • Promote vocational training - especially for youth, in places with high in-migration potential migrants
Energy, Industrial and Infrastructural Development	• Improve technical capacities, data collection and documentation systems for GHG emissions inventories and reporting • Improve institutional arrangements and existing national GHG system for data collection, data sharing and archiving in appropriate quality and format. • Support research, development and transfer of low emission technology such as natural gas combined cycle, natural gas distribution system, and mini and small hydro. • Promote energy efficiency and management activities that include new and innovative energy efficiency methodologies and techniques in various sectors, especially power generation, oil and gas, transport, biomass, industry, and waste

	• Promote the use of cleaner and more efficient energy sources and production methods that minimise resulting emissions and pollution • Create an enabling environment, including incentives and financing mechanisms, to encourage and support the use of renewable sources of energy. • Establish effective mechanisms for reducing volume of waste, and controlled and safe disposal of unavoidable wastes • Establish sustainable recycling and waste management technologies that generate energy (e.g., biomass energy, biogas, methane, etc.) and reduce emissions from solid and liquid waste, especially in urban areas. • Support public awareness of efficient use of energy and of renewable energy sources • Establish efficient infrastructures and mechanisms for processing and use of by-products from oil fields to prevent gas flaring • Assist the private sector by way of incentives, and financial and technical support • Increase research and development on clean energy sources • Improve national greenhouse gas inventory mechanisms • Strengthen measures to reduce greenhouse gas emissions • Regular training for business leaders to appreciate the impact of climate change on their business • Build capacity for corporate GHG accounting
Natural Resource Management	• Support awareness creation and dissemination programmes

	• Encourage and promote community based activities to improve land and water quality • Promote, through increased funding and opportunities, plantation development and management in off-reserve areas for private and public-private partnerships • Support scientific research, including traditional and indigenous knowledge, monitoring, and collaboration with national and international institutions • Improve knowledge capacity for effective management of natural resources, for example, through sustained extension activities in soil and water conservation
General education and capacity building	• Green economy rationale, benefits and key concepts (e.g. environmental externalities, valuing natural capital, ecosystem services, resource efficiency, GE - poverty reduction interface, green industry and green jobs, etc.) • Awareness Creation on Environmental Conventions among the general public • Green economy strategies and development planning (e.g. National GE/Growth Strategies, integrating GE considerations in sectoral planning processes, etc.) • Green economy modelling and policy assessments (e.g. macroeconomic modelling, green jobs and industry assessments, etc.) • Policy, regulatory, economic and voluntary tools to advance a Green economy (e.g. environmental standards, tax incentives, subsidies, certification schemes, sustainable public procurement, etc.) • Green economy indicators and measuring progress (e.g. from GDP to Total Wealth Accounting, different types of indicators, linkages with the Sustainable Development Goals, etc.)

	• International green economy policies and cooperation (e.g. global policy milestones, major international programmes and initiatives, relevant funding sources, etc.)

Source: Stakeholder consultations 2015/2016; National Climate Change Policy, 2013; Green Economy Learning Assessment, 2015

5. Action Plans

5.1 Introduction

Action plans for the Ghana Climate and Green Economy Learning Strategy have been developed through a multi-stakeholder approach for the various priority areas of the National Climate change Policy. These action plans reflect the prevailing priority institutional and individual learning and capacity building needs, and by extension, the national situation. Priority action plans for the strategy were identified to meet the urgent capacity building needs and skills gaps identified in the National Climate Change Policy and the Green Economy Learning Assessment respectively.

The action plans are the results of multi-stakeholder discussions. While the focus of the capacity building needs identified within the National Climate Change Policy remains the same in this strategy, they were modified to reflect the cross-sectoral and cross-stakeholder priority capacity building needs and actions to address them.

The multi-stakeholder approach for defining action plans ensures stakeholder buy-in across all sectors, guarantee sustainability of the action plans in the medium to long term, and ensure proper coordination of action implementation across the various sectors. In the design of climate change and green economy learning modules to strengthen both individuals and institutions, the relationship between climate change and green economy, land use, agriculture, natural resources, waste management, energy, gender and health will be incorporated to ultimately contribute to achieving the vision of the National Climate Change Policy of “making Ghana climate resilient and climate-compatible” Tables 7 to 11 below presents the various action plans proposed for the various priority areas. Timelines for implementation has been attached as Annex I and II

5.2 Priority Area Action Plans

5.2.1 Agricultural and Food Systems

Table 6: Action Plans For Agricultural and Food Systems

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Promote appropriate technologies for small scale irrigation, water re-use and water harvesting (e.g. waste/water recycling, rainwater harvesting etc.)	Ghana Irrigation Policy Tono Irrigation Project Vea Irrigation Project Kpong Irrigation Project Weija Irrigation Project Training on management of irrigation systems Training on water management methods	Integrate water conservation into curricular of agriculture Colleges and Farm Institutes	Students trained on water conservation methods	Number of students trained on water conservation.	Agriculture training institutions	GES/MoE/MOFA/GIDA/MESTI
		Train farmers on management of simple irrigation systems and irrigation-compatible farming practices	Farmers trained on the management of irrigation systems and subsequent application of knowledge.	Number of farmers trained Numbers of farmers applying knowledge acquired	Farmers	MOFA (GIDA)
		Train farmers on appropriate rain water harvesting systems	Farmers trained on rain water harvesting	Number of farmers trained	Farmers	MOFA / DoAs
		Train farmers on water conservation practices	Farmers trained on water conservation and being able to apply knowledge to farming practices	Number of farmers trained	Farmers	MOFA / DoAs
Promote awareness on climate change impacts for fishing and farming and provide sustained support in the use of simple agronomic soil and water conservation measures and climate smart agricultural and aquaculture practices	Awareness creation on climate change and its effects in selected fishing communities across the country Promotion of conservation agriculture; Implementation of sustainable land and water management technologies	Train relevant stakeholders on communicating climate change issues to local communities	skills developed in communicating causes, effects and impacts of climate change on local communities	Number of officials trained. Number of communities engaged	NADMO, MOFA Staff, Local authorities, CBOs, Farmers, Fisher folks, Farmer-based organisations, relevant CCSOs	EPA / MoFA
		Train farmers and fishermen and present information on conservation agriculture, climate smart cropland management, and other climate smart agricultural and	Farmers and fishermen better able to understand, interpret, and apply information on climate smart agriculture and aquaculture practices	Number of farmers reached	Farmers, farmer-based organisations, relevant CSOs	MOFA / MESTI / CRI / SARI

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	Building capacity of relevant institutions (e.g., Fishery Commission - FC) and fish farmers in Volta lake riparian communities on current situation regarding the ecology of the Lake and fishery resources Installation of automatic weather stations at Weija, Kpong, Bontanga and Akumadan public irrigation schemes to transmit weather information to a platform which uses the data to compute crop water availability via modified FAO cropwat model set-up in a simple spreadsheet. Community engagements at Weija, Kpong, Bontanga and Akumadan scheme sites 2 years field trials at the 4 schemes	aquaculture practices in simple language for easy appreciation				
		Train farmers on weather monitoring and integration of climate smart considerations into existing cropland management systems through training and education.	Farmers trained on appropriate weather monitoring and climate smart cropland management.	Number of farmers reached and training programmes organised.	Farmers	MOFA / CRI / SRI
		Through research and development, improve upon the already existing cropland management systems	New and enhanced knowledge on cropland management systems	Number of new research information documented.	Research institutions /Tertiary institutions	MOFA / CRI / SRI
		Provide relevant and timely climate related information to farmers	Farmers have easy access to climate related information.	Reduction in loss to farmers as a result of crop failures due to droughts and other weather related conditions	Farmers	MOFA
		Create awareness on climate change impact on fishery resources such as Lake Volta through TV talk shows (Twice a year for 5 years), radio discussion (Quarterly for 5 years), and community engagements (e.g. Durbar – annually for 10 groups of communities to cover the 52 riparian communities of the Lake).	Increased awareness of the impact of climate change on Lake Volta fishery resources	Number of farmers and fishermen with improved level of awareness amongst fisher folks and fishery-related institutions	Fishing communities, Fish-related institutions (e.g., FC)	CSIR-WRI / FC
		Train staff of fishery institutions (e.g., Fishery Commission) and Fish farmers on the impacts of climate change on the ecology of the Volta Lake and its fishery resources (Separate annual trainings for national and district level institutions and community representatives)	Enhanced capacity of FC to better regulate and manage the fishery resources of Lake Volta	New or revised management plan for Lake Volta, incorporating climate change issues and measure to adapt to its impact	Fish related institutions	CSIR-WRI

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
		Create awareness on climate-smart irrigation technologies for agriculture through documentaries & radio (quarterly)/TV talk shows (Twice a year).	Enhanced awareness of farmers, GIDA staff, agricultural extension officers, agronomist, etc., in the use of ICT and climate-smart irrigation technologies for Improved irrigation efficiency, and Improved agricultural water management	Number of staff and other relevant stakeholders with increased awareness and knowledge of climate-smart irrigation technologies Number of farmers adopting climate-smart irrigation technologies	GIDA staff, Farmers, NGOs	CSIR-WRI / GIDA
		Develop brochures and training manuals for educating and training farmers and GIDA staff and agricultural extension-officers in the use of ICT tools and climate-smart irrigation technologies.	Increased understanding and enhanced knowledge of relevant personnel in the use of ICT tools and climate-smart irrigation technologies	Number of brochures and training manuals developed and number of people trained	Farmers, GIDA staff, agricultural extension officers	CSIR-WRI/GIDA
		Set-up field trial sites in the remaining 18 public irrigation schemes across the country, for training and demonstration of the technologies to GIDA staff, agricultural extension-officers and farmers. The 18 sites will be established over a 5-year period (maximum of 4 sites per year).	Increased knowledge and understanding of the importance and use of irrigation schemes	Number of field trial sites set up	Farmers, GIDA staff, agricultural extension officers	CSIR-WRI / GIDA
Promote emission reduction in cocoa, livestock and rice landscapes	Stakeholder Dialogue e.g.: with CoCoBOD, farming communities, PBC	Create awareness for farming communities and promotion of climate smart cocoa, livestock and rice production processes	Training manual prepared and cocoa farmers trained on climate smart production processes	Number of farmers trained	Cocoa, livestock and rice farmers	MOFA / MESTI / CRIG / CocOBOD
Enhancing food security and small enterprise development through biodiversity businesses	Education on conservation, livelihood training and business support for biodiversity businesses e.g.: apiculture, snail rearing, etc.	Establish community awareness programmes, training and business support for other agriculture related livelihoods	Local community members trained on other agricultural related livelihoods to reduce overdependence on natural resources	Number of farmers and locals trained on other agricultural related livelihoods	Farmer, community members, CBOs, NGOs	MOFA / FORIG

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	SEAWEED project[50] ongoing project by the John Agyekum Kuffour (JAK) foundation/EPA/BUSAC to create biodiversity offsetting business scheme		Sensitisation and awareness programmes organised for local community members on climate change and green economy	Number of community engagement on climate change and green economy		
Capacity building on green economy concepts for sustainable agriculture	Training of farmers on compost preparation and utilization Training of farmers on eco-labelling	Train on eco-gardening that uses green concepts in farms	Extension officers, Farmers, and other relevant stakeholders trained on eco-gardening concepts	Number of farmers and extension officers trained	Extension officers, Farmers	MOFA
		Create consumer awareness about nutritional and health benefits of sustainable agri-food products	Increased consumer awareness about nutritional and health benefits of sustainable agri-food products	Number of awareness creation programmes and campaigns and their reach	General public	MoFA / MOTI / MESTI
		Build capacities of farmers on the production, supply and marketing of non-synthetic, natural inputs for farming	Farmers' with a better understanding and skills in the production, supply and marketing of non-synthetic natural inputs for farming	Number of farmers trained	Farmers, Agric extension officers	MoFA
		Train agricultural officers and farmers on organic certification and reporting	Relevant officials and farmers with adequate knowledge in organic certification and reporting	Number of officers trained	Agricultural officers, farmers	MoFA

[50] See http://www.myjoyonline.com/business/2015/january-22nd/seaweed-biorefinery-project-launched-in-ghana.php / http://biofuels-news.com/display_news/8760/ghana_biorefinery_project_utilises_seaweed/

5.2.2 Disaster Preparedness and Response

Table 7: Action Plans for Disaster Preparedness and Response

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Research on appropriate infrastructure design standards that meet higher requirements against extreme weather-related natural hazard events	Revision of housing code Validation stage The intervention research on flood risk climate resilient infrastructure in urban/peri-urban Accra by RIPS-UG [51]	Simulate various scenarios of the impacts of climate change on major human settlements and ecosystems in Ghana	Evidence to support the need to take immediate action to address the impacts of climate change	A manual on the design, management and operation of climate-resilient infrastructure.	NADMO, MMDAs	MWWH / GREDA / MESTI / CSIR – BRRI / Academia / Ghana institute of engineers
		Train on the principles for the design, management and operation of climate-resilient infrastructure	Increased knowledge and skills in the design, management and operation of climate-resilient infrastructure.	Number of workshops and seminars organized for professionals on climate resilient infrastructure	Architects, Civil Engineers, Construction Companies, Spatial Planners, Quantity surveyors, Professional bodies in the building environment	MWWH / GREDA / MESTI / BRRI
Document and improve community-based early warning systems for natural disasters and effective dissemination, especially at the local level in local languages	CREW project (NADMO) by the Norwegians Weather update by GMET	Update and train on post-emergency recovery protocols and plans OR Prepare community emergency response plans[52]	Enhanced capacity to prepare for climate related natural disasters NADMO staff trained on current and up to date post-emergency recovery protocols and plans	Number of districts with comprehensive emergency response plans	NADMO Staff	MESTI / NADMO / GMET
Promote general climate and green economy knowledge among the youth	Civil society advocacy on climate justice The WASH project	Institute Climate Change and Green Economy Festival/Week: • Music concerts • Climate change dramas and plays • Documentaries • Training workshops	Livelihoods diversified. Behavioural Change	Reports from various activities undertaken will be used to assess result	General Public/MMDAs	MESTI / NAFTI / Ministry of Youth and Sports / NADMO / ISD / NCCE / Ministry of Local Government and Rural Development

[51] Regional Institute for Population Studies – University of Ghana

[52] Where post emergency response protocols and plans do not already exist entirely new ones will be prepared

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	The use community radios, meetings, durbars and ethnic festivals as well as festivities and special days like holidays and international days to create awareness by the EPA at the Regional level	• Public Lectures • Community meetings • Inter-school competitions, etc				
		Select a climate change youth ambassador	The youth empowered to take local actions to combat climate change	70% of the youth will take up local actions to combat climate change	General Public	MESTI/ MoFA / CSIR - CRI / FRI / ARI / WRI
		Intensify and upscale the use of community radios, meetings, durbars, and festivals to create awareness and hold side events like exhibition to showcase climate issues through audio-visuals etc.	An improved appreciation of environmental and climate change issues at the local level and a reduction of activities pollutes the environment	Number of local communities engaged/Number of community radio programmes/ durbars festivals, etc. used to engage communities on climate change and GE principles	General Public/ Local Communities	MESTI / Local Assemblies
Improve hydro-meteorological observation networks to provide better climate data and information, and communicate early warning for natural hazards	Adaptation Learning Programme (2010-2017), CARE International in Ghana. Southern Voices on Climate Change Adaptation (2014-2017), CARE International-led consortium. Community Resilience through Early Warning Systems (2012-2015), NADMO/UNDP.	Establish Climate Information Centres to facilitate easy access to agro-met information and early warning system for disaster risk reduction	Climate information centres established within all the Districts	Number of climate information centres established Number of small holder farmers having access to climate information	General Public	GMET / MoFA extension officers / NADMO / ISD
		Monitor the utilization of weather forecast information by smallholder farmers, including interpretation of climate information in different timescales at community group level and establishing a community-based monitoring system	Promote the use weather forecast information by smallholder farmers in order to enhance climate change resilience	Number of small holders farmers able to use weather forecast information	Smallholder farmers	GMET / MESTI

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
		Broadcast radio programmes on farming technologies, including new crop varieties (e.g., drought-tolerant crops), shifting planting seasons, irrigation, post-harvest technologies to improve storage, and diversification of livelihoods	Adoption of new and improved technologies	Improved yields	Farmers	MOFA / CSRI – CRI / Cocoa Services Division of CoCoBOD / FC
		Apply innovative information and communication technologies for improved dissemination, participation and accessibility (widening catchment areas of radio stations, set up listener groups, arrange phone-in radio programmes) and facilitate the integration and use of climate information in farmer planning processes, such as Participatory Scenario Planning workshops	Increased awareness of the general public on climate information through the use of innovative information technology	Level of climate information integrated into farmer planning process and number of farmers who integrate climate information integrated into farmer planning process	Farmers	MOFA
Build capacity of disaster volunteer groups	Training in floods, fire and drought in the area of CC and GE	Undertake community based training programmes for disaster volunteer groups (DVGs)	Appreciation of the phenomenon of CC and GE, sensitization of other members of the community, behavioural change,	10,000 DVGs trained	General public	NADMO / Ghana National Fire Service / FC
Improve governance for Disaster Risk Reduction and Climate Change resilience building in the health sector		Designate DRR & Climate Change focal points within all levels of the health sector	Improved collaboration with NADMO in preparedness and response to DRR and CC activities	Number of DRR and Climate Change unites established and the levels within the health sector value chain they have been established	Health sector institutions	MOH / GHS

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Building capacity for management of climate-related Public health emergencies	Community engagement for health education, platform for data sharing (HESA) to improve preparedness and alertness Integrated disease surveillance and response	Community engagement on various platforms and media	Empowered communities who can effectively prevent and respond to health risks from extreme weather events	Behavioural change, local knowledge on epidemic management Effective platform for data engagement from collaborating institutions	Communities, General Public	MOH / GHS / MESTI/ NADMO / CWSA / MoE / MMDAs
		Develop Health sector contingency plans for extreme weather events, including risk reduction, preparedness and response, in line with the WHO emergency response framework	Emergency response plans for individual health facilities defined and implemented in case of need	Emergency response plans for individual health facilities	Health sector institutions and facilities	MOH/GHS/NADMO
		Prepare a plan of action for physical reinforcement of Health facilities in natural disaster risk prone areas.	Climate-resilient health facilities	A plan developed with actions and timelines	Health sector institutions and facilities	MOH / GHS / BRRI NADMO
		Strengthen systems for health & Environment (H&E) surveillance to allow for measurement of interlinked H&E impacts, and to identify emerging risks including climate-sensitive environmental risk-factors, in order to manage them better.	H&E Minimal Information Sharing System generating, timely, complete and quality information to all partners	Number of initiatives, technology, and interventions introduced and implemented to Strengthen systems for Health & Environment (H&E) surveillance to allow for measurement of interlinked H&E impacts	Health sector institutions	HEISS[53] technical committee, HESA[54] committee, HESA member institutions[55]
		Conduct enhanced surveillance for prioritized (epidemic prone) climate-sensitive diseases in health facilities.	Timely, evidence-based decisions are taken for the sound management of public health risks related to climate change	Number, nature and frequency of surveillance for prioritized (epidemic prone) climate-sensitive diseases done in health facilities.	Health sector institutions	MOH / GHS

[53] Health and Environment Integrated Surveillance System

[54] Health and Environment Strategic Alliance

[55] Members include MOFA, CWSA, DFI-MoESW, EPA, FDA, GMET, etc.,

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
		Design a multi-hazard EWS to predict infectious disease epidemics, with identified key areas of focus and collaborating agencies.	Early warning systems for relevant extreme weather events and climate-sensitive diseases (e.g. heat-stress, zoonotic diseases, and undernutrition) established.	Early warning system designed and number of infectious diseases and epidemics the designed EWS detects	Health sector institutions	MOH / GHS / GMET / NADMO
Monitoring of Climate Change indicators		Organise periodic reviews for improvement of capacity gaps identified in climate change Vulnerability and Adaptation assessments	Continuous enhancement of capacity and ability of institutions and systems to address climate vulnerability	Designed review plan and frequency	Relevant institutions	MOH / GHS / MDAs / EPA / MESTI
		Conduct monitoring of prioritised climate sensitive environmental risk-factors	Early identification of risk factors to promote public health	Nature and frequency of monitoring	Relevant institutions	MOH / GHS, Environment related institutions (e.g. EPA, MWRWH etc.) / HEISS / HESA.
Risk communication		Development and implementation of internal and external communication plans (including the development of knowledge products) to raise awareness of health and climate change, and response options targeting key audiences, such as health professionals and decision-makers, communities, the media and other sectors.	Timely warnings communicated to health decision-makers, the media and the public and translated into effective action to prevent negative health outcomes	Number of knowledge products developed including internal and external communication plans	Health related institutions, Media, and other relevant institutions	MOH / GHS / NCCE
Enhance capacity of NADMO disaster management and response	.	Organise workshops and training programmes for staff across all the ten regions of Ghana. Intensive training on disaster management to support NADMO at all levels	Knowledge sharing with staff at the district and zonal levels. Knowledgeable staff who are able to disseminate information on CC to the general public. Engage on media interactions on awareness creation in all the regional offices	Ten regional and district offices CC desks set up. Most regional NADMO staff trained on CC Number of staff trained on disaster management	NADMO Staff	NADMO

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Creation of awareness on climate change and adaptation in climatically zoned areas for crop cultivation and other agricultural purposes	Some academic modules have been developed by some universities to serve as a springboard for awareness creation by students.	Create Awareness on emerging agronomic practices that help to increase more organic carbon in the soil and serve as a sink for carbon sequestration	Strategies that should be taken to adapt to climate change by farmers made known to farmers	Measurable practical measures taken by farmers and other stakeholders to help adapt to climate change to reduce the negative impact	General Public	MEST / GMET / CSIR-SRI / CRI
		Promote the use of Biochar as an emerging agronomic technique by encouraging the use of efficient charcoal stove.	Farmers and other stakeholders implementing practical measures to aid in reduction of negative impact of climate change	Level of biochar penetration	General Public	MEST / GMET / CSIR-SRI
Revise design standards, building codes and spatial planning to include climate change parameters	Government's policy on local building materials is not being enforced as there is no legal backing no is it demanded in contracts or design specifications Promotion of pozzolona and burnt bricks as appropriate building materials Training of artisans in the use of green building materials. Passage of the Land and spatial planning Act by Parliament	Sensitize building professionals on the use of available local building materials through workshops, exhibitions and competitions.	Built environment professionals will be more exposed to climate smart building design practices and materials	Increased demand and reliance on the use of green local materials	Building professionals, Architects, Engineers, Planners, Fire service	MESTI / GREDA
		Promote the use of sustainable building materials and practices through mass media- tv and radio documentaries.	The general public will appreciate and make a better informed choice when it comes to selecting appropriate building material for their houses	Changing landscapes of the environment to green initiatives	Building professionals	MESTI / GREDA
		Sensitize the general citizenry through exhibitions of sustainable green building practices and materials.	Enhanced appreciation ad use of sustainable green building practices and materials.	Number of exhibitions	Building professionals/General public	MESTI / GREDA
		Institute annual awards to recognize and motivate corporate companies and institutions and individuals on their efforts in promoting effective green building design and sustainable practices.	Enhanced appreciation ad use of sustainable green building practices and materials among building professionals	Number of awards undertaken	Building professionals	MESTI / GREDA

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Enhance awareness and build capacity in climate resilient urban planning	LAP 1 New land use and planning bill before parliament LAP2	Train urban planners, estate developers, traditional Authorities and MMDA's on effective climate smart land use planning systems and general climate change and green economy sensitization on climate change and green economy.	Enhance the knowledge of local and urban planners on land use planning and its effect on climate and green economy	Revised and new land use planning schemes reflecting climate smart and green economy principles	Traditional Authorities, MMDAs, Town and Country planning, Statutory planning committees	MESTI / MMDAs
		Organize durbars and fora to sensitize opinion leaders and other identifiable stakeholders	Educate stakeholders on appropriate climate smart planning practices for a green economy	Synchronization of master plans for towns and cities Number of stakeholders engaged and trained	General Public, Local Communities, urban planners, estate developers	MESTI / MWWH / MLG
Develop rainwater harvesting and increased use of shallow wells, dugouts and dams for water use	The national water policy of Ghana, adopted in 2007, recognizes RWH as an integral part of IWRM and as a mechanism to increase water availability in both urban and rural areas CSIR-WRI, in collaboration with CSIR-STEPRI and SINTEF Technology of Norway, has developed and tested 3 different standardized roof rainwater harvesting models for homes and public buildings, between 2013 and 2015.The same collaboration trained a few artisans in Accra in the proper installation of the designed system	Promote rainwater harvesting technology through awareness creation via workshops (2 workshops per district), radio (bi-monthly at the district level using selected and trained community stakeholders; national talk shows will be done monthly) and TV talk shows (nationally on quarterly basis) and print media.	Increased penetration or RWH within the built environment	Survey showing increased use of RWH technologies Number of new infrastructure with RWH systems Number of relevant stakeholders engaged	General Public	MOFA / CSIR-WRI / IIR / STEPRI / MWWH
		Train artisans in each district in the proper installation of the standard systems.	Increased availability of water supply for domestic and other uses, contributing to SDG goals 4 and 6	National census showing increased proportion of domestic water supply from rainwater harvesting as well as increased level of sanitation (reduced level of open-defecation).	Artisans	District Assemblies /
		Create awareness among estate developers and work with them to adopt RWH technology as part of estate building.	Widespread adoption of and incorporation of RWH technology to building designs to combat the impact of climate change, contributing to SDG goal 13	Number of estate developers reached Survey showing increased level of awareness of RWH technologies	Relevant manufacturing companies, GREDA, Architects	CSIR-WRI / MWWH / GREDA / MESTI

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
			Less pressure on centralized water provides and water bodies			
		Sensitize local manufacturers of building materials on manufacturing parts of the RWH technology using locally available materials	Increased resilience of population to impact of climate change on water resources	Number of sensitisation outreaches done	GREDA, Architects	MWWH / GREDA / MESTI

5.2.3 Natural Resource Management

Table 8: Action Plans for Natural Resource Management

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Promote effective spatial planning and land zoning, mapping and production of land resource management plans at all levels.	A National Spatial Development framework has been developed Passage of the Land and spatial planning Act by Parliament	Train on GIS and other spatial planning tools and the development of regional and district level spatial development frameworks and further development of community land use plans to improve NRM	Training on developing effective spatial and land use plans at all levels done	Number of training organised and number of people trained	District Assemblies, Local authorities, land owners, CBOs	GMET / TCPD / Survey department / NDPC
Promote community based adaptation activities to improve land and water quality at local level	Awareness creation in some mining communities on the harmful effects of illegal mining on the environment and the damaging effects of some chemicals used in the processing of gold and other minerals by NADMO and some stakeholders	Extend on-going awareness creation programme to many more communities	Awareness creation extended to cover more local communities	Number of communities reached	Local communities, industries, local authorities, CBOs, Mining firms	NADMO / Forestry Commission / Minerals Commission / CWSA / NGOs / media / Ghana Chamber of Mines
		Undertake education on alternative livelihoods as part of the awareness creation programme in the communities	Local communities educated on alternative livelihoods as part of awareness programmes	Number of communities reached	Local communities	NADMO / MoE / GES / Non Formal educational institutions
		Train on and the development of community-based adaptation strategies	Adaptation strategies developed for specific communities by respective District Assemblies	Number of District Assemblies with community based adaptation strategies under implementation	District Assemblies, Local communities, Community based organisations, Relevant CSOs	MESTI / Ministry of Local Government and Rural Development / EPA
Build capacity to improve on efficiency of production, harvesting, conversion and use of wood fuels	Sustainable energy for all (SE4ALL) initiatives National standards for the regulation of improved cookstoves	Intensify awareness of the impacts of traditional cooking methods	Awareness programmes on the impacts of traditional cooking methods intensified	Number of target groups trained Total number of households using improves cookstoves and LPGs	Local communities, General Public	Energy Commission / EPA / Forestry Commission / Minerals Commission

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	Awareness creation for the adoption of improved cookstoves.					
Build capacity of local government officials and other relevant state institutions in natural resource management	Implementation of strategic environmental and social assessment programme Implementation of REDD+ Mechanism by the forestry commission Development of reference emission levels and measurement, reporting and verification systems in Ghana	Establish and build capacity of climate change desk officers in key government ministries and agencies and other relevant institutions.	Climate change desks established Legislation and enforcement	Number of climate change desks established in key government ministries and agencies Number of legislation improved	Ministries and Agencies	MESTI / MLNR / NDPC
		Undertake specific training courses for local government officials, fringe forest community farmers, and community leaders.	About 2000 hectares of degraded land will be restored every year.	Number of personnel strengthened, trained and empowered in fringe forest communities	Government Officials, local authorities	MLG / MESTI / MLNR
		Strengthen capacity of natural resource governance institutions through training to undertake effective valuation of natural resources	Relevant staff of natural resource institutions with the requisite skills and knowledge in natural resource valuation	Number of staff trained	Natural resource institutions	MESTI / Ministry of lands and natural resources
Capacity building on sustainable land management practices	Management plans for forest reserves, ongoing sensitization of local communities	Training of local authorities and communities to adopt sustainable land management practices	Local communities, community leaders, and other relevant institutions trained on sustainable land management for emissions reduction	Number of training carried out Number of District Assemblies and local communities implementing sustainable land management practices and guidelines	Local Authorities, Communities, CBOs	MLNR / FC
Rehabilitate degraded natural ecosystems through enrichment planting in degraded		Intensive advocacy through information dissemination on media - Brochure TV and Radio., documentaries, etc.	Nationwide awareness created on the significance of reducing deforestation	Number of awareness programmes, and dissemination undertaken	General public	MESTI / MLNR FORIG / FC

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
forest reserves and off-forest reserves areas		Education on the importance of ecosystems and the payment of ecosystem services via training workshops, seminars and public forum	Education and awareness campaigns organised nationally and locally	Number of awareness campaigns and public engagement on eco-system preservation Number of educational campaigns	General Public and Relevant stakeholders	MESTI / MLNR FORIG / FC
Improve knowledge capacity for effective management of natural resource for example through sustain extension activities in soil and water conservation	Multi- stakeholder dialogue under projects e.g. Conservation and utilization of medicinal plants, Rehabilitation of degraded lands and mine sites, EU chainsaw project, etc. Sensitization programmes by FORIG, MoFA, etc.- Produce high impact knowledge that could improve sustainable management policy through extension activities and practices Development of climate smart tools and products (e.g. trade-off curves, climate change projections and impact on stream flows, water-related ecosystems in the Volta basin) for the management of natural and built water infrastructures in the basin Training of national, regional and district level institutions on climate smart-water resources management	Strengthen community forestry, land and water management through education- Workshops	Increased awareness about proper forest management practices as a shared responsibility.	Number of awareness campaigns within local communities	District Assemblies, Local authorities	MLNR / MESTI / Water Commission / MoFA
		Sensitize the general public on Forest, land and water management through outreach programmes - Open forum	General public with a fair knowledge of forest, land and water management practices through the sensitisation workshops	Number of workshops organised in local communities	General public/District Assemblies/Local Authorities, CBOs/NGOs	MLNR / MESTI / Water Commission / MoFA
		Create awareness on climate change impact on water resources and water-related ecosystem services as well as the importance of natural water infrastructure such as the Volta Basin (ecosystem services) as solution for climate change adaptation (TV talk shows - twice in a year; quarterly radio programs; documentaries, community engagements, flyers policy briefs, newsletters)	Increased level of awareness of climate change impacts on water resources, ecosystems and the services they render in the Volta Basin; recognition and inclusion of ecosystem services in water infrastructure investment decisions	Inclusion of ecosystem services in water infrastructure investment strategies and plans at all levels; actual use of the climate-smart innovative tools to support water infrastructure planning and development	MWRWH, WRC, GIDA, GWCL, MOFA, NDPC, VRA, MMDAs, EPA	CSIR-WRI/MESTI/FC
		Build capacity of national, regional and district level institutions to undertake climate change impact analysis, optimization and trade-off analysis for aiding decisions in water infrastructure investments, ecosystem mapping and	Enhanced capacity in the use of innovative and climate smart tools for undertaking water resources management, ecosystem mapping, economic valuation of ecosystem services, optimization of built and natural water	Number of national, regional and district level institutions trained in climate change impact analysis, optimization and trade-off analysis for aiding decisions in water infrastructure investments,	Relevant national, regional, and district level institutions	MESTI/GMET/NDPC/ CSIR

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	using water management tools such as IRAS2010, WEAP and SWAT)	economic valuation of ecosystem services	infrastructure and trade-off analysis of the varied interests of different stakeholders.	ecosystem mapping and economic valuation of ecosystem services		
Promote climate resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought, and salinity (Specific title: Modelling the impact of climate change and adaptation for oil palm food crop association in climatically zoned oil palm growing areas in Ghana)	Historical climate information has been obtained and analysed and this indicates increase in both minimum and maximum temperature, precipitation fluctuations and increase in solar radiation for the past years. Breeding of some crops that are climate resilient and conservation agriculture are been practiced to reduce the negative impact	Train farmers, extension officers, policy makers and other relevant stakeholders on Global Circulation Models (GCMs) and Regional Circulation Models (RCMs) on future climate scenarios that have been generated through seminars and workshops.	Farmers trained on GCMS and RCMs on future climate scenarios Farmers trained on improved crop varieties, livestock and conservation agriculture	Number of seminars/workshops organised and number of farmers trained on forecasting climatic events	Government officials and other relevant high level civil servant, farmers, CBOs, local authorities, processors, exporters, other relevant stakeholders	MESTI / MoFA
		Educate farmers and other stakeholders on crop simulation models that have been generated for future crop productivity levels in specific areas in the context of climate change and variability through a multi-stakeholder platform	Farmers and local communities educated on crop simulation models	Number of platforms created and number of engagements done on crop simulation models.	Farmers	MOFA
		Educate policy makers and farmers on actions that will help reduce the negative impact of climate change targeting on specific adaptation information	New crop varieties developed	New crop varieties developed.	Farmers, Government officials, Policy makers	MOFA / MESTI
		Inform various stakeholders on quantification of future percentage loss as results of climate change impact and quantification of percentage negative yield loss reduction by implementing adaptation measures	Stakeholders educated on Improved adoption of effective technologies	Number of sensitisation fora organised and number of stakeholders educated	Government officials, Policy makers, NGOs, CBOs, other relevant opinion leaders, Local authorities	MESTI

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
		Educate farmers and policy makers on importance of crop diversification.	Farmers and relevant policy makers well informed on the benefits of crop diversification through organised engagements.	Number of engagement done to educate identified stakeholders on crop diversification	Farmers / Policy makers	MOFA
		Educate farmers on the cultivation of early maturing crops through field demonstrations.	Sensitisation workshops organised and demonstration farms established for practical education	Number of farmers educated and trained on the cultivation o early maturing crops	Farmers	MOFA

5.2.4 Equitable Social Development

Table 9: Action Plans for Equitable Social Development

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Training on the assessment and management of public health impacts of climate change	The GEF/UNDP/MOH project has trained health personnel in pilot districts on risk mapping, identification and management of CC health risks and engaged in awareness creation Identifying scope and target for the climate change and health capacity development strategy in the health sector	Develop and implement training programmes for health workers, CSOs, CBOs, SHEP coordinators in relevant national programmes[56] on health vulnerability & adaptation assessment and identification and effective management of the current and likely future health risks of climate change[57]	Training workshops designed and organised on the management of public health impacts of climate change	Number of workshops and individuals trained	Relevant health professionals, CSOs, CBOs, SHEP coordinators, District Public Health Emergency Management Committee	MoH / GHS
Build capacity of health personnel to develop and/or update health risk maps	Identifying scope and target for the climate change and health capacity development strategy in the health sector, so that this is coordinated with relevant existing and proposed training interventions The GEF/UNDP/MOH project has trained health	Train on developing/updating health risk maps to depict current and likely future areas vulnerable to prioritized climate sensitive diseases at the district, regional and national levels.	Key health personnel at national, regional and district levels trained to develop/update health risk maps	Number of training organised and number of personnel trained	Relevant health professionals	MoH

[56] Such as the Child Health Programme and the National Malaria Control Programme, the national disease surveillance unit, and other relevant programmes at the national, regional, district and sub-district levels

[57] Includes risks related to air, water, food and vector borne diseases, RTI, CVDs, malnutrition and other climate change related health conditions



	personnel in pilot districts on risk mapping, identification and management of CC health risks and engaged in awareness creation.					
Train and enhance the knowledge and skills of national experts for different public health areas		Train national experts in various climate change and health areas such as environmental sciences, epidemiology, public health, vector control, safety of drinking water and food, air pollution, sanitation, waste management, management of climate change related diseases, flooding, deforestation, soil degradation, sea level rise, etc.	National experts/ institutional focal persons trained on various climate change and health related areas with roles and responsibilities assigned	Number of training programmes organised	Health professionals, EPA,INMD of assemblies, EHSDs, Forestry Commission	MoH / Educational Institutions/Local Assemblies
Improve awareness of the general public on health impacts of climate change		Undertake social mobilization and communication for behaviour change to support resilience of local communities Integrating climate change awareness into National Sanitation Day campaigns	Awareness raising activities on the health impacts of climate change and adaptation options conducted targeting general population	Number of awareness raising activities organised	General Public	MESTI/MMDAs
Improve surveillance systems for existing and new disease risks and enhance the capacity of health systems		Train health professionals on the potential health-related impacts of climate change in Ghana	Increases awareness of the potential health-related impacts of climate change in Ghana	Number of awareness creation campaigns organised and or media campaigns rolled out	General public, Health professionals	MoH
		Train district health officers/professionals and other relevant	Improved skills for designing and implementing a robust surveillance system Enhanced CSO capacity	Number of training programmes organised and number of	Health professionals	MoH

		stakeholders[58] on implementing an efficient health surveillance system at the district level	for promoting health adaptation to climate change	professionals trained		
Continuous knowledge enhancement programmes for climate change adaptation		Facilitate exchange of experiences in climate change adaptation planning processes	Promotion of health representation and meaningful participation in national and international climate change processes (e.g. NAP and loss and damage processes).	Number of exchange programmes undertaken and number of beneficiaries How climate change adaptation strategies are communicated to trickle to people below	All relevant ministries and agencies	MESTI / NDPC
Climate change health risk awareness and its impact on population and Communities		Raise awareness of general public through dissemination of information on Climate change and its impacts to people health and wellbeing	Behaviour Change and increase awareness on health impact of climate change for the general population.	Number of awareness creation campaigns organised and or media campaigns rolled out	General public	MoH / MESTI / MMDAs / CWSA / CSOs / NGOs
Increase awareness on efficiency of water usage and sanitation practices	Sanitization programmes on the causes of cholera and other water borne diseases by NADMO and its stakeholders ongoing in the Greater Accra Region	Extend the sensitization programme to additional communities	Less incidents of cholera and other water borne diseases	Number of people and Communities educated	General public, local communities	MoH / MESTI
Mainstream gender considerations in climate change related policies	Development of vulnerability assessment of women's livelihoods in Ghana.	Strengthen the implementation of gender responsiveness in disaster risk management.	Change in attitude and behaviour of vulnerable groups to reduce emissions that influence climate change patterns such as deforestation, bush burning	Number of gender responsive actions in disaster risk management at the local and national level	NADMO, District Assemblies	NADMO / NDPC / Ministry of Gender, Children and Social Protection

[58] Including health related CSOs/CBOs

	Gender being mainstreamed into a national climate change and human health adaptation strategy.					
		Develop effective gender and climate change goals and gender sensitive indicators.	Gender sensitive climate change indicators developed	Number of indicators developed	Ministry of Gender, other relevant ministries	Ministry of Gender, Children, and Social Protection / MESTI / NDPC
Develop expertise in gender mainstreaming - Gender Analysis and gender sensitive monitoring and evaluation of climate change and GE programming		Develop training manual and train on Gender and social inclusion in Climate change and GE	Relevant officials with adequate knowledge and expertise in gender and social inclusion in climate change and GE issues	Number of institutions (both state institutions, and CSOs, and CBOs[59]) to have in the training programme Number of officials trained	Relevant MDAs, MMDAs, CSOs, CBOs, Media personnel	MESTI / Ministry of Gender, Children, and Social Protection / Ministry of Local Government
Strengthen disease surveillance systems through early warning	Climate change Early Warning Systems in place some communities in the Upper East region	Extend of the Early Warning Systems to cover diseases such as CSM in the three Northern regions through training.	Availability of timely and appropriate early warning systems on diseases	Number of early warning systems deployed	MOH	MOH
Mainstream green economy principles in city planning and development	100 resilient cities project	Build capacity on Green Economy in City Planning and Development	Formal and informal training organised	Number of professionals and students trained	Local government officials	MLGRD / NDPC
		Guide MMDAs to develop policies for green economy	Green policies developed in each MMDA	Number of MMDAs with green economy principles mainstreamed in their activities	MMDAs	MESTI / MLG / NDPC

[59] Community Based Organisations

5.2.5 Energy, Industrial, and Infrastructural Development

Table 10: Action Plans for Energy, Industrial, and Infrastructural Development

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Training for business leaders to appreciate the impact of climate change on their business	SWITCH Africa NAMA Investor guide platform	Undertake sensitisation/awareness programmes for business owners and staff to understand issues of climate change.	The business leaders and staff are fully sensitised about climate change and green economy issues	Number of sensitization engagements with business leaders	NBSSI, AGI, ASSI[60]	MOTI / MESTI / PEF[61]
		Train business leaders on the challenges and opportunities associated with climate change.	Capacity of business owners built to appreciate climate and GE issues and the opportunities thereof.	Number of own climate change Initiatives undertaken by private businesses owners	NBSSI, Power utilities/Industry	MOTI/MESTI/PEF
		Provide technical and financial assistance to businesses to undertake viable pilot initiatives.	To demonstrate and integrate green practises in the operation lines of businesses	Proportion of businesses adopting energy and water efficiency measures. Proportion of businesses with emission reduction targets.	PEF, AGI, business schools	MOTI/MESTI/PEF
		Train and build capacity of business in corporate GHG accounting and carbon trading	Businesses trained in corporate GHG accounting and carbon trading	Number of business involved in corporate GHG accounting	Corporate Institutions	PEF / AG / MOTI / MESTII / EPA
Create awareness for efficient use of energy and renewable energy sources	Enforcement of the ban on the importation and use of second-hand fridges, air-conditioners,	Intensify the sensitization programme on sustainable use of electricity nation-wide.	Improvement in the availability of electric power.	Reduction in the per capita domestic consumption of energy	General public	ECG / Energy Commission / Ministry of Power

[60] Association of Small Scale Industries

[61] Private Enterprise Federation

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	and other used electrical gadgets. Eco-labelling and the promotion of energy efficient electronic gadgets. Renewable energy technology transfer project on-going Public education, sensitisation and training in energy efficiency and conservation					
		Scale up public education on renewable energy sources, Eco-labelling, appliance energy efficiency labelling	Public education campaigns rolled out	Number of awareness creation campaigns, fairs, exhibitions etc.	General public	ECG/Energy Commission / Ministry of Power / VRA[62] / NEDCo[63] /
		Train media personnel on efficient use of energy and renewable energy resources to educate their communities and patrons	Training programmes organised for media personnel	Number of training programmes organised	Media personnel	ECG / Energy Commission / Ministry of Power
		Undertake packaged learning and policy support to business associations and key government stakeholders for developing energy usage, and if possible, water usage targets for agro-industries	Energy and water usage targets developed by key government stakeholders	Number of indicators developed	Key government Institutions	MESTI / Ministry of Power / ministry of Water Works and Housing
		Intensify and expand the scope of public education, sensitization and training programmes for identifiable institutions and communities[64]	Public and users of energy sensitized and educated on energy efficiency and conservation measures Awareness of public on energy efficiency and conservation enhanced.	Number of sensitization, education and training programmes undertaken, regional coverage.	Media, public, businesses	EC / Power Utilities / Ministry of Power

[62] Volta River Authority

[63] Northern Electricity Distribution Company

[64] Such as schools, churches, mosques markets, business associations etc

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Promotion of mass transportation as an efficient transport option	Development of BRT and Rail in the medium to the long term	Train relevant institutions to undertake effective monitoring and evaluation of the environmental, economic and social impacts of mass transport	BRT and other mass transport modes promoted and developed	Number of mass transport options promoted and developed	Investors, Public, MMDAs	EC / DVLA / Ministry of Transport / GHA, MMDAs
Promotion of electricity use efficiency in the industry	Power Factor Improvement in industries	Educate and sensitize industries on efficient use of electricity	Power factors and energy use efficiencies in industries improved	Number of industrial facilities not paying power factor surcharges	Industries	ECG / EC / Private sector/ Energy Foundation
Support for the development and promotion of energy efficient wood and charcoal cooking stoves for the domestic and commercial sectors	Promotion of energy efficient stoves and Public education and sensitization	Review and develop standards for efficient cooking stoves	Standards developed for cookstoves	Number of users of energy efficient cookstoves Number of cookstoves sold Availability of standards for cookstoves	Public, businesses, artisans	EC / NGOs / MESTI
		Scale up the promotion of energy efficient cooking stoves and sensitisation on their benefits	Increased adoption of energy efficient Cookstoves	Number of promotion campaigns Rate of efficient cookstove adoption	General public, local communities	EC / NGOs / MESTI
		Train artisans in the design and manufacture of modern and energy efficient cooking stoves	Local artisans trained and able to design and manufacture modern efficient cooking stoves	Number of local artisans trained Number of manufacturing workshops established	Local artisans	EC / NGOs / MESTI
Support for the promotion of renewable energy technologies	Promotion of solar energy (e.g. Solar PV, solar lanterns, Public education and sensitization	Develop standards/regulations for solar PV technologies	Standards/regulations developed for solar PV The use of Solar PV increased	Availability of Solar PV standards/regulations Number and capacity of solar PV systems installed	Public, businesses	Ministry of Power / EC / Private sector / MESTI
		Train local artisans for installation and maintenance of equipment/systems	Local artisans trained and able to install and maintain solar PV systems	Number of artisans trained	Local artisans	EC / NGOs / MESTI
Capacity building for the promotion of safe use of LPG	Promotion of LPG in the domestic and commercial	Training and capacity building to develop, monitor and enforce	LPG use, storage and transportation safety improved.	Number of people trained on LPG safety	Public, OMCs, LPG outlets, LPG consumers	NPA / OMCs / Ministry of

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	sectors to reduce woodfuel demand Education and sensitization on the safe use of LPG	standards for improving safety of LPG transportation, storage and use.	Number of LPG related accidents/fires reduced.	Number of LPG accidents/fires		Petroleum / Ghana National Fire Service

5.2.6 General Education and Capacity Building

Table 11: Action Plans for General Education and Capacity Building

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Capacity building for media campaigns and awareness creation		Technical content and support for media campaigns and related activities including capacity building for media personnel designed to raise awareness among the general public.	Capacity of relevant institutions built to be able to undertake media campaigns and general public awareness	Number of institutions supported and trained for media campaigns and awareness creation	Media personnel / relevant state institutions at the national, regional, and district levels	Media Commission / MESTI / Ministry of Communication / Ghana Journalists Association / Ghana Writers Association / NCA
Build capacity of research institutions		Provide logistical and financial support for research	Logistical and financial support provided to laboratories and research institutions	Number of research logistics supplied Number and value of research funded	Laboratories, research Institutions, tertiary institutions	MESTI / MoF
Build the capacity of basic and secondary school children to monitor climatic events	Formation of environmental clubs at the basic level of education	Continuous formation of environmental clubs and upscaling the action to the basic, secondary and tertiary levels	Existence of functional environmental and climate science clubs at the basic and secondary school level[65]	Improved ability to monitor and report climatic events by students and teachers	Pre-tertiary institutions, Tertiary institutions	MoE / MESTI / GES

[65] Clubs will engage in numerous environmental and climate change awareness activities and programmes including excursions, etc

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
			to promote climate change alertness			
		Observe school sanitation days, where choked gutters and debris would be cleared, buried and burnt to avoid flooding	Students at the basic and secondary level more actively involved in the climate process and are climate change alert	Number of functional clubs formed	Pre-tertiary institutions	MoE / MESTI / GES
		Educate to both teachers, pupils, and students on the use of I.C.T. as a tool in monitoring climate events and provide early warning signs Access to ICT in rural areas	Students, pupils and teachers well trained on the use of ICT for monitoring climatic events	Number of teachers, pupils, and students trained	Pre-tertiary institutions	MoE / MESTI / Non-formal education
Support scientific research, including traditional and indigenous knowledge, monitoring, and collaboration with national and international institutions	Signatory to Kyoto protocol Clean Development Mechanism REDD+ Research on adaptation strategies Afforestation and reforestation programmes (mitigation)	Assess and apply indigenous knowledge and practices in natural resource management.	Application of indigenous knowledge in resource conservation at the local level	Number of indigenous knowledge applied to resource conservation within different communities	Local communities	MESTI
		Train relevant state institutions on environmental accounting.	An approved system of environmental accounting for the country.	The existence of an approved national environmental accounting system.	Tertiary Institutions, wood workers	Relevant MDAs
		Research into resource conservation methods.	Appropriate resource conservation methods developed across the country.	The number of methods developed	Tertiary Institutions	MOE / Universities
		Undertake public education on the optimal utilization of wood waste through workshops, documentaries / commercials, other applicable medium	Training on wood waste use organised for different target groups and commercials/documentaries deployed	Number of technologies introduced Number of training organised/commercials and documentaries aired.	General Public	MESTI
		Educate Ghanaian communities on the Payment for Environmental services.	Public education organised on the payment or environmental services	Number of educational campaigns and local community engagements undertaken Awareness of carbon credit Number of clubs by the public	Local communities	MESTI / MLNR / Educational institutions

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Training on climate change vulnerability and adaptation	Implementation of national sector plans of action for strengthening national capacities: health, education, water, transport, justice, finance, agriculture, housing, transport, energy, rural development, etc. EPA has an on-going climate change education / awareness creation programme for MDAs	Prepare capacity-building plans specific to climate-change adaptation and mitigation to fill the gaps identified from vulnerability assessments.	Capacity building plans designed covering technical, organizational (human and financial resources) and institutional capacities.	MDAs and other sector heads mainstreaming climate change into their development planning.	MESTI / Other relevant ministries	NDPC
		Conduct an assessment of health worker training needs (including health policy makers and others)	Training course on health vulnerability and adaptation assessment designed and being implemented	Ability of health workers to effectively communicate health related adaptation measures.	Health professionals, Health related NGOs	MoH, NGOs, GRNA, GMA, GHS
		Review the current climate change and health training manual to align with the WHO and IPCC guidelines.	Existing climate change and health training manual reviewed and aligned with WHO and IPCC guidelines	Public health sector staff and other local government staff trained health vulnerability and adaptation.	Health professionals	MoH/GRNA/GMA/GHS
		Design and organise training courses on health vulnerability, impact assessment, adaptation assessment, communication and management of public health impacts of climate change.	Short training courses organised on health vulnerability impact assessment, adaptation assessment, communication and management of public health impacts of climate change.	Number of health professionals trained	Health professionals	MoH
Strengthen national capacity for accessing global climate finance		Train all relevant officials on innovative ways of attracting and monitoring climate finance	Enhanced ability of relevant staff and institutions in accessing climate finance	Number of officials trained	MOF Staff, Relevant agencies	MOF/Relevant agencies (AGI, NBSSI)
Capacity development of Ministry of Finance Staff (especially NREG Unit staff and budget division) in Climate Change and Green Economy principles	GCF Readiness programme of Ghana that seeks to provide some form of support for capacity development for the NDA	Design short courses (not less than 2 weeks) in the area of climate change governance, climate finance, climate change programme and project development and management, climate change mitigation and adaptation strategies, and climate sensitive budgeting (including tracking of climate finance).	Staff of NREG Unit and budget division participates effectively in developing programmes and projects for climate and GE finance and monitoring of climate and GE finance	At least four (4) staff in the NREC Unit trained in at least three (3) of the focus areas of training identified above annually.	MOF Staff	MoF

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
	It is important to indicate that the financial support cannot provide fully for the rigorous and continuous training required by the Unit and allied institutions.	Sponsor relevant staff on international conferences that will allow exchange of experience and address capacity gaps identified above.	The Unit is able to coordinate climate finance delivery effectively through collaboration with relevant stakeholders	At least ten (10) staff of partner institutions trained in at least three (3) of the focus areas of training identified above annually.	MOF Staff	MoF
		Create awareness and train relevant MoF staff on climate change and public finance for funding the green economy transition	The Unit is able to facilitate climate change related workshops locally.	At least three (3) local workshops on climate change and climate change financing facilitated by the NREG Unit annually.	Relevant MoF Staff	MoF
Strengthen national capacity for accessing global climate finance		Train all relevant officials to innovative ways of attracting climate finance	Guidance on how to access global funds for health adaptation to climate change developed	Number of officials trained	MOF Staff, Relevant agencies	MoF / Relevant agencies (AGI, NBSSI)

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
Capacity building for Government officials and other policy makers on GE thematic areas and its impacts of national development		Undertake introductory training on green economy concepts including but not limited to the following; a) GE rationale, benefits and key concepts; b) GE Strategies and development planning; c) GE modelling and policy assessment; d) Policy, regulatory, economic, and voluntary tools to advance green economy; e) Green economy indicators and measuring progress; f) International green economy policies and cooperation; g) Green economy strategies and development planning; h) Ecosystems modelling and impact analysis	Government officials trained on GE thematic areas.	Number of officials trained	Government officials and key Civil Servants, NDPC and line ministries, and other key stakeholders	MESTI / MoF
		Packaged individual green economy learning and policy support to line ministries covering energy and housing in order to provide the ministries with the necessary skills to support the implementation of the government's objective of increasing the number of solar powered homes in Ghana by 2020	Capacity of relevant institutions built to support the objective of increasing the number of solar powered homes in Ghana by 2020	Number of relevant institutions supported	Relevant line ministries and other state institutions	Ministry of Power/Ministry of Energy/NDPC/MoF/ Energy Commission
Train a critical mass of human resource with general and specialised knowledge on climate change, green economy concepts, and sustainable development impacts.	Promotion of Energy Audit in Commercial and Public Buildings	Incorporate climate change and green economy learning into the educational curricula across all disciplines at all levels of education	Capacity of students/ pupils built to disseminate information on climate change issues.	Number of climate change and green economy related subjects and courses developed	Educational institutions, non - formal educational institutions	MoE / GES / MESTI / non - formal educational institutions
		Develop programmes on key GE concepts at the tertiary level	Degree and refresher courses designed in GE concepts and development.	Number of courses designed. Number of professionals/ Students trained.	Tertiary Institutions	GES / MoE / MESTI

Capacity Need	Ongoing Action	Additional Action	Expected Results	Indicators	Target Group	Lead Institution
		Set up a scholarship scheme for undergraduate and graduate studies	Train professionals for the climate change, environment, and green economy industry	Number of students trained through the scholarship scheme	Undergraduate and graduate students	MoE
		Train climate scientist and meteorologists in weather and climate issues	Degree and refresher courses designed and training rolled out.	Number of scientist trained Number of fire science and climate change professionals trained	Tertiary Institutions	GES / MoE / MESTI / Tertiary Institutions
		Undertake teaching of energy management and audit in tertiary institutions and certification of energy auditors and managers	Energy Auditors trained and certified. Availability of qualified energy auditors in the country	Number of qualified Energy Auditors	Students in Tertiary Institutions, Tertiary Institutions, Businesses	EC / Energy Foundation / Tertiary Institutions

5.3 Financial Requirement

Ongoing actions under the various priority and capacity need areas will be implemented and monitored as part of this strategy. Financial requirements for the additional actions have however been costed at a total of USD 103,073,000. Table 12 summarises the cost estimation for the priority areas. Detailed budget estimates for all action plans have been attached as Annex II.

Table 12: Total Estimated Budget

Priority Area	Cost (USD)
Agriculture and Food Systems	15,900,000.00
Disaster Preparedness and Response	19,117,000.00
Natural Resource Management	34,930,000.00
Equitable Social Development	5,361,000.00
Energy, Industrial, and Infrastructural Development	4,800,000.00
General education and capacity building	22,815,000.00
Critical Next Steps	50,000.00
Strategy Review and Evaluation	100,000.00
Total	**103,073,000.00**

6. Strategy Implementation

6.1 Implementation Framework

The Ghana Climate and Green Economy Learning Strategy will be implemented within the framework of the NCCP with the MESTI as the coordinating Ministry. All relevant sector ministries, departments and agencies will implement action plans specific to their sector and activities with innovative and action-specific strategies at the level of implementation. The overall implementation will be coordinated by the by MESTI and will drive the process of ensuring that the strategy is well supported financially and technically with the collaboration of relevant institutions.

While the MESTI will play a coordinating role, individual sector ministries, agencies, and relevant institutions will lead the implementation of actions that fall within their purview along the respective value chain. The lead and target institutions identified within the action plan tables may not exhaustive, however, at the level of implementation, all other relevant stakeholders along the value chain of the respective action will be identified and engaged through the appropriate institutional coordination mechanism.

This strategy acknowledges that there currently a number climate change and green economy learning and capacity building actions either incorporated in on-going projects and programmes, or being implemented independently. This strategy will therefore not create a parallel implementation structure, but will coordinate and streamline on-going and additional actions through institutional coordination to ensure appropriate and adequate monitoring, evaluation and reporting of the learning and capacity building actions. All respective MDAs and MMDAs will also incorporate the priority actions identified within this strategy in the preparation of their annual plans and budgets which will all be coordinated at the strategic level by the MESTI, and by extension, the EPA and the National Climate Change Implementation Committee.

The implementation of the action plans identified in this learning strategy will be hinged on three major focus areas which are; a) Human and institutional capacity development; b) Sustainable financing; c) Cross-cutting issues. Table 13 shows the strategic objectives for the afore-mentioned broad areas of the strategy's implementation, together with action areas, indicators for measuring performance, and lead institutions.

Table 13: Implementation Framework

Focus Area	Strategic objective	Action areas	Indicator	Lead Institution(s)
Human and Institutional Capacity Building	To develop critical mass of human resources with requisite understanding, knowledge and skills to regarding climate change and green economy	Undertake Training of Trainers workshop for various stakeholders	Number trained	MESTI / MoFA / NDPC / MLGRD
		Train local communities in climate change basics	Number trained	
		Train policymakers in climate change basics	Number trained	
		Establish and build capacity of climate change desk officers in all key ministries and departments	Number trained	
		Train professionals in relevant areas of climate change	Number trained: Certificates Diploma Bachelors Masters PhDs	Universities
		Training of National & Regional House of Chiefs members including Queen mothers in Climate Change basics	Number trained	
		Identify and train private sector groups including AGI, Hoteliers, OMCs, Health Providers, etc. in Climate change basics	Number trained	
		Train Religious Groups in Climate Change basics	Number trained	
	Develop strong organisations to champion public awareness and training in various aspect of climate change and green economy	Mainstream climate change in the media	Number of media houses with climate change programmes	MESTI / Ministry of Communications / Ministry of Education / Universities
		Mainstream climate change in school curricular	Number of curricular revised Number of new cc courses developed	
		Strengthen climate change research and training at universities and training centres	Number of institutions funded, Number of research Programmes conducted	

Focus Area	Strategic objective	Action areas	Indicator	Lead Institution(s)
			Number of research publications produced	
		Strengthen the capacities of teachers and students in higher education to design and manage climate change projects	Number of teachers trained Number of students trained	
		Train parliamentarians as well as officials working in public administration and local authorities on integrating climate change issues in legislation and regulations	Number of parliamentarians trained Number of public sector workers trained	
Sustainable Financing of Learning Activities	To develop a sustainable financing mechanism for climate change learning programmes	Mainstream financing of climate change activities in sectoral budgets.	Amount of money set aside from national budgets for climate change learning activities	Ministry of Finance / Ministry of Education
		Introduce local carbon tax/levy to finance climate change learning activities	Amount of money generated from tax collection for use in climate change learning activities	
		Mainstreaming Climate Change financing activities in MMDAs budgets	Amount of money set aside from common fund and IGF	
Cross cutting Issues	To take into account gender and policy consideration in climate change initiatives and programs	• Mainstreaming gender and social inclusion in climate change learning activities • Include climate change learning activities in sectoral policies and strategies	Number of sectoral policies and strategies that include climate change learning	MESTI/MWGC

6.2 Coordination

To ensure effective coordination and guide the implementation phase, the strategy will be coordinated through a multi-stakeholder and multi-sectoral process under the leadership of MESTI and with technical support provided by the Climate Change Unit of the Environmental Protection Agency. Subordinate implementation structures may be established to guide activities at the level of implementation by respective institutions on a regular basis based on the nature of the action being implemented and the target group. MESTI will be responsible for sharing information about implementation activities, including sharing of new learning materials, writing press releases, participating in regional and international fora, etc.

The Climate and Green Economy Learning Strategy action plans will be led by the National Focal person for climate change education and awareness creation at the Climate Change Unit of the Environmental Protection Agency. The existing National Climate Change Implementation Committee will support the implementation and monitoring of the priority action plans of the strategy.

6.3 Communication

Effective communication among actors will play a key role to ensure a successful implementation of Ghana's climate and green economy learning strategy. A comprehensive approach to communication will therefore ensure that key messages are shared and well understood, as well as ensure the continuous engagement of all relevant stakeholders.

6.3.1 Key Imperatives for Communication

The overall communication plan for the strategy will consider a number of critical issues. These are:

- Message
- Purpose of message
- Channel
- Content
- Language

6.3.2 Emerging trends in communication

Communicating climate change and green economy issues will take advantage of emerging trends. Among these new communication trends are:

1. Increasing use of media relation techniques in mobilising public opinion;

2. The rise of social media (WhatsApp, Viber, Facebook, SMS, etc.) as a tool for networking and mobilisation;

3. Using commercial (Print & Electronic) and community radio as a major means of mass mobilisation;

4. Using blogging as a tool to disseminate information and shape of opinions on climate change.

6.3.3 Corporate Communication and Strategy Communication

It is important to ensure that the communication of climate change and green economy activities is well integrated within the existing communication structure and the overall communication strategy of EPA and MESTI.

A critical part of the strategy will be the development of key messages and creative materials to support implementation. It is therefore important for the communication resources of oversight and implementing institutions especially the EPA and MESTI to support the communication plan of the strategy.

6.3.4 Media Relations

Media relations in the context of climate change and green economy learning involve working with the media to inform the public about climate change and green economy issues in a positive, consistent and credible manner. The purpose of media relations is to create and sustain positive coverage for the learning strategy by developing innovative content.

The key elements in the media relations strategy will include but not limited to the following:

- Creating/further development of the media database
- Developing a classification and typology of the media
- Identifying traditional and cultural elements/influences in the mass media
- The use of local languages
- Matching messages to target audience

The Climate and Green Economy Learning Strategy will also take advantage of media opportunities with reference to the following:

- The UN, African and National Calendars of observations (E.g.; World Environment Day)
- Traditional festivals
- Launch of a new product/service
- Report of financial results
- Corporate Social Responsibility
- Sponsored events
- Awards and accolades

- Engaging celebrities as ambassadors
- Involvement in community activities
- Panel discussions

6.3.5 Visibility strategy

Visibility for the learning activities will be created and sustained through the following:

- Public/media relations using print, broadcast and digital media
- Periodic public lectures and speaking engagements
- Publication(s)
- Social media presence
- Endorsements and sponsorships
- Product placement
- Taking advantage of sports to promote visibility of climate change learning activities and issues
- Creating "social" networking group
- Guest blogging

6.3.6 Communication Activities

a. Designing newsletters for providing information for all stakeholders.

b. Creation of a media database to include all the names of media contacts across the country.

c. Creation and maintenance of a climate change learning website. This could be distinct from that of MESTI and EPA or as a link under any of the two websites.

d. Creation of a group of media personnel who report environmental issues regularly. This group will be the forerunner in getting the programme information out.

e. Engaging on columnists/bloggers to write about climate change, especially the implementation of the learning activities.

f. Media Engagement:
   - Periodic Press Conferences
   - Regular press releases
   - Educational seminars for journalists
   - Periodic panel discussion on radio (this can rotate on radio stations/regions)
   - Regular presentation of information/reports
   - Radio/TV Quiz

g. Community Engagement/Outreach:
   - Traditional festivals throughout the country

- Community fora
- Schools and colleges fora (formation of clubs)
- Engagement with the Ghana Community Radio Network
- Religious and faith-based networks
- Youth groups
- Women's groups
- Men's
- Persons with disabilities (PWDs)

h. Use of Audio-visuals:
- Environmental Film Festival
- TV Environmental festival
- Photography competition
- Art exhibition
- Documentary
- ISD Mobile Vans

i. Artistic expression:
Different artistic groups may be engaged through the Ghana Culture Forum to use artistic expression as a communication tool. These may include music, dance, drama, painting, sculpture, writing, etc.

6.3.7 Target Audience

Decision makers and politicians:
The knowledge and capacity of politicians and decision makers at all levels of society need to be built to help them align societal development to climatic considerations and to enable them play an oversight role effectively.

Environmental specialists and Sector workers:
The knowledge and technical skills of actors within the climate change sector need to see continuous improvement to ensure that their work is made relevant to sustainable development priorities.

Farmers and fishermen:
Agriculture is directly impacted by climate change. Farmers and fishermen will be trained to enable them effectively adapt to the impacts of climate change.

Civil society:
Civil society is a major channel for public engagement and education. Building the capacity of civil society organisations will therefore enhance their ability to engage and build the awareness of society on the subject of climate change and green economy.

Wider society:
The success of the National Climate Change and Green Economy Learning Strategy will to a large extent, depend on the level of engagement and participation of the wider society. It is imperative therefore that innovative means are employed to keep the general public engaged for continuous learning and to build general acceptance and encourage behavioural changes that enhance climate change adaptation, promote a green economy transition, and protection of the ecosystem.

Media:
The media plays an important role in educating and informing the public on critical matters. Building their capacity will ensure that media practitioners are well equipped not only to report on climate change, but also to educate the public on effective adaptation measures.

Actors within the educational system:
To maintain a sustained supply of human resource with the requisite skills, the educational system at all levels will need to incorporate climate change learning in their curricula. Appropriate training programmes and courses need to be designed for policy makers and implementers, as well as teachers and students/pupils at all levels of the educational system.

Business Leaders and Executives:
Business leaders need to first and foremost understand what climate change and the green economy transition means for their business in terms of profitability in the short to medium term, and sustainability in the long term.

Religious Bodies and Leaders:
In order to build their capacity and knowledge level to impart same onto their congregation, religious bodies and their leaders will be the targets for awareness and sensitization efforts under this strategy.

6.4 Financing and Resourcing

Financial sustainability will be key to the successful implementation of the National Climate Change and Green Economy Learning Strategy. While financial sources for on-going learning actions have been secured, funding for additional actions will be sought both at the national and international level.

At the national level, the Government of Ghana (GoG) will make budget allocations towards the implementation of this strategy from the consolidated fund through respective MDAs and MMDAs annual budgets and plans. GoG's equity contribution will also be in the form of office

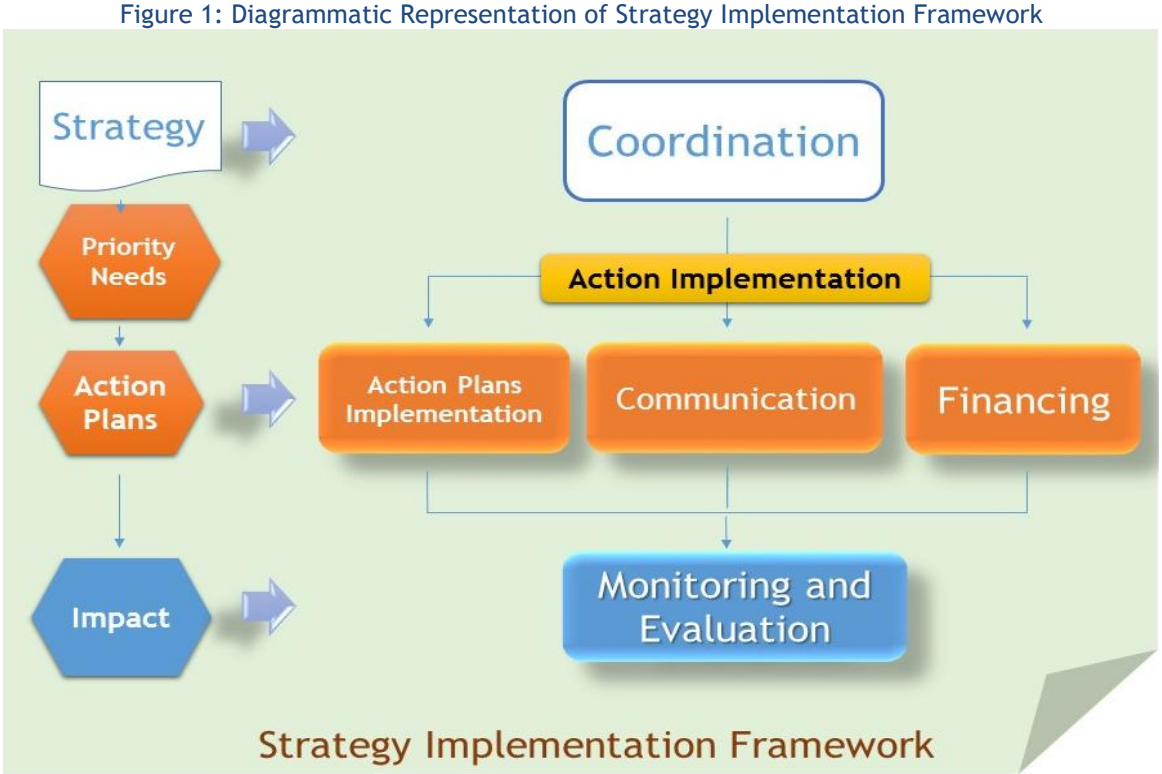
space use and the payment of salaries and emoluments of staff implementing the learning strategy. In the short term, action plans to address immediate learning needs will also be financed by funds from the One UN Climate Change Learning Partnership (UN CC: Learn).

In the medium to long-term, there are a number of multilateral, bilateral and private financing options which are appropriate funding sources for Ghana's climate and green economy learning strategy. Multilateral financing sources include multilateral development banks (MDBs) such as the World Bank; agencies of the United Nations, such as UNDP and UNEP; and special international agencies created by these MDBs (such as the Global Environment Facility) in collaboration with various national governments.

Private financing sources, which are increasingly involved in financing climate change mitigation actions, include a wide range of local and international banks and financial institutions, venture capital and private equity funds, pension funds and some special funds created to address climate change mitigation. Private financing sources also include carbon finance companies. Many of the public (multilateral and bilateral) financing sources seek to leverage increased financing from private sources.

Figure 1 is a diagrammatic overview of climate change learning strategy implementation

Figure 1: Diagrammatic Representation of Strategy Implementation Framework



6.5 Roles and Responsibilities for Action Implementation

There are a number of existing national institutions and private organisations in Ghana whose mandates/activities are directly and indirectly related to climate change and green economy. To ensure successful implementation of the climate change learning strategy, a number of key stakeholders will be involved. As mentioned earlier, the Ministry of Environment and Science, Technology and Innovation (MESTI) will have the oversight responsibility for implementing the Strategy while coordination will be done by the Climate Change Unit of the EPA. Sectoral budgeting and on-the-ground activities will be done by sector ministries or departments. The National Climate Change Policy identifies a number of institutions as key institutions responsible for coordination of climate change related activities. For the purposes of the National Climate Change and Green Economy Learning Strategy, these institutions will be relevant in the implementation of the strategy:

- Environmental Protection Agency (EPA)
- National Development Planning Commission
- Ministry of Finance
- Other agencies such as Ghana Meteorological Agency and MMDAs

Other stakeholders such as UNDP, Ministry of Education, CSOs etc. will play a role in the implementation of the learning strategy.

The process of developing climate and green economy related curricular will be led by the Ministry of Education and its Agencies with technical input by MESTI. In addition, academic institutions will be tasked with the responsibility to develop degree programmes as well as tailor-made short courses on climate change and green economy. Table 14 below indicates the key institutions and their roles in the implementation of the strategy.

Table 14: Key institutions and responsibilities

Institution	Key responsibility
MESTI / Parliament / PEF	• Policy • Coordination • Fund raising
EPA	• Implementation • Monitoring and Evaluation
MoF	• Implementation • Sectoral budget and sourcing of finances • Monitoring and Evaluation
Ministry of Education / Ghana Education Service / Academic Institutions	• Curricular development • Training • Implementation

	• Monitoring

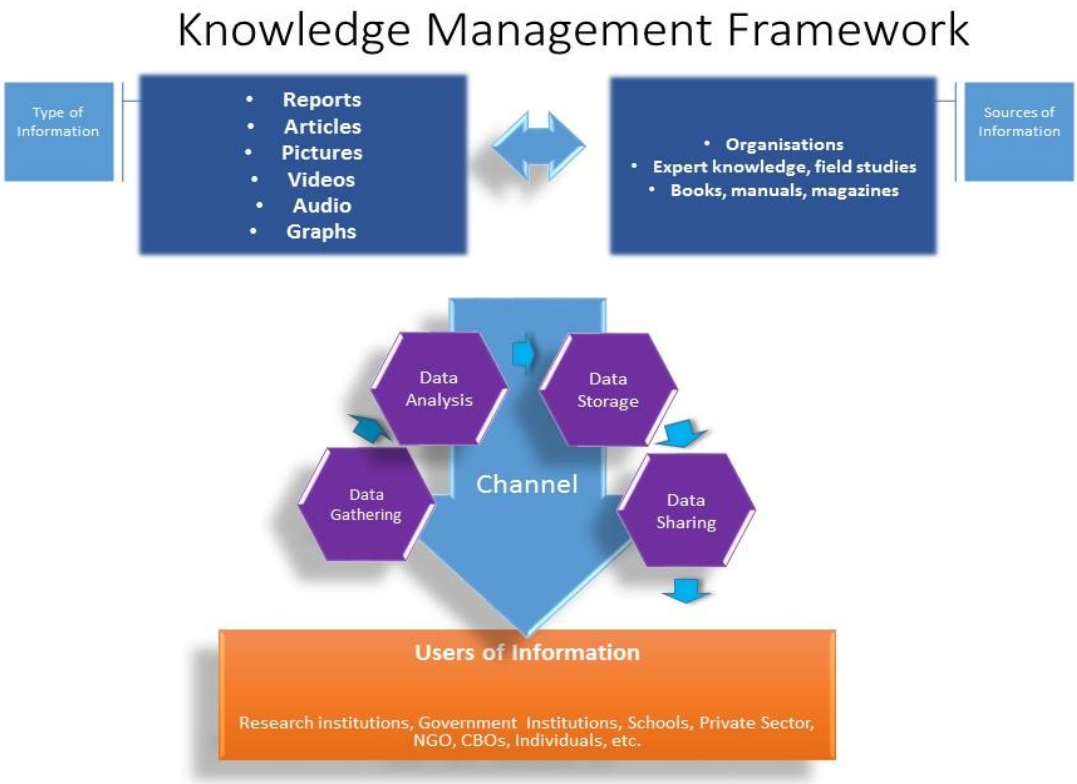
6.6 Knowledge Management

Climate change and green economy knowledge activities and learning process are mostly undertaken by tertiary institutions, research institutions, government ministries, local and international non-governmental organisations, civil society organisations, policy think tanks and donor partners. However, most of the non-formal knowledge management activities are largely uncoordinated.

The various knowledge needs of different audience or stakeholders and the appropriate means of reaching these stakeholders will be given consideration in the strategy implementation. These learning activities also require proper coordination to avoid duplication of efforts as well as take advantage of synergies. Regular assessment and review of knowledge and capacity needs will also help ascertain the changes in learning needs of different stakeholders over time and to inform an appropriate response.

The capacity of knowledge management institutions and dissemination channels will also be reviewed constantly to ensure that the desired impact is made.

Figure 2: Knowledge Management Framework



7 Monitoring, Evaluation and Reporting

7.1 Introduction

Monitoring and evaluation is essential to ensure progress, effectiveness and efficient implementation of the strategy in general, and the priority action plans in particular. The framework for monitoring and evaluation is dependent on the pre-determined objectives of the strategy, as well as the indicators of the various action plans. Monitoring will assist with tracking the progress made in achieving the objectives of the strategy, while evaluation involves a more detailed analysis of the impact of the climate change and green economy learning strategy.

As part of management function, the activities will be monitored on a regular basis through formal reports involving all implementing partners at regular intervals, with the overall monitoring, evaluation and reporting function being executed by the Environmental Protection Agency with the involvement of the National Climate Change Implementation Committee. The first stage of monitoring, evaluation, and reporting will be at implementing institutions based on the existing national monitoring and evaluation framework. Monitoring and evaluation will be benchmarked against the strategic objectives and performance indicators for each action plan using baseline information. A continuous process of monitoring based on the existing national monitoring and evaluation framework will provide regular feedback on the progress made towards achieving the goals and objectives of the strategy.

It must be emphasised that monitoring and evaluation for this strategy will be done based existing national monitoring and evaluation framework with all actions incorporated into the activities of relevant MDAs and MMDAs together with on-going learning activities. Lessons learnt from monitoring and evaluation will help either review the relevant parts of the strategy, or develop new action plans. Monitoring and evaluation will also involve both the financial aspects of the strategy implementation as well as the impact of the individual activities in achieving the overall objective of the strategy (i.e. institutional and individual capacity building).

7.2 Levels of Monitoring and Evaluation

Monitoring and evaluation will take place at three major levels of the strategy's result chain, which are;

1. **Strategy Impact:**
   Evaluating the overall impact of the National Climate Change and Green Economy Learning Strategy will form a part of the broader evaluation of the impact of the National Climate Change Policy and will be integrated within the measuring framework of the policy.

   The impact of the strategy will be compared with the strategic objectives of the strategy and will specifically bother on the following critical considerations regarding the strategic objectives;

   - Whether the implementation of the action plans of the strategy has contributed to achieving the overall objectives of the National Climate Change Policy and to what extent.
   - Financial and non-financial resources available for the strategy's implementation.
   - To what extent climate change and green economy learning is being implemented at all levels of education.
   - Whether the implementation of the strategy has improved the understanding of the general public on the subject of climate change and green economy
   - Whether the strategy has attracted the support of most stakeholders such as the local population and development partners.

   The overall strategy impact will be tracked based on the following three parameters: a) Human and institutional capacity development; b) Sustainable financing of climate learning activities; and c) Cross cutting issues.

   Beyond tracking the implementation of the strategy based on the individual action plans, the strategy's implementation will also be tracked based on the focus areas in Table 15.

Table 15: Climate and Green Economy Learning Strategy Indicators

Capacity Building Area	Indicators
Human and institutional capacity development	• Number of new and innovative climate change and green economy courses developed and operationalised. • Number of new climate change courses introduced by national institutions • Sectoral learning strategies developed • Number of teachers trained on climate change and green economy • Integration of climate change in curricula at primary and secondary levels
Sustainable financing of climate learning activities	• Amount of money set aside from national budgets for climate change learning activities • Amount of additional funding for climate change learning that has been mobilised from domestic and external sources • Amount of resources allocated by Ministry for staff training on climate change
Cross cutting issues	• Number of sectoral policies and strategies that include climate change learning

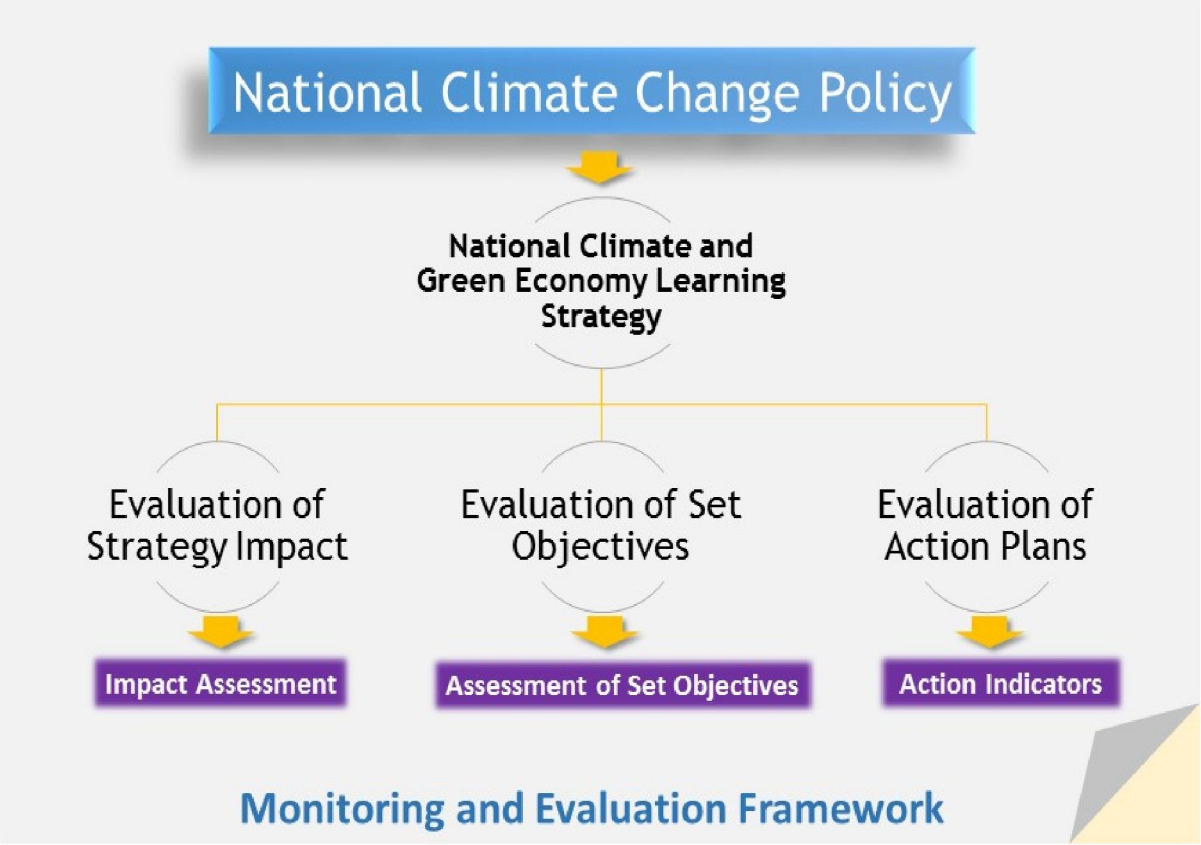
2. **Strategy Objectives:**
This level of evaluation considers the extent to which the priorities and objectives of the strategy have been achieved. Monitoring and evaluation at this level focuses on the outcome of the strategy. For example, one objective of the strategy is to ensure the integration of climate change and green economy principles into academic curricular. Evaluating this objective will take into account the number of climate change and green economy related subjects and courses being taught and the number of teachers who have been trained over time to teach these subjects and courses.

Monitoring and evaluation at this level will also consider but will not be limited to;

- Challenges faced during implementation and how the implementing agencies overcame them, lessons learnt, etc.
- Whether action plans being implemented are still relevant to meeting the objectives of the strategy.
- Changes needed to be made to planned actions.

3. **Learning Actions and Activities:**
   Monitoring and evaluation at this level focuses on the individual actions and activities and measuring results against the indicators of the respective actions.

Figure 3: Monitoring and Evaluation Framework



7.3 Reporting

7.3.1 Annual Reports

There will be annual reports based on the continuous monitoring and evaluation of the strategy which will inform the necessary reviews of the learning strategy and the various priority action plans and their implementation. The annual reports will include both financial and non-financial aspects of the strategy implementation.

7.3.2 Mid-Term Evaluation

A mid-term review and evaluation will be undertaken in 2025 to assess the impact of the strategy with the annual reports forming the primary source of information. The mid-term review report will inform the required changes for the second half of the strategy implementation.

7.3.3 Final Impact Analysis

A final impact analysis of the strategy will be undertaken during the final year of the strategy's implementation. This will assess the overall impact of the learning strategy over the implementation period.

8. Implementation Barriers and Policy Actions

8.1 Potential barriers

Some factors could constrain the successful implementation of this learning strategy. The possible barriers have been clustered into the following:

8.1.1 Institutional and Stakeholder Barriers

Inadequate Institutional Capacity:
Inadequate institutional capacity of implementing agencies may adversely affect their ability to effectively implement the strategy.

Increased conflict around resources and conflict of interest:
The strategy and action implementation will require a balancing act. The ability to work closely with all stakeholders in order to build cohesion and support for the strategy could be compromised due to conflict of interest, and make it difficult if not impossible to maintain the objectivity required in making critical decisions.

Resistance to change:
Executing this strategy will require changes in approach and ways of doing things. A resistance to change and hesitation to implement action plans will greatly impede the successful implementation of the strategy as a whole.

Weak monitoring and accountability:
A weak system of monitoring the implementation of action plans as well as lack of proper accountability especially regarding financial matters will negatively affect support for implementing the strategy especially from development partners.

8.1.2 Financial barriers

Unavailability of adequate funds:

Implementing climate change learning action plans require substantial funds. Inadequate funding, unreliable funding sources and /or late release of funds could be a hindrance in meeting stated objectives of the climate change learning and capacity building strategy.

High cost of climate mitigation technologies:

Technology transfer plays a critical role in an effective global response to the climate change challenge. Achieving the goal and specific objectives of climate change learning strategy requires innovations to transform current technologies into cleaner and climate-resilient technologies. This effort may be hindered by the high cost involved.

8.1.3 Implementation barriers

Excessive Bureaucracy:

Implementing the National Climate Change and Green Economy Learning Strategy could to be fraught with excessive administrative bureaucracy and or bottlenecks that will consequently affect timelines for action plan implementation.

Inadequate data:

Inadequate data on baseline scenarios for the action plans will negatively impact the ability to adequately measure the indicators of the action plans as well as the overall impact of the strategy.

8.2 Policy actions and immediate next steps to mitigate potential barriers

The barriers identified in 8.1 can be effectively addressed with concerted effort, sufficient political will, creative management, and prioritisation. Specifically, the following policy actions will address the barriers identified and ensure the successful implementation of the strategy:

8.2.1 Institutional and stakeholder barriers

Coordinating and implementing institutions and agencies will be strengthened to enable them effectively implement the strategy. A comprehensive needs assessment will be undertaken at the inception phase of the strategy implementation to ascertain the areas of institutional capacity building needed to effectively implement the climate change and green economy learning strategy

The establishment and enforcement of a strong monitoring and evaluation system will ensure that resources are judiciously used for the desired purposes. Annual reports for the strategy implementation will ensure that financial and non-financial resources are judiciously used for

the desired results. Additionally, a thorough gender vulnerability analysis will be undertaken at the preliminary stage.

8.2.2 Financial barriers

Innovative financing will be sourced for the climate and green economy learning strategy. The Ministry of Finance is the country's Green Climate Fund (GCF) National Designated Authority and will lead in sourcing funds through the GCF. The strategy will also be pursued together with ongoing initiatives under the UN Joint Programme on Climate Change that focuses on capacity building and policy advocacy to avoid duplication efforts. This will also catalyse the shaping of the country along a green low-emission and climate-resilient development path.

8.2.3 Implementation barriers

A study to ascertain baseline data for all proposed action plans will be undertaken before action plans are implemented to ensure effective measuring and evaluation.

Engaging all relevant institutional stakeholders and institutional heads during the strategy formulation stage will ensure institutional buy-in during implementation. The strong coordination mechanism that will be instituted and led by the MESTI will also ensure bureaucratic bottlenecks are fully addressed.

8.3 Actions for Immediate Implementation

Thirteen priority actions have been identified through the stakeholder consultations as needing urgent implementation to further enhance the capacity to implement additional learning actions. Implementation of these actions (Presented in Table 16) will commence soon after the Climate and Green Economy Learning Strategy has been officially launched.

Table 16: Actions for Immediate Implementation

Priority Area	Capacity Need	Actions
Agriculture and Food Systems	Promote awareness on climate change impacts for fishing and farming and provide sustained support in the use of simple agronomic soil and water conservation measures	Train farmers and fishermen and present information on conservation agriculture, climate smart cropland management, and other climate smart agricultural and aquaculture practices in simple language for easy appreciation
Disaster Preparedness and response	Research on appropriate infrastructure design standards that meet higher requirements against extreme weather-related natural hazard events	Train on the principles for the design, management and operation of climate-resilient infrastructure
	Promote general climate and green economy knowledge among the youth	Institute Climate Change and Green Economy Festival / Week

Priority Area	Capacity Need	Actions
	Improve hydro-meteorological observation networks to provide better climate data and information, and communicate early warning for natural hazards	Establish Climate Information Centres to facilitate easy access to agro-met information and early warning system for disaster risk reduction
Equitable Social Development	Design of training manual on public health impacts of climate change	Develop and implement climate change and health training programmes for clinical health workers in order to identify and effectively manage climate change related health conditions
	Develop expertise in gender mainstreaming – Gender Analysis and gender sensitive monitoring and evaluation of climate change and GE programming	Develop training Manual and train on Gender and social inclusion in Climate change and GE
	Improve surveillance systems for existing and new disease risks and ensure health systems are geared up to meet future demands	Train on implementing an efficient health surveillance system at the district level
Energy, Industrial, and Infrastructural Development	Training for business leaders to appreciate the impact of climate change on their business	Train business leaders on the challenges and opportunities associated with climate change.
		Provide technical and financial assistance to businesses to undertake viable pilot initiatives.
General Education and Capacity Building	Capacity building for media campaigns and awareness creation	Provide technical content and support for media campaigns and related activities designed to raise awareness among the general public
	Capacity development of Ministry of Finance Staff (especially NREG Unit and budget Division staff) in Climate Change and Green Economy	Create awareness and train relevant MoF staff on climate change and public finance for funding the green economy transition
	Capacity building for Government officials and other policy makers on CC and GE thematic areas and its impacts of national development	Provide introductory training on climate change and green economy concepts
	Train a critical mass of human resource with general and specialised knowledge on climate change, green economy concepts, and sustainable development impacts.	Initiate activities to incorporate climate change and green economy learning into the educational curricula across all disciplines at all levels of education, bearing in mind the flow of learning from pre-school to the tertiary level.

References

Asante, F.A., Bawakyillenuo, S., Bird, N., Trujillo, N.C., Tagoe, C. A. and Ashiabi, N. (2015). Climate finance in Ghana. Available at http://www.mofep.gov.gh/sites/default/files/docs/Climate-Finance-Study-Report.pdf. Accessed on 25/11/2015.

Energy Commission (April 2016). Wholesale Electricity Market Bulletin, Issue 4.

Energy Commission (June 2016). Wholesale Electricity Market Bulletin, Issue 6.

Ghana Statistical Service (2014). Ghana Living Standards Survey. Round 6

IPCC (2007). Summary for Policymakers. In Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Avert, M. Tignor and H.L. Miller (eds)]. Cambridge University Press, Cambridge, United Kingdom

IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp

Ministry Of Environment Science and Technology, 2012. National Assessment Report on Achievement of Sustainable Development Goals and Targets for Rio+20 Conference

Ministry of Environment Science, Technology and Innovation. (2013b). Ghana national climate change policy

Ministry of Environment Science, Technology and Innovation. (2015). Ghana's third national communication report to the UNFCCC.

Ministry of Environment, Science, Technology and Innovation. (2013). Africa Adaptation Program on Climate Change Ghana; Final Project Review Report, Available at: http://www.gh.undp.org/content/dam/ghana/docs/Doc/Susdev/UNDP_GH_SUSDEV_AFRICA%20ADAPTATION%20PROGRAMME%20ON%20CLIMATE%20CHANGE%20GHANA.pdf. Accessed on 29/09/2015.

Ministry of Food and Agriculture. (2010). Medium term agriculture sector investment plan (METASIP) 2011 – 2015. Available at https://www.grain.org/attachments/2684/download. Accessed on 25/11/2015.

Ministry of Science, Environment, Technology and Innovation, (2012). National Environmental Policy. MESTI, Accra.

Ministry of Science, Environment, Technology and Innovation, (2015). Climate Change Learning Strategy in Ghana: Background Report

PAGE (2015), Ghana's Transition to a Green Economy: A Stocktaking Report.

UNEP (2011). Towards a GE pathways to Sustainable Development and poverty eradication.

UNESCO (2015). Putting Climate Change Education into Practice the United Nations Educational, Scientific and Cultural Organization, France.

United Nations Institute for Training and Research (UNITAR) (2013). Guidance Note for Developing National Climate Change Learning Strategy. UN-REDD Programme. (2014). On the Road to REDD+: The UN-REDD Programme's Support to REDD+ Readiness, 2008-2013. Available at http://www.un-redd.org/Portals/15/documents/FINAL%20Road%20to%20REDD%2017-06-14.pdf. Accessed on 25/11/2015.

United Nations Economic Commission for Africa, 2015. Inclusive Green Growth in Ghana: Selected case studies.

Würtenberger, L., Bunzeck, I.G. and Tilburg, X. V. (2011). Initiatives related to climate change in Ghana: Towards coordinating efforts. Available at http://cdkn.org/wp-content/uploads/2012/04/Ghana-initiatives-mapping-climate-change-May2011.pdf. Accessed on 25/11/2015.

Yaro, J. A. (2010). The social dimensions of adaptation to climate change in Ghana. World Bank Discussion Paper, (15), 88.

Annexes

Annex I: Timelines Per Priority Area and Capacity Building Needs

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
AGRICULTURAL AND FOOD SYSTEMS	Promote appropriate technologies for small scale irrigation, water re-use and water harvesting (e.g. waste/water recycling, rainwater harvesting etc)	Integrate water conservation into curricular of agriculture Colleges and Farm Institutes											
		Train farmers on management of simple irrigation systems and irrigation-compatible farming practices											
		Train farmers on appropriate rain water harvesting systems											
		Train farmers on water conservation practices											
	Promote awareness on climate change impacts for fishing and farming and	Train relevant stakeholders on communicating climate change issues to local communities											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	provide sustained support in the use of simple agronomic soil and water conservation measures and climate smart agricultural and aquaculture practices	Train farmers and fishermen and present information on conservation agriculture, climate smart cropland management, and other climate smart agricultural and aquaculture practices in simple language for easy appreciation											
		Train farmers on weather monitoring and integration of climate smart considerations into existing cropland management systems through training and education.											
		Through research and development, improve upon the already existing cropland management systems											
		Provide relevant and timely climate related information to farmers											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Create awareness on climate change impact on fishery resources such as Lake Volta through TV talk shows (Twice a year for 5 years), radio discussion (Quarterly for 5 years), and community engagements (e.g. Durbar – annually for 10 groups of communities to cover the 52 riparian communities of the Lake).											
		Train staff of fishery institutions (e.g., Fishery Commission) and Fish farmers on the impacts of climate change on the ecology of the Volta Lake and its fishery resources (Separate annual trainings for national and district level institutions and community representatives)											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Create awareness on climate-smart irrigation technologies for agriculture through documentaries & radio (quarterly)/TV talk shows (Twice a year).										
		Develop brochures and training manuals for educating and training farmers and GIDA staff and agricultural extension-officers in the use of ICT tools and climate-smart irrigation technologies.										
		Set-up field trial sites in the remaining 18 public irrigation schemes across the country, for training and demonstration of the technologies to GIDA staff, agricultural extension-officers and farmers. The 18 sites will be established over a 5-year period (maximum of 4 sites per year).										

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Promote emission reduction in cocoa, livestock and rice landscapes	Create awareness for farming communities and promotion of climate smart cocoa, livestock and rice production processes											
	Enhancing food security and small enterprise development through biodiversity businesses	Establish community awareness programmes, training and business support for other agriculture related livelihoods											
	Capacity building on green economy concepts for sustainable agriculture	Train on eco-gardening that uses green concepts in farms											
		Create consumer awareness about nutritional and health benefits of sustainable agri-food products											
		Build capacities of farmers on the production, supply and marketing of non-synthetic, natural inputs for farming											
		Train agricultural officers and farmers on organic certification and reporting											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
DISASTER PREPAREDNESS AND RESPONSE	Research on appropriate infrastructure design standards that meet higher requirements against extreme weather-related natural hazard events	Simulate various scenarios of the impacts of climate change on major human settlements and ecosystems in Ghana											
		Train on the principles for the design, management and operation of climate-resilient infrastructure											
	Document and improve community-based early warning systems for natural disasters and effective dissemination, especially at the local level in local languages	Update and train on post-emergency recovery protocols and plans OR Prepare community emergency response plans											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Promote general climate and green economy knowledge among the youth	Institute Climate Change and Green Economy Festival/Week: • Music concerts • Climate change dramas and plays • Documentaries • Training workshops • Public Lectures • Community meetings • Inter-school competitions, etc											
		Select a climate change youth ambassador											
		Intensify and upscale the use of community radios, meetings, durbars, and festivals to create awareness and hold side events like exhibition to showcase climate issues through audio-visuals etc.											
	Improve hydro-meteorological observation networks to provide better climate data and information,	Establish Climate Information Centres to facilitate easy access to agro-met information and early warning system for disaster risk reduction											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	and communicate early warning for natural hazards	Monitor the utilization of weather forecast information by smallholder farmers, including interpretation of climate information in different timescales at community group level and establishing a community-based monitoring system											
		Broadcast radio programmes on farming technologies, including new crop varieties (e.g., drought-tolerant crops), shifting planting seasons, irrigation, post-harvest technologies to improve storage, and diversification of livelihoods											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Apply innovative information and communication technologies for improved dissemination, participation and accessibility (widening catchment areas of radio stations, set up listener groups, arrange phone-in radio programmes) and facilitate the integration and use of climate information in farmer planning processes, such as Participatory Scenario Planning workshops										
	Build capacity of disaster volunteer groups	Undertake community based training programmes for disaster volunteer groups (DVGs)										
	Improve governance for Disaster Risk Reduction and Climate Change resilience building in the health sector	Designate DRR & Climate Change focal points within all levels of the health sector										
	Building capacity for management of climate-related	Community engagement on various platforms and media										

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Public health emergencies	Develop Health sector contingency plans for extreme weather events, including risk reduction, preparedness and response, in line with the WHO emergency response framework											
		Prepare a plan of action for physical reinforcement of Health facilities in natural disaster risk prone areas.											
		Strengthen systems for health & Environment (H&E) surveillance to allow for measurement of interlinked H&E impacts, and to identify emerging risks including climate-sensitive environmental risk-factors, in order to manage them better.											
		Conduct enhanced surveillance for prioritized (epidemic prone) climate-sensitive diseases in health facilities.											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Design a multi-hazard EWS to predict infectious disease epidemics, with identified key areas of focus and collaborating agencies.											
	Monitoring of Climate Change indicators	Organise periodic reviews for improvement of capacity gaps identified in climate change Vulnerability and Adaptation assessments											
		Conduct monitoring of prioritised climate sensitive environmental risk-factors											
	Enhance capacity of NADMO disaster management and response	Organise workshops and training programmes for staff across all the ten regions of Ghana. Intensive training on disaster management to support NADMO at all levels											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Risk communication	Development and implementation of internal and external communication plans (including the development of knowledge products) to raise awareness of health and climate change, and response options targeting key audiences, such as health professionals and decision-makers, communities, the media and other sectors.											
		Create Awareness on emerging agronomic practices that help to increase more organic carbon in the soil and serve as a sink for carbon sequestration											
		Promote the use of Biochar as an emerging agronomic technique by encouraging the use of efficient charcoal stove.											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Revise design standards, building codes and spatial planning to include climate change parameters	Sensitize building professionals on the use of available local building materials through workshops, exhibitions and competitions.											
		Sensitize the general citizenry through exhibitions of sustainable green building practices and materials.											
		Promote the use of sustainable building materials and practices through mass media- tv and radio documentaries.											
		Institute annual awards to recognize and motivate corporate companies and institutions and individuals on their efforts in promoting effective green building design and sustainable practices.											
	Enhance awareness and build capacity in climate resilient urban planning	Train urban planners, estate developers, traditional Authorities and MMDA's on											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		effective climate smart land use planning systems and general climate change and green economy sensitization on climate change and green economy.											
		Organize durbars and fora to sensitize opinion leaders and other identifiable stakeholders											
	Develop rainwater harvesting and increased use of shallow wells, dugouts and dams for water use	Promote rainwater harvesting technology through awareness creation via workshops (2 workshops per district), radio (bi-monthly at the district level using selected and trained community stakeholders; national talk shows will be done monthly) and TV talk shows (nationally on quarterly basis) and print media.											
		Train artisans in each district in the proper installation of the standard systems.											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Create awareness among estate developers and work with them to adopt RWH technology as part of estate building.											
		Sensitize local manufacturers of building materials on manufacturing parts of the RWH technology using locally available materials											
NATURAL RESOURCE MANAGEMENT	Promote effective spatial planning and land zoning, mapping and production of land resource management plans at all levels.	Train on GIS and other spatial planning tools and the development of regional and district level spatial development frameworks and further development of community land use plans to improve NRM											
	Promote community based adaptation activities to improve land and water quality at local level	Extend on-going awareness creation programme to many more communities											
		Undertake education on alternative livelihoods as part of the awareness creation programme in the communities											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Train on and the development of community-based adaptation strategies											
	Build capacity to improve on efficiency of production, harvesting, conversion and use of wood fuels	Intensify awareness of the impacts of traditional cooking methods											
	Build capacity of local government officials and other relevant state institutions in natural resource management	Establish and build capacity of climate change desk officers in key government ministries and agencies and other relevant institutions.											
		Undertake specific training courses for local government officials, fringe forest community farmers, and community leaders.											
		Strengthen capacity of natural resource governance institutions through training to undertake effective valuation of natural resources											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Capacity building on sustainable land management practices	Training of local authorities and communities to adopt sustainable land management practices											
	Rehabilitate degraded natural ecosystems through enrichment planting in degraded forest reserves and off- forest reserves areas	Intensive advocacy through information dissemination on media - Brochure TV and Radio., documentaries, etc.											
		Education on the importance of ecosystems and the payment of ecosystem services via training workshops, seminars and public forum											
	Improve knowledge capacity for effective management of natural resource for example through sustain extension activities in soil and water conservation	Strengthen community forestry, land and water management through education- Workshops											
		Sensitize the general public on Forest, land and water management through outreach programmes - Open forum											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Create awareness on climate change impact on water resources and water-related ecosystem services as well as the importance of natural water infrastructure such as the Volta Basin (ecosystem services) as solution for climate change adaptation (TV talk shows – twice in a year; quarterly radio programs; documentaries, community engagements, flyers policy briefs, newsletters)										
		Build capacity of national, regional and district level institutions to undertake climate change impact analysis, optimization and trade-off analysis for aiding decisions in water infrastructure investments, ecosystem mapping and economic valuation of ecosystem services										

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Promote climate resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought, and salinity (Specific title: Modelling the impact of climate change and adaptation for oil palm food crop association in climatically zoned oil palm growing areas in Ghana)	Train farmers, extension officers, policy makers and other relevant stakeholders on Global Circulation Models (GCMs) and Regional Circulation Models (RCMs) on future climate scenarios that have been generated through seminars and workshops.											
		Educate farmers and other stakeholders on crop simulation models that have been generated for future crop productivity levels in specific areas in the context of climate change and variability through a multi-stakeholder platform											
		Educate policy makers and farmers on actions that will help reduce the negative impact of climate change targeting on specific adaptation information											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Inform various stakeholders on quantification of future percentage loss as results of climate change impact and quantification of percentage negative yield loss reduction by implementing adaptation measures											
		Educate farmers and policy makers on importance of crop diversification.											
		Educate farmers on the cultivation of early maturing crops through field demonstrations											
EQUITABLE SOCIAL DEVELOPMENT	Training on the assessment and management of public health impacts of climate change	Develop and implement training programmes for health workers, CSOs, CBOs, SHEP coordinators in relevant national programmes on health vulnerability & adaptation assessment and identification and effective management of the current and likely future health risks of climate change											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Build capacity of health personnel to develop and/or update health risk maps	Train on developing/updating health risk maps to depict current and likely future areas vulnerable to prioritized climate sensitive diseases at the district, regional and national levels.											
	Train and enhance the knowledge and skills of national experts for different public health areas	Train national experts in various climate change and health areas such as environmental sciences, epidemiology, public health, vector control, safety of drinking water and food, air pollution, sanitation, waste management, management of climate change related diseases, flooding, deforestation, soil degradation, sea level rise, etc.											
	Build capacity of research institutions	Provide logistical and financial support for research											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Improve awareness of the general public on health impacts of climate change	Undertake social mobilization and communication for behaviour change to support resilience of local communities Integrating climate change awareness into National Sanitation Day campaigns											
	Improve surveillance systems for existing and new disease risks and enhance the capacity of health systems	Train health professionals on the potential health-related impacts of climate change in Ghana											
		Train district health officers/professionals and other relevant stakeholders on implementing an efficient health surveillance system at the district level											
	Continuous knowledge enhancement programmes for climate change adaptation	Facilitate exchange of experiences in climate change adaptation planning processes											
	Climate change health risk awareness and its impact on	Raise awareness of general public through dissemination of information on											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	population and Communities	Climate change and its impacts to people health and wellbeing											
		Extend the sensitization programme to additional communities											
	Mainstream gender considerations in climate change related policies	Strengthen the implementation of gender responsiveness in disaster risk management.											
		Develop effective gender and climate change goals and gender sensitive indicators.											
	Develop expertise in gender mainstreaming - Gender Analysis and gender sensitive monitoring and evaluation of climate change and GE programming	Develop training manual and train on Gender and social inclusion in Climate change and GE											
	Strengthen disease surveillance systems through early warning	Extend of the Early Warning Systems to cover diseases such as CSM in the three Northern regions through training											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Mainstream green economy principles in city planning and development	Build capacity on Green Economy in City Planning and Development											
		Guide MMDAs to develop policies for green economy											
ENERGY, INDUSTRIAL AND INFRASTRUCTURAL DEVELOPMENT	Training for business leaders to appreciate the impact of climate change on their business	Undertake sensitisation/awareness programmes for business owners and staff to understand issues of climate change.											
		Train business leaders on the challenges and opportunities associated with climate change.											
		Provide technical and financial assistance to businesses to undertake viable pilot initiatives											
		Train and build capacity of business in corporate GHG accounting and carbon trading											
	Create awareness for efficient use of energy and renewable energy sources	Intensify the sensitization programme on sustainable use of electricity nation-wide.											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Scale up public education on renewable energy sources, Eco-labelling, appliance energy efficiency labelling											
		Train media personnel on efficient use of energy and renewable energy resources to educate their communities and patrons											
		Undertake packaged learning and policy support to business associations and key government stakeholders for developing energy usage, and if possible, water usage targets for agro-industries											
		Intensify and expand the scope of public education, sensitization and training programmes for identifiable institutions and communities											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Promotion of mass transportation as an efficient transport option	Train relevant institutions to undertake effective monitoring and evaluation of the environmental, economic and social impacts of mass transport											
	Promotion of electricity use efficiency in the industry	Educate and sensitize industries on efficient use of electricity											
	Support for the development and promotion of energy efficient wood and charcoal cooking stoves for the domestic and commercial sectors	Review and develop standards for efficient cooking stoves											
		Scale up the promotion of energy efficient cooking stoves and sensitisation on their benefits											
		Train artisans in the design and manufacture of modern and energy efficient cooking stoves											
	Support for the promotion of renewable energy technologies	Review and development of standards/regulations for solar PV technologies											
		Train local artisans for installation and maintenance of equipment/systems											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Capacity building for the promotion of safe use of LPG	Training and capacity building to develop, monitor and enforce standards for improving safety of LPG transportation, storage and use.											
GENERAL EDUCATION AND CAPACITY BUILDING	Capacity building for media campaigns and awareness creation	Technical content and support for media campaigns and related activities including capacity building for media personnel designed to raise awareness among the general public											
	Build the capacity of basic and secondary school children to monitor climatic events	Continuous formation of environmental clubs and upscaling the action to the basic, secondary and tertiary levels											
		Observe school sanitation days, where choked gutters and debris would be cleared, buried and burnt to avoid flooding											
		Educate to both teachers, pupils, and students on the use of I.C.T. as a tool in monitoring climate events and provide early warning signs											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Access to ICT in rural areas											
	Support scientific research, including traditional and indigenous knowledge, monitoring, and collaboration with national and international institutions	Assess and apply indigenous knowledge and practices in natural resource management.											
		Train relevant state institutions on environmental accounting.											
		Research into resource conservation methods.											
		Undertake public education on the optimal utilization of wood waste through workshops, documentaries / commercials, other applicable medium											
		Educate Ghanaian communities on the Payment for Environmental services.											
	Training on climate change vulnerability and adaptation	Prepare capacity-building plans specific to climate-change adaptation and mitigation to fill the gaps identified from vulnerability assessments.											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Conduct an assessment of health worker training needs (including health policy makers and others)											
		Review the current climate change and health training manual to align with the WHO and IPCC guidelines.											
		Design and organise training courses on health vulnerability, impact assessment, adaptation assessment, communication and management of public health impacts of climate change.											
	Capacity development of Ministry of Finance Staff (especially NREG Unit staff and budget division) in Climate Change and Green Economy principles	Design short courses (not less than 2 weeks) in the area of climate change governance, climate finance, climate change programme and project development and management, climate change mitigation and adaptation strategies, and climate sensitive											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		budgeting (including tracking of climate finance).											
		Sponsor relevant staff on international conferences that will allow exchange of experience and address capacity gaps identified above.											
		Create awareness and train relevant MoF staff on climate change and public finance for funding the green economy transition											
	Strengthen national capacity for accessing global climate finance	Train all relevant officials to innovative ways of attracting climate finance											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
	Capacity building for Government officials and other policy makers on GE thematic areas and its impacts of national development	Undertake introductory training on green economy concepts including but not limited to the following; a) GE rationale, benefits and key concepts; b) GE Strategies and development planning; c) GE modelling and policy assessment; d) Policy, regulatory, economic, and voluntary tools to advance green economy; e) Green economy indicators and measuring progress; f) International green economy policies and cooperation; g) Green economy strategies and development planning; h) Ecosystems modelling and impact analysis										

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES									
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Packaged individual green economy learning and policy support to line ministries covering energy and housing in order to provide the ministries with the necessary skills to support the implementation of the government's objective of increasing the number of solar powered homes in Ghana by 2020											
	Train a critical mass of human resource with general and specialised knowledge on climate change, green economy concepts, and sustainable development impacts.	Incorporate climate change and green economy learning into the educational curricula across all disciplines at all levels of education											
		Develop programmes on key GE concepts at the tertiary level											
		Set up a scholarship scheme for undergraduate and graduate studies											
		Train climate scientist and meteorologists in weather and climate issues											

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	TIMELINES										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
		Undertake teaching of energy management and audit in tertiary institutions and certification of energy auditors and managers											
Critical Next Steps		Institutional needs assessment											
		Gender vulnerability analysis											
		Baseline study											
Strategy Review and Evaluation		Mid-Term Review											
		Strategy Evaluation and Impact Analysis											

Annex II: Action Plan Timelines

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Institutional needs assessment											
Gender vulnerability analysis											
Baseline study											
Develop training manual and train on Gender and social inclusion in Climate change and GE											
Technical content and support for media campaigns and related activities including capacity building for media personnel designed to raise awareness among the general public											
Train on the principles for the design, management and operation of climate-resilient infrastructure											
Incorporate climate change and green economy learning into the educational curricula across all disciplines at all levels of education											
Create awareness and train relevant MoF staff on climate change and public finance for funding the green economy transition											
Train district health officers/professionals and other relevant stakeholders on implementing an efficient health											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
surveillance system at the district level											
Train farmers and fishermen and present information on conservation agriculture, climate smart cropland management, and other climate smart agricultural and aquaculture practices in simple language for easy appreciation											
Establish Climate Information Centres to facilitate easy access to agro-met information and early warning system for disaster risk reduction											
Train business leaders on the challenges and opportunities associated with climate change.											
Provide technical and financial assistance to businesses to undertake viable pilot initiatives											
Institute Climate Change and Green Economy Festival/Week: • Music concerts • Climate change dramas and plays • Documentaries • Training workshops • Public Lectures • Community meetings • Inter-school competitions, etc											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Undertake introductory training on green economy concepts including but not limited to the following; a) GE rationale, benefits and key concepts; b) GE Strategies and development planning; c) GE modelling and policy assessment; d) Policy, regulatory, economic, and voluntary tools to advance green economy; e) Green economy indicators and measuring progress; f) International green economy policies and cooperation; g) Green economy strategies and development planning; h) Ecosystems modelling and impact analysis											
Review and develop standards for efficient cooking stoves											
Integrate water conservation into curricular of agriculture Colleges and Farm Institutes											
Review and development of standards/regulations for solar PV technologies											
Strengthen capacity of natural resource governance institutions through training to undertake effective valuation of natural resources											
Assess and apply indigenous knowledge and practices in natural resource management.											
Develop effective gender and climate change goals and gender sensitive indicators.											
Train on and the development of community-based adaptation strategies											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Simulate various scenarios of the impacts of climate change on major human settlements and ecosystems in Ghana											
Prepare capacity-building plans specific to climate-change adaptation and mitigation to fill the gaps identified from vulnerability assessments.											
Train relevant state institutions on environmental accounting.											
Train farmers on appropriate rain water harvesting systems											
Undertake specific training courses for local government officials, fringe forest community farmers, and community leaders.											
Train farmers on weather monitoring and integration of climate smart considerations into existing cropland management systems through training and education.											
Guide MMDAs to develop policies for green economy											
Intensify the sensitization programme on sustainable use of electricity nation-wide.											
Scale up public education on renewable energy sources, Eco-labelling, appliance energy efficiency labelling											
Train media personnel on efficient use of energy and renewable energy resources to educate their communities and patrons											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Train urban planners, estate developers, traditional Authorities and MMDA's on effective climate smart land use planning systems and general climate change and green economy sensitization on climate change and green economy.											
Train all relevant officials to innovative ways of attracting climate finance											
Packaged individual green economy learning and policy support to line ministries covering energy and housing in order to provide the ministries with the necessary skills to support the implementation of the government's objective of increasing the number of solar powered homes in Ghana by 2020											
Sensitize building professionals on the use of available local building materials through workshops, exhibitions and competitions.											
Promote the use of sustainable building materials and practices through mass media- tv and radio documentaries.											
Undertake public education on the optimal utilization of wood waste through workshops, documentaries / commercials, other applicable medium											
Develop and implement training programmes for health workers, CSOs, CBOs, SHEP coordinators in relevant national programmes on health vulnerability & adaptation assessment and identification and effective management of the											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
current and likely future health risks of climate change											
Undertake social mobilization and communication for behaviour change to support resilience of local communities Integrating climate change awareness into National Sanitation Day campaigns											
Train health professionals on the potential health-related impacts of climate change in Ghana											
Facilitate exchange of experiences in climate change adaptation planning processes											
Train farmers, extension officers, policy makers and other relevant stakeholders on Global Circulation Models (GCMs) and Regional Circulation Models (RCMs) on future climate scenarios that have been generated through seminars and workshops.											
Educate farmers and other stakeholders on crop simulation models that have been generated for future crop productivity levels in specific areas in the context of climate change and variability through a multi-stakeholder platform											
Educate policy makers and farmers on actions that will help reduce the negative impact of climate change targeting on specific adaptation information											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Inform various stakeholders on quantification of future percentage loss as results of climate change impact and quantification of percentage negative yield loss reduction by implementing adaptation measures											
Educate farmers and policy makers on importance of crop diversification.											
Educate farmers on the cultivation of early maturing crops through field demonstrations											
Train on developing/updating health risk maps to depict current and likely future areas vulnerable to prioritized climate sensitive diseases at the district, regional and national levels.											
Train national experts in various climate change and health areas such as environmental sciences, epidemiology, public health, vector control, safety of drinking water and food, air pollution, sanitation, waste management, management of climate change related diseases, flooding, deforestation, soil degradation, sea level rise, etc.											
Train farmers on management of simple irrigation systems and irrigation-compatible farming practices											
Create awareness on climate change impact on fishery resources such as Lake Volta through TV talk shows (Twice a year for 5 years), radio discussion (Quarterly for 5 years), and community engagements (e.g. Durbar – annually for 10 groups of											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
communities to cover the 52 riparian communities of the Lake).											
Extend on-going awareness creation programme to many more communities											
Undertake education on alternative livelihoods as part of the awareness creation programme in the communities											
Scale up the promotion of energy efficient cooking stoves and sensitisation on their benefits											
Through research and development, improve upon the already existing cropland management systems											
Strengthen the implementation of gender responsiveness in disaster risk management.											
Train farmers on water conservation practices											
Develop programmes on key GE concepts at the tertiary level											
Extend of the Early Warning Systems to cover diseases such as CSM in the three Northern regions through training											
Training of local authorities and communities to adopt sustainable land management practices											
Intensify awareness of the impacts of traditional cooking methods											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Institute annual awards to recognize and motivate corporate companies and institutions and individuals on their efforts in promoting effective green building design and sustainable practices.											
Train relevant stakeholders on communicating climate change issues to local communities											
Sponsor relevant staff on international conferences that will allow exchange of experience and address capacity gaps identified above.											
Set up a scholarship scheme for undergraduate and graduate studies											
Provide relevant and timely climate related information to farmers											
Create awareness for farming communities and promotion of climate smart cocoa, livestock and rice production processes											
Establish community awareness programmes, training and business support for other agriculture related livelihoods											
Select a climate change youth ambassador											
Intensify and upscale the use of community radios, meetings, durbars, and festivals to create awareness and hold side events like exhibition to showcase climate issues through audio-visuals etc.											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Monitor the utilization of weather forecast information by smallholder farmers, including interpretation of climate information in different timescales at community group level and establishing a community-based monitoring system											
Broadcast radio programmes on farming technologies, including new crop varieties (e.g., drought-tolerant crops), shifting planting seasons, irrigation, post-harvest technologies to improve storage, and diversification of livelihoods											
Apply innovative information and communication technologies for improved dissemination, participation and accessibility (widening catchment areas of radio stations, set up listener groups, arrange phone-in radio programmes) and facilitate the integration and use of climate information in farmer planning processes, such as Participatory Scenario Planning workshops											
Undertake community based training programmes for disaster volunteer groups (DVGs)											
Community engagement on various platforms and media											
Education on the importance of ecosystems and the payment of ecosystem services via training workshops, seminars and public forum											
Strengthen community forestry, land and water management through education- Workshops											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Sensitize the general public on Forest, land and water management through outreach programmes - Open forum											
Provide logistical and financial support for research											
Continuous formation of environmental clubs and upscaling the action to the basic, secondary and tertiary levels											
Observe school sanitation days, where choked gutters and debris would be cleared, buried and burnt to avoid flooding											
Educate to both teachers, pupils, and students on the use of I.C.T. as a tool in monitoring climate events and provide early warning signs Access to ICT in rural areas											
Prepare a plan of action for physical reinforcement of Health facilities in natural disaster risk prone areas.											
Design a multi-hazard EWS to predict infectious disease epidemics, with identified key areas of focus and collaborating agencies.											
Development and implementation of internal and external communication plans (including the development of knowledge products) to raise awareness of health and climate change, and response options targeting key audiences, such as health professionals and decision-makers, communities, the media and other sectors.											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Undertake teaching of energy management and audit in tertiary institutions and certification of energy auditors and managers											
Research into resource conservation methods.											
Establish and build capacity of climate change desk officers in key government ministries and agencies and other relevant institutions.											
Create awareness on climate-smart irrigation technologies for agriculture through documentaries & radio (quarterly)/TV talk shows (Twice a year).											
Update and train on post-emergency recovery protocols and plans OR Prepare community emergency response plans											
Train local artisans for installation and maintenance of equipment/systems											
Train artisans in the design and manufacture of modern and energy efficient cooking stoves											
Undertake packaged learning and policy support to business associations and key government stakeholders for developing energy usage, and if possible, water usage targets for agro-industries											
Organise workshops and training programmes for staff across all the ten regions of Ghana. Intensive training on disaster management to support NADMO at all levels											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Sensitize the general citizenry through exhibitions of sustainable green building practices and materials.											
Designate DRR & Climate Change focal points within all levels of the health sector											
Develop Health sector contingency plans for extreme weather events, including risk reduction, preparedness and response, in line with the WHO emergency response framework											
Strengthen systems for health & Environment (H&E) surveillance to allow for measurement of interlinked H&E impacts, and to identify emerging risks including climate-sensitive environmental risk-factors, in order to manage them better.											
Create awareness among estate developers and work with them to adopt RWH technology as part of estate building.											
Sensitize local manufacturers of building materials on manufacturing parts of the RWH technology using locally available materials											
Create Awareness on emerging agronomic practices that help to increase more organic carbon in the soil and serve as a sink for carbon sequestration											
Promote the use of Biochar as an emerging agronomic technique by encouraging the use of efficient charcoal stove.											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Set-up field trial sites in the remaining 18 public irrigation schemes across the country, for training and demonstration of the technologies to GIDA staff, agricultural extension-officers and farmers. The 18 sites will be established over a 5-year period (maximum of 4 sites per year).											
Create consumer awareness about nutritional and health benefits of sustainable agri-food products											
Raise awareness of general public through dissemination of information on Climate change and its impacts to people health and wellbeing											
Train and build capacity of business in corporate GHG accounting and carbon trading											
Extend the sensitization programme to additional communities											
Train staff of fishery institutions (e.g., Fishery Commission) and Fish farmers on the impacts of climate change on the ecology of the Volta Lake and its fishery resources (Separate annual trainings for national and district level institutions and community representatives)											
Create awareness on climate change impact on water resources and water-related ecosystem services as well as the importance of natural water infrastructure such as the Volta Basin (ecosystem services) as solution for climate change adaptation (TV talk shows – twice in a year; quarterly radio programs; documentaries,											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
community engagements, flyers policy briefs, newsletters)											
Build capacity of national, regional and district level institutions to undertake climate change impact analysis, optimization and trade-off analysis for aiding decisions in water infrastructure investments, ecosystem mapping and economic valuation of ecosystem services											
Intensive advocacy through information dissemination on media - Brochure TV and Radio., documentaries, etc.											
Organize durbars and fora to sensitize opinion leaders and other identifiable stakeholders											
Promote rainwater harvesting technology through awareness creation via workshops (2 workshops per district), radio (bi-monthly at the district level using selected and trained community stakeholders; national talk shows will be done monthly) and TV talk shows (nationally on quarterly basis) and print media.											
Train artisans in each district in the proper installation of the standard systems.											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Undertake sensitisation/awareness programmes for business owners and staff to understand issues of climate change.											
Educate Ghanaian communities on the Payment for Environmental services.											
Conduct an assessment of health worker training needs (including health policy makers and others)											
Review the current climate change and health training manual to align with the WHO and IPCC guidelines.											
Design and organise training courses on health vulnerability, impact assessment, adaptation assessment, communication and management of public health impacts of climate change.											
Design short courses (not less than 2 weeks) in the area of climate change governance, climate finance, climate change programme and project development and management, climate change mitigation and adaptation strategies, and climate sensitive budgeting (including tracking of climate finance).											
Train climate scientist and meteorologists in weather and climate issues											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Intensify and expand the scope of public education, sensitization and training programmes for identifiable institutions and communities											
Develop brochures and training manuals for educating and training farmers and GIDA staff and agricultural extension-officers in the use of ICT tools and climate-smart irrigation technologies.											
Train on eco-gardening that uses green concepts in farms											
Build capacities of farmers on the production, supply and marketing of non-synthetic, natural inputs for farming											
Train agricultural officers and farmers on organic certification and reporting											
Train on GIS and other spatial planning tools and the development of regional and district level spatial development frameworks and further development of community land use plans to improve NRM											
Educate and sensitize industries on efficient use of electricity											
Conduct monitoring of prioritised climate sensitive environmental risk-factors											
Conduct enhanced surveillance for prioritized (epidemic prone) climate-sensitive diseases in health facilities.											

ACTION PLAN	TIMELINES										
	Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10
Build capacity on Green Economy in City Planning and Development											
Training and capacity building to develop, monitor and enforce standards for improving safety of LPG transportation, storage and use.											
Train relevant institutions to undertake effective monitoring and evaluation of the environmental, economic and social impacts of mass transport											
Organise periodic reviews for improvement of capacity gaps identified in climate change Vulnerability and Adaptation assessments											
Mid-Term Review											
Strategy Evaluation and Impact Analysis											

Annex III: Detailed Budget Estimates

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
AGRICULTURAL AND FOOD SYSTEMS	Promote appropriate technologies for small scale irrigation, water re-use and water harvesting (e.g. waste/water recycling, rainwater harvesting etc)	Integrate water conservation into curricular of agriculture Colleges and Farm Institutes		25,000	-	-	-	-	-	-	-	-	-	25,000
		Train farmers on management of simple irrigation systems and irrigation-compatible farming practices		175,000	175,000	175,000	175,000	175,000	-	-	-	-	-	875,000
		Train farmers on appropriate rain water harvesting systems		150,000	100,000	100,000	-	-	-	-	-	-	-	350,000
		Train farmers on water conservation practices		150,000	150,000	150,000	150,000	150,000	150,000	150,000	-	-	-	1,050,000
	COST FOR CAPACITY NEED (USD)			500,000	425,000	425,000	325,000	325,000	150,000	150,000	-	-	-	**2,300,000**
	Promote awareness on climate change impacts for fishing and farming and provide sustained support in the use of simple agronomic soil and water conservation measures and climate smart agricultural and aquaculture practices	Train relevant stakeholders on communicating climate change issues to local communities		50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000
		Train farmers and fishermen and present information on conservation agriculture, climate smart cropland management, and other climate smart agricultural and aquaculture practices in	250,000	500,000	500,000	500,000	500,000	250,000	-	-	-	-	-	2,250,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		simple language for easy appreciation												
		Train farmers on weather monitoring and integration of climate smart considerations into existing cropland management systems through training and education.		100,000	100,000	100,000	-	-	-	-	-	-	-	300,000
		Through research and development, improve upon the already existing cropland management systems		250,000	250,000	250,000	100,000	100,000	100,000	-	-	-	-	1,050,000
		Provide relevant and timely climate related information to farmers		50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000
		Create awareness on climate change impact on fishery resources such as Lake Volta through TV talk shows (Twice a year for 5 years), radio discussion (Quarterly for 5 years), and community engagements (e.g. Durbar - annually for 10		70,000	70,000	70,000	70,000	70,000	-	-	-	-	-	350,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		groups of communities to cover the 52 riparian communities of the Lake).												
		Train staff of fishery institutions (e.g., Fishery Commission) and Fish farmers on the impacts of climate change on the ecology of the Volta Lake and its fishery resources (Separate annual trainings for national and district level institutions and community representatives)		-	150,000	150,000	150,000	150,000	150,000	-	-	-	-	750,000
		Create awareness on climate-smart irrigation technologies for agriculture through documentaries & radio (quarterly)/TV talk shows (Twice a year).		-	100,000	100,000	-	-	-	-	-	-	-	200,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Develop brochures and training manuals for educating and training farmers and GIDA staff and agricultural extension-officers in the use of ICT tools and climate-smart irrigation technologies.		-	-	150,000	150,000	-	-	-	-	-	-	300,000
		Set-up field trial sites in the remaining 18 public irrigation schemes across the country, for training and demonstration of the technologies to GIDA staff, agricultural extension-officers and farmers. The 18 sites will be established over a 5-year period (maximum of 4 sites per year).		-	150,000	150,000	150,000	150,000	-	-	-	-	-	600,000
	COST FOR CAPACITY NEED (USD)		250,000	1,020,000	1,420,000	1,570,000	1,220,000	820,000	350,000	100,000	100,000	100,000	100,000	**7,050,000**
	Promote emission reduction in cocoa, livestock and rice landscapes	Create awareness for farming communities and promotion of climate smart cocoa, livestock and rice production processes		350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	3,500,000
	COST FOR CAPACITY NEED (USD)			350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	**3,500,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Enhancing food security and small enterprise development through biodiversity businesses	Establish community awareness programmes, training and business support for other agriculture related livelihoods		250,000	250,000	250,000	250,000	250,000	250,000	150,000	150,000	150,000	150,000	2,100,000
	COST FOR CAPACITY NEED (USD)			250,000	250,000	250,000	250,000	250,000	250,000	150,000	150,000	150,000	150,000	**2,100,000**
	Capacity building on green economy concepts for sustainable agriculture	Train on eco-gardening that uses green concepts in farms		-	-	50,000	50,000	50,000	-	-	-	-	-	150,000
		Create consumer awareness about nutritional and health benefits of sustainable agri-food products		-	50,000	50,000	50,000	50,000	-	-	-	-	-	200,000
		Build capacities of farmers on the production, supply and marketing of non-synthetic, natural inputs for farming		-	-	150,000	150,000	150,000	-	-	-	-	-	450,000
		Train agricultural officers and farmers on organic certification and reporting		-	-	50,000	50,000	50,000	-	-		-	-	150,000
	COST FOR CAPACITY NEED (USD)		-	-	50,000	300,000	300,000	300,000	-	-	-	-	-	**950,000**
	COST FOR PRIORITY AREA (USD)													15,900,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
DISASTER PREPAREDNESS AND RESPONSE	Research on appropriate infrastructure design standards that meet higher requirements against extreme weather-related natural hazard events	Simulate various scenarios of the impacts of climate change on major human settlements and ecosystems in Ghana		150,000	150,000	-	-	-	-	-	-	-	-	300,000
		Train on the principles for the design, management and operation of climate-resilient infrastructure	150,000	150,000	150,000	-	-	-	-	-	-	-	-	300,000
	COST FOR CAPACITY NEED (USD)		150,000	300,000	300,000	-	-	-	-	-	-	-	-	**750,000**
	Document and improve community-based early warning systems for natural disasters and effective dissemination, especially at the local level in local languages	Update and train on post-emergency recovery protocols and plans OR Prepare community emergency response plans		-	120,000	120,000	120,000	-	-	-	-	-	-	360,000
	COST FOR CAPACITY NEED (USD)				120,000	120,000	120,000	-	-	-	-	-	-	**360,000**
	Promote general climate and green economy knowledge among the youth	Institute Climate Change and Green Economy Festival/Week: • Music concerts • Climate change dramas and plays • Documentaries • Training workshops • Public Lectures • Community	200,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	1,800,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		meetings • Inter-school competitions, etc												
		Select a climate change youth ambassador		50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000
		Intensify and upscale the use of community radios, meetings, durbars, and festivals to create awareness and hold side events like exhibition to showcase climate issues through audio-visuals etc.		160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	1,600,000
	COST FOR CAPACITY NEED (USD)		200,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	**3,900,000**
	Improve hydro-meteorological observation networks to provide better climate data and information, and communicate early warning	Establish Climate Information Centres to facilitate easy access to agro-met information and early warning system for disaster risk reduction	150,000	100,000	100,000	100,000	100,000	100,000	-	-	-	-	-	650,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	for natural hazards	Monitor the utilization of weather forecast information by smallholder farmers, including interpretation of climate information in different timescales at community group level and establishing a community-based monitoring system		20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000
		Broadcast radio programmes on farming technologies, including new crop varieties (e.g., drought-tolerant crops), shifting planting seasons, irrigation, post-harvest technologies to improve storage, and diversification of livelihoods		50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	500,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Apply innovative information and communication technologies for improved dissemination, participation and accessibility (widening catchment areas of radio stations, set up listener groups, arrange phone-in radio programmes) and facilitate the integration and use of climate information in farmer planning processes, such as Participatory Scenario Planning workshops		20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000
	COST FOR CAPACITY NEED (USD)		150,000	190,000	190,000	190,000	190,000	190,000	90,000	90,000	90,000	90,000	90,000	**1,550,000**
	Build capacity of disaster volunteer groups	Undertake community based training programmes for disaster volunteer groups (DVGs)		15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000
	COST FOR CAPACITY NEED (USD)			15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	150,000
	Improve governance for Disaster Risk Reduction and Climate Change resilience building in the health sector	Designate DRR & Climate Change focal points within all levels of the health sector		-	10,000	10,000	10,000	-	-	-	-	-	-	30,000
	COST FOR CAPACITY NEED (USD)			-	10,000	10,000	10,000	-	-	-	-	-	-	30,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Building capacity for management of climate-related Public health emergencies	Community engagement on various platforms and media		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000
		Develop Health sector contingency plans for extreme weather events, including risk reduction, preparedness and response, in line with the WHO emergency response framework		-	30,000	30,000	30,000	-	-	-	-	-	-	90,000
		Prepare a plan of action for physical reinforcement of Health facilities in natural disaster risk prone areas.		-	50,000	-	-	-	-	-	-	-	-	50,000
		Strengthen systems for health & Environment (H&E) surveillance to allow for measurement of interlinked H&E impacts, and to identify emerging risks including climate-sensitive environmental risk-factors, in order to manage them better.		-	20,000	20,000	20,000	-	-	-	-	-	-	60,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Conduct enhanced surveillance for prioritized (epidemic prone) climate-sensitive diseases in health facilities.		-	-	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	80,000
		Design a multi-hazard EWS to predict infectious disease epidemics, with identified key areas of focus and collaborating agencies.		-	100,000	-	-	-	-	-	-	-	-	100,000
	COST FOR CAPACITY NEED (USD)			10,000	210,000	70,000	70,000	20,000	20,000	20,000	20,000	20,000	20,000	480,000
	Monitoring of Climate Change indicators	Organise periodic reviews for improvement of capacity gaps identified in climate change Vulnerability and Adaptation assessments		-	-		32,000	-	-	45,000	-		60,000	137,000
		Conduct monitoring of prioritised climate sensitive environmental risk-factors		-	-	10,000	-	-	10,000	-	-	10,000	-	30,000
	COST FOR CAPACITY NEED (USD)			-	-	10,000	32,000	-	10,000	45,000	-	10,000	60,000	167,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Enhance capacity of NADMO disaster management and response	Organise workshops and training programmes for staff across all the ten regions of Ghana. Intensive training on disaster management to support NADMO at all levels		-	250,000	250,000	250,000	-	-	-	-	-	-	750,000
	COST FOR CAPACITY NEED (USD)			-	250,000	250,000	250,000	-	-	-	-	-	-	**750,000**
	Risk communication	Development and implementation of internal and external communication plans (including the development of knowledge products) to raise awareness of health and climate change, and response options targeting key audiences, such as health professionals and decision-makers, communities, the media and other sectors.		-	25,000	-	-	-	-	-	-	-	-	**25,000**
	COST FOR CAPACITY NEED (USD)			-	25,000	-	-	-	-	-	-	-	-	25,000
	Creation of awareness on climate change and adaptation in climatically zoned areas for crop cultivation	Create Awareness on emerging agronomic practices that help to increase more organic		-	150,000	250,000	250,000	250,000	-	-	-	-	-	900,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	and other agricultural purposes	carbon in the soil and serve as a sink for carbon sequestration												
		Promote the use of Biochar as an emerging agronomic technique by encouraging the use of efficient charcoal stove.		-	100,000	100,000	100,000	100,000	-	-	-	-	-	400,000
	COST FOR CAPACITY NEED (USD)			-	250,000	350,000	350,000	350,000	-	-	-	-	-	**1,300,000**
	Revise design standards, building codes and spatial planning to include climate change parameters	Sensitize building professionals on the use of available local building materials through workshops, exhibitions and competitions.		40,000	40,000	40,000	40,000	-	-	-	-	-	-	160,000
		Sensitize the general citizenry through exhibitions of sustainable green building practices and materials.		-	75,000	100,000	120,000	-	-	-	-	-	-	295,000
		Promote the use of sustainable building materials and practices through mass media- tv and radio documentaries.		150,000	150,000	150,000	150,000	-	-	-	-	-	-	600,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Institute annual awards to recognize and motivate corporate companies and institutions and individuals on their efforts in promoting effective green building design and sustainable practices.		200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	2,000,000
	COST FOR CAPACITY NEED (USD)			390,000	465,000	490,000	510,000	200,000	200,000	200,000	200,000	200,000	200,000	**3,055,000**
	Enhance awareness and build capacity in climate resilient urban planning	Train urban planners, estate developers, traditional Authorities and MMDA's on effective climate smart land use planning systems and general climate change and green economy sensitization on climate change and green economy.		200,000	200,000	200,000	-	-	-	-	-	-	-	600,000
		Organize durbars and fora to sensitize opinion leaders and other identifiable stakeholders		-	100,000	150,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	1,650,000
	COST FOR CAPACITY NEED (USD)			200,000	300,000	350,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	**2,250,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Develop rainwater harvesting and increased use of shallow wells, dugouts and dams for water use	Promote rainwater harvesting technology through awareness creation via workshops (2 workshops per district), radio (bi-monthly at the district level using selected and trained community stakeholders; national talk shows will be done monthly) and TV talk shows (nationally on quarterly basis) and print media.		-	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	900,000
		Train artisans in each district in the proper installation of the standard systems.		-	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	3,150,000
		Create awareness among estate developers and work with them to adopt RWH technology as part of estate building.		-	50,000	50,000	50,000	-	-	-	-	-	-	150,000
		Sensitize local manufacturers of building materials on manufacturing parts of the RWH technology		-	50,000	50,000	50,000	-	-	-	-	-	-	150,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		using locally available materials												
	COST FOR CAPACITY NEED (USD)			-	550,000	550,000	550,000	450,000	450,000	450,000	450,000	450,000	450,000	**4,350,000**
	COST FOR PRIORITY AREA (USD)													19,117,000
NATURAL RESOURCE MANAGEMENT	Promote effective spatial planning and land zoning, mapping and production of land resource management plans at all levels.	Train on GIS and other spatial planning tools and the development of regional and district level spatial development frameworks and further development of community land use plans to improve NRM		-	-	82,500	82,500	82,500	82,500	-	-	-	-	330,000
	COST FOR CAPACITY NEED (USD)			-	-	82,500	82,500	82,500	82,500	-	-	-	-	**330,000**
	Promote community based adaptation activities to improve land and water quality at local level	Extend on-going awareness creation programme to many more communities		260,000	260,000	260,000	260,000	260,000	-	-	-	-	-	1,300,000
		Undertake education on alternative livelihoods as part of the awareness creation programme in the communities		260,000	260,000	260,000	260,000	260,000	-	-	-	-	-	1,300,000
		Train on and the development of community-based		300,000	300,000									

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		adaptation strategies												
	COST FOR CAPACITY NEED (USD)			820,000	820,000	520,000	520,000	520,000	-	-	-	-	-	**2,600,000**
	Build capacity to improve on efficiency of production, harvesting, conversion and use of wood fuels	Intensify awareness of the impacts of traditional cooking methods		1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	13,500,000
	COST FOR CAPACITY NEED (USD)			1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000	**13,500,000**
	Build capacity of local government officials and other relevant state institutions in natural resource management	Establish and build capacity of climate change desk officers in key government ministries and agencies and other relevant institutions.		-	50,000	50,000	-	-	-	-	-	-	-	100,000
		Undertake specific training courses for local government officials, fringe forest community farmers, and community leaders.		100,000	100,000	100,000	-	-	-	-	-	-	-	300,000
		Strengthen capacity of natural resource governance institutions through training to undertake effective valuation of natural resources		100,000										100,000
	COST FOR CAPACITY NEED (USD)			200,000	150,000	150,000	-	-	-	-	-	-	-	**500,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Capacity building on sustainable land management practices	Training of local authorities and communities to adopt sustainable land management practices		500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	5,000,000
	COST FOR CAPACITY NEED (USD)			500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	5,000,000
	Rehabilitate degraded natural ecosystems through enrichment planting in degraded forest reserves and off- forest reserves areas	Intensive advocacy through information dissemination on media - Brochure TV and Radio., documentaries, etc.		-	100,000	250,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	2,800,000
		Education on the importance of ecosystems and the payment of ecosystem services via training workshops, seminars and public forum		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000
	COST FOR CAPACITY NEED (USD)			100,000	200,000	350,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	**3,800,000**
	Improve knowledge capacity for effective management of natural resource for example through sustain extension activities in soil and water conservation	Strengthen community forestry, land and water management through education- Workshops		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	600,000
		Sensitize the general public on Forest, land and water management through outreach programmes - Open forum		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	600,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Create awareness on climate change impact on water resources and water-related ecosystem services as well as the importance of natural water infrastructure such as the Volta Basin (ecosystem services) as solution for climate change adaptation (TV talk shows – twice in a year; quarterly radio programs; documentaries, community engagements, flyers policy briefs, newsletters)		-	150,000	150,000	150,000	150,000	150,000	150,000	150,000	-	-	1,050,000
		Build capacity of national, regional and district level institutions to undertake climate change impact analysis, optimization and trade-off analysis for aiding decisions in water infrastructure investments, ecosystem mapping and economic valuation of		-	150,000	150,000	150,000	150,000	150,000	150,000	150,000	-	-	1,050,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		ecosystem services												
	COST FOR CAPACITY NEED (USD)			120,000	420,000	420,000	420,000	420,000	420,000	420,000	420,000	120,000	120,000	**3,300,000**
	Promote climate resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought, and salinity (Specific title: Modelling the impact of climate change and adaptation for oil palm food crop association in climatically zoned oil palm growing areas in Ghana)	Train farmers, extension officers, policy makers and other relevant stakeholders on Global Circulation Models (GCMs) and Regional Circulation Models (RCMs) on future climate scenarios that have been generated through seminars and workshops.		100,000	100,000	100,000	100,000	100,000	-	-	-	-	-	500,000
		Educate farmers and other stakeholders on crop simulation models that have been generated for future crop productivity levels in specific areas in the context of climate change and variability through a multi-stakeholder platform		150,000	200,000	300,000	350,000	350,000	-	-	-	-	-	1,350,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Educate policy makers and farmers on actions that will help reduce the negative impact of climate change targeting on specific adaptation information		150,000	200,000	300,000	350,000	350,000	-	-	-	-	-	1,350,000
		Inform various stakeholders on quantification of future percentage loss as results of climate change impact and quantification of percentage negative yield loss reduction by implementing adaptation measures		100,000	100,000	100,000	100,000	100,000	-	-	-	-	-	500,000
		Educate farmers and policy makers on importance of crop diversification.		150,000	200,000	250,000	250,000	250,000	-	-	-	-	-	1,100,000
		Educate farmers on the cultivation of early maturing crops through field demonstrations		150,000	200,000	250,000	250,000	250,000	-	-	-	-	-	1,100,000
	COST FOR CAPACITY NEED (USD)			800,000	1,000,000	1,300,000	1,400,000	1,400,000	-	-	-	-	-	**5,900,000**
	COST FOR PRIORITY AREA (USD)													34,930,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
EQUITABLE SOCIAL DEVELOPMENT	Training on the assessment and management of public health impacts of climate change	Develop and implement training programmes for health workers, CSOs, CBOs, SHEP coordinators in relevant national programmes on health vulnerability & adaptation assessment and identification and effective management of the current and likely future health risks of climate change		100,000	100,000	100,000	100,000	100,000	-	-	-	-	-	500,000
	COST FOR CAPACITY NEED (USD)		-	100,000	100,000	100,000	100,000	100,000	-	-	-	-	-	**500,000**
	Build capacity of health personnel to develop and/or update health risk maps	Train on developing/updating health risk maps to depict current and likely future areas vulnerable to prioritized climate sensitive diseases at the district, regional and national levels.		25,000	45,000	45,000	45,000	45,000	-	-	-	-	-	205,000
	COST FOR CAPACITY NEED (USD)			25,000	45,000	45,000	45,000	45,000	-	-	-	-	-	**205,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Train and enhance the knowledge and skills of national experts for different public health areas	Train national experts in various climate change and health areas such as environmental sciences, epidemiology, public health, vector control, safety of drinking water and food, air pollution, sanitation, waste management, management of climate change related diseases, flooding, deforestation, soil degradation, sea level rise, etc.		30,000	30,000	30,000	30,000	30,000	-	-	-	-	-	150,000
	COST FOR CAPACITY NEED (USD)			30,000	30,000	30,000	30,000	30,000	-	-	-	-	-	**150,000**
	Improve awareness of the general public on health impacts of climate change	Undertake social mobilization and communication for behaviour change to support resilience of local communities Integrating climate change awareness into National Sanitation Day campaigns		50,000	50,000	50,000	50,000	50,000	-	-	-	-	-	250,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	COST FOR CAPACITY NEED (USD)			50,000	50,000	50,000	50,000	50,000	-	-	-	-	-	**250,000**
	Improve surveillance systems for existing and new disease risks and enhance the capacity of health systems	Train health professionals on the potential health-related impacts of climate change in Ghana		60,000	60,000	60,000	60,000	60,000	-	-	-	-	-	300,000
		Train district health officers/professionals and other relevant stakeholders on implementing an efficient health surveillance system at the district level	300,000	300,000	300,000	300,000	-	-	-	-	-	-	-	1,200,000
	COST FOR CAPACITY NEED (USD)		300,000	360,000	360,000	360,000	60,000	60,000	-	-	-	-	-	**1,500,000**
	Continuous knowledge enhancement programmes for climate change adaptation	Facilitate exchange of experiences in climate change adaptation planning processes		30,000	30,000	30,000	30,000	30,000	-	-	-	-	-	150,000
	COST FOR CAPACITY NEED (USD)			30,000	30,000	30,000	30,000	30,000	-	-	-	-	-	**150,000**
	Climate change health risk awareness and its impact on population and Communities	Raise awareness of general public through dissemination of information on Climate change and its impacts to people health and wellbeing	-	-	50,000	50,000	50,000	50,000	-	-	-	-	-	200,000
	COST FOR CAPACITY NEED (USD)		-	-	50,000	50,000	50,000	50,000	-	-	-	-	-	200,000
	Increase awareness on efficiency of water usage and sanitation practices	Extend the sensitization programme to additional communities		-	200,000	200,000	200,000	200,000	200,000	-	-	-	-	1,000,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	COST FOR CAPACITY NEED (USD)			-	200,000	200,000	200,000	200,000	200,000	-	-	-	-	**1,000,000**
	Mainstream gender considerations in climate change related policies	Strengthen the implementation of gender responsiveness in disaster risk management.		30,000	100,000	100,000	100,000	100,000	100,000	-	-	-	-	530,000
		Develop effective gender and climate change goals and gender sensitive indicators.		30,000	30,000	-	-	-	-	-	-	-	-	60,000
	COST FOR CAPACITY NEED (USD)			60,000	130,000	100,000	100,000	100,000	100,000	-	-	-	-	590,000
	Develop expertise in gender mainstreaming - Gender Analysis and gender sensitive monitoring and evaluation of climate change and GE programming	Develop training manual and train on Gender and social inclusion in Climate change and GE	300,000										-	300,000
	COST FOR CAPACITY NEED (USD)		300,000.0	-	-	-	-	-	-	-	-	-	-	300,000
	Strengthen disease surveillance systems through early warning	Extend of the Early Warning Systems to cover diseases such as CSM in the three Northern regions through training		25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	256,000
	COST FOR CAPACITY NEED (USD)			25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	25,600	**256,000**
	Mainstream green economy principles in city planning and	Build capacity on Green Economy in City Planning and Development		-	-	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	200,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	development	Guide MMDAs to develop policies for green economy		20,000	20,000	20,000	-	-	-	-	-	-	-	60,000
	COST FOR CAPACITY NEED (USD)			20,000	20,000	45,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	260,000
	COST FOR PRIORITY AREA (USD)													5,361,000
ENERGY, INDUSTRIAL AND INFRASTRUCTURAL DEVELOPMENT	Training for business leaders to appreciate the impact of climate change on their business	Undertake sensitisation/awareness programmes for business owners and staff to understand issues of climate change.		-	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	450,000
		Train business leaders on the challenges and opportunities associated with climate change.	100,000	50,000	50,000	50,000	50,000	50,000	-	-	-	-	-	350,000
		Provide technical and financial assistance to businesses to undertake viable pilot initiatives	30,000	30,000	65,000	65,000	65,000	65,000	65,000	-	-	-	-	385,000
		Train and build capacity of business in corporate GHG accounting and carbon trading			150,000	100,000	100,000	100,000	-	-	-	-	-	450,000
	COST FOR CAPACITY NEED (USD)		130,000	80,000	315,000	265,000	265,000	265,000	115,000	50,000	50,000	50,000	50,000	**1,635,000**
	Create awareness for efficient use of energy and renewable energy sources	Intensify the sensitization programme on sustainable use of electricity nation-wide.	-	30,000	30,000	30,000	-	-	-	-	-	-	-	90,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Scale up public education on renewable energy sources, Eco-labelling, appliance energy efficiency labelling	-	100,000	100,000	100,000	-	-	-	-	-	-	-	300,000
		Train media personnel on efficient use of energy and renewable energy resources to educate their communities and patrons	-	35,000	35,000	35,000	-	-	-	-	-	-	-	105,000
		Undertake packaged learning and policy support to business associations and key government stakeholders for developing energy usage, and if possible, water usage targets for agro-industries	-	-	200,000	200,000	200,000	-	-	-	-	-	-	600,000
		Intensify and expand the scope of public education, sensitization and training programmes for identifiable institutions and communities	-	-	-	100,000	-	-	-	-	-	-	-	100,000
	COST FOR CAPACITY NEED (USD)		-	165,000	365,000	465,000	200,000	-	-	-	-	-	-	**1,195,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Promotion of mass transportation as an efficient transport option	Train relevant institutions to undertake effective monitoring and evaluation of the environmental, economic and social impacts of mass transport		-	-	-	50,000	50,000	50,000	-	-	-	-	150,000
	COST FOR CAPACITY NEED (USD)		-	-	-	-	50,000	50,000	50,000	-	-	-	-	**150,000**
	Promotion of electricity use efficiency in the industry	Educate and sensitize industries on efficient use of electricity	-	-	-	25,000	25,000	25,000	25,000	-	-	-	-	100,000
	COST FOR CAPACITY NEED (USD)		-	-	-	25,000	25,000	25,000	25,000	-	-	-	-	**100,000**
	Support for the development and promotion of energy efficient wood and charcoal cooking stoves for the domestic and commercial sectors	Review and develop standards for efficient cooking stoves	-	35,000	-	-	-	-	-	-	-	-	-	35,000
		Scale up the promotion of energy efficient cooking stoves and sensitisation on their benefits	-	50,000	50,000	50,000	50,000	50,000	-	-	-	-	-	250,000
		Train artisans in the design and manufacture of modern and energy efficient cooking stoves	-	-	200,000	200,000	200,000	-	-	-	-	-	-	600,000
	COST FOR CAPACITY NEED (USD)		-	85,000.00	250,000.00	250,000.00	250,000.00	50,000.00	-	-	-	-	-	**885,000**
	Support for the promotion of renewable energy technologies	Review and development of standards/regulations for solar PV technologies		35,000	-	-	-	-	-	-	-	-	-	35,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Train local artisans for installation and maintenance of equipment/systems		-	200,000	200,000	200,000	-	-	-	-	-	-	600,000
	COST FOR CAPACITY NEED (USD)		-	35,000	200,000	200,000	200,000	-	-	-	-	-	-	**635,000**
	Capacity building for the promotion of safe use of LPG	Training and capacity building to develop, monitor and enforce standards for improving safety of LPG transportation, storage and use.	-	-	50,000	50,000	50,000	50,000	-	-	-	-	-	200,000
	COST FOR CAPACITY NEED (USD)		-	-	50,000.00	50,000.00	50,000	50,000	-	-	-	-	-	200,000
	COST FOR PRIORITY AREA (USD)													4,800,000
GENERAL EDUCATION AND CAPACITY BUILDING	Capacity building for media campaigns and awareness creation	Technical content and support for media campaigns and related activities including capacity building for media personnel designed to raise awareness among the general public	50,000	50,000	50,000	-	-	-	-	-	-	-	-	150,000
	COST FOR CAPACITY NEED (USD)		50,000	50,000	50,000	-	-	-	-	-	-	-	-	**150,000**
	Build capacity of research institutions	Provide logistical and financial support for research		500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	5,000,000
	COST FOR CAPACITY NEED (USD)			500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	**5,000,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Build the capacity of basic and secondary school children to monitor climatic events	Continuous formation of environmental clubs and upscaling the action to the basic, secondary and tertiary levels		160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	1,600,000
		Observe school sanitation days, where choked gutters and debris would be cleared, buried and burnt to avoid flooding		80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	800,000
		Educate to both teachers, pupils, and students on the use of I.C.T. as a tool in monitoring climate events and provide early warning signs												
		Access to ICT in rural areas		80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	800,000
	COST FOR CAPACITY NEED (USD)			320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	**3,200,000**
	Support scientific research, including traditional and indigenous knowledge, monitoring, and collaboration with national and international institutions	Assess and apply indigenous knowledge and practices in natural resource management.		100,000	100,000	-	-	-	-	-	-	-	-	200,000
		Train relevant state institutions on environmental accounting.		70,000	70,000	70,000	-	-	-	-	-	-	-	210,000
		Research into resource conservation methods.		-	70,000	70,000	-	-	-	-	-	-	-	140,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Undertake public education on the optimal utilization of wood waste through workshops, documentaries / commercials, other applicable medium		50,000	50,000	50,000	50,000	50,000	-	-	-	-	-	250,000
		Educate Ghanaian communities on the Payment for Environmental services.		-	100,000	100,000	100,000	100,000	-	-	-	-	-	400,000
	COST FOR CAPACITY NEED (USD)			220,000	390,000	290,000	150,000	150,000	-	-	-	-	-	**1,200,000**
	Training on climate change vulnerability and adaptation	Prepare capacity-building plans specific to climate-change adaptation and mitigation to fill the gaps identified from vulnerability assessments.		50,000	50,000	50,000	-	-	-	-	-	-	-	150,000
		Conduct an assessment of health worker training needs (including health policy makers and others)		-	30,000	30,000	-	-	-	-	-	-	-	60,000
		Review the current climate change and health training manual to align with the WHO and IPCC guidelines.		-	20,000	20,000	-	-	-	-	-	-	-	40,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)										
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Design and organise training courses on health vulnerability, impact assessment, adaptation assessment, communication and management of public health impacts of climate change.		-	50,000	50,000	50,000	50,000	50,000	50,000	50,000	-	-	350,000
	COST FOR CAPACITY NEED (USD)			50,000	150,000	150,000	50,000	50,000	50,000	50,000	50,000	-	-	**600,000**
	Capacity development of Ministry of Finance Staff (especially NREG Unit staff and budget division) in Climate Change and Green Economy principles	Design short courses (not less than 2 weeks) in the area of climate change governance, climate finance, climate change programme and project development and management, climate change mitigation and adaptation strategies, and climate sensitive budgeting (including tracking of climate finance).		-	50,000	50,000	50,000	50,000	50,000	-	-	-	-	250,000
		Sponsor relevant staff on international conferences that will allow exchange of experience and		60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	600,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		address capacity gaps identified above.												
		Create awareness and train relevant MoF staff on climate change and public finance for funding the green economy transition	90,000	50,000	50,000	50,000	-	-	-	-	-	-	-	240,000
	COST FOR CAPACITY NEED (USD)			110,000	160,000	160,000	110,000	110,000	110,000	60,000	60,000	60,000	60,000	**1,090,000**
	Strengthen national capacity for accessing global climate finance	Train all relevant officials to innovative ways of attracting climate finance	-	35,000	35,000	35,000	35,000	-	-	-	-	-	-	140,000
	COST FOR CAPACITY NEED (USD)		-	35,000	35,000	35,000	35,000	-	-	-	-	-	-	**140,000**
	Capacity building for Government officials and other policy makers on GE thematic areas and its impacts of national development	Undertake introductory training on green economy concepts including but not limited to the following; a) GE rationale, benefits and key concepts; b) GE Strategies and development planning; c) GE modelling and policy assessment; d) Policy, regulatory, economic, and voluntary tools to advance green economy;	50,000	50,000	100,000	200,000	200,000	300,000	300,000	300,000	300,000	300,000	300,000	**2,400,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		e) Green economy indicators and measuring progress; f) International green economy policies and cooperation; g) Green economy strategies and development planning; h) Ecosystems modelling and impact analysis												
		Packaged individual green economy learning and policy support to line ministries covering energy and housing in order to provide the ministries with the necessary skills to support the implementation of the government's objective of increasing the number of solar powered homes in Ghana by 2020	-	70,000	150,000	150,000	150,000	-	-	-	-	-	-	520,000
	COST FOR CAPACITY NEED (USD)		50,000	120,000	250,000	350,000	350,000	300,000	300,000	300,000	300,000	300,000	300,000	**2,920,000**

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
	Train a critical mass of human resource with general and specialised knowledge on climate change, green economy concepts, and sustainable development impacts.	Incorporate climate change and green economy learning into the educational curricula across all disciplines at all levels of education	165,000	100,000	100,000	100,000								465,000
		Develop programmes on key GE concepts at the tertiary level		50,000	50,000	100,000	100,000	100,000	100,000	100,000	100,000	-	-	700,000
		Set up a scholarship scheme for undergraduate and graduate studies		100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000	1,000,000	5,500,000
		Train climate scientist and meteorologists in weather and climate issues		-	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	1,350,000
		Undertake teaching of energy management and audit in tertiary institutions and certification of energy auditors and managers		-	100,000	100,000	100,000	100,000	100,000	-	-	-	-	500,000
	COST FOR CAPACITY NEED (USD)		165,000	250,000	600,000	750,000	750,000	850,000	950,000	950,000	1,050,000	1,050,000	1,150,000	**8,515,000**
	COST FOR PRIORITY AREA (USD)													**22,815,000**
Critical Next Steps		Institutional needs assessment	15000											10,000
		Gender vulnerability analysis	25000											25,000

PRIORITY AREA	CAPACITY NEED	ACTION PLAN	COST (US$)											
			Pre-Implementation Period	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	TOTAL
		Baseline study	10000											15,000
COST FOR CRITICAL NEXT STEPS (USD)														**50,000**
Strategy Review and Evaluation		Mid-Term Review						40,000						40,000
		Strategy Evaluation and Impact Analysis											60,000	60,000
COST FOR REVIEW AND EVALUATION (USD)														**100,000**
TOTAL COST (USD)														**103,073,000**

Annex IV: Questionnaire Administered to Identify Sectoral Priority Actions

DEVELOPMENT OF
NATIONAL CLIMATE CHANGE AND GREEN ECONOMY LEARNING STRATEGY

TERMS OF REFERENCE

As a party to the United Nations Framework Convention on Climate Change (UNFCCC), Ghana is obliged under the Article 6 of the Convention (climate change education, training and public awareness) to develop and implement climate change (CC) focused programmes that reflect national priorities and initiatives that could easily be supported by development partners and other implementing agencies. Elements of Article 6 of the Convention are Climate Change Education, Training. Public Awareness, Public Access to Information, Public Participation and International Cooperation

To meet this obligation the National Climate Change Policy (NCCP) in the light of its priority activities, mentions capacity building, information, communication and education as systematic pillars which must be built on in order to achieve the objectives of the policy, among others.

In line with this, the Ministry of Environment, Science, Technology and Innovation on 5th August 2015, kicked-off the development of National Climate Change Learning Strategy at Holiday Inn Airport Accra, to foster a systematic and country-driven process to determine and implement climate change learning and skill development needs and priority actions in key sectors of national development, and to strengthen national education and training systems through cross-sectoral and multi-stakeholder collaboration.

The 10-year National Climate Change Learning Strategy will therefore outline specific short, medium and long-term capacity and learning actions, with coordination mechanism for implementation from 2016, as well as indicators for monitoring and evaluation. Such actions will include but not limited to:

- The design of sectoral skills development activities,
- Integrate climate change learning into school curricula,
- Create climate change specialized website/platform to educate, share knowledge, lessons and experience,
- Develop climate change jingles, documentary and communication materials
- Organize annual youth/music/drama festivals on climate change
- Publish feature articles in media,
- Organise climate change diplomacy/research dissemination days, etc.,

The Climate Change learning needs and actions will focus on the 5 key priority areas of the NCCP: (i) Agriculture and Food Systems, (ii) Disaster Preparedness and Response (iii) Natural Resource Management, (iv) Equitable Social Development and (v) Energy, Industrial, and

Infrastructural Development and an additional priority area for general education and capacity building. For each of the 5 areas the NCCP already lists a number of capacity building needs.

Based on the above, the MESTI is requesting institutions that a key stakeholders in the area of Climate Change Learning to provide input in terms of their climate change capacity and learning needs as well as capacity to deliver the CC actions to be incorporated in the National Climate Change Learning Strategy for implementation from 2016.

The following guidance will be used for workshops bringing together representatives from different sectors of society (government, private sector, academia, civil society (environment, youth, women, etc.). The objective is to develop under each of the 5 NCCP priority areas draft action plans to address at least 2 capacity building needs. In addition 2 action plans will be developed for the area of general education. (Total of 12 draft action plans).

Participants split up in 6 groups: 5 groups in line with the NCCP priority areas plus 1 group that deals with general education. For the NCCP priority area "Equitable social development" 2 or 3 groups can be created as this area includes a long list of capacity building needs.

Each group then completes the questionnaire below:

Name of NCCP priority area: Name and affiliation of participants of the working group:		
1	Among the capacity building needs included in the NCCP under Agriculture and Food Systems (see list on the right), what are the 2 most important and urgent needs that should be addressed? For each of the 2 needs you have selected, fill in the template below. *(If you have time you can select up to 3 needs.)*	☐ Promote awareness for climate change issues for fisher folks and farmers ☐ Build capacity for community-level weather data collection, analysis, and dissemination for agricultural planning ☐ Document and promote appropriate indigenous knowledge and best practices ☐ Promote diversified land use practices, including agro-forestry, dry land farming, urban/backyard vegetable production to reduce risk and increase the capacity of farmers to cope with floods ☐ Design and implement programmes on fisheries management and disease control, which integrate climatic and hydrological parameters ☐ Provide sustained support in the use of simple agronomic soil and water conservation measures (e.g., agro-forestry, crop rotation, tied ridging, mulching, contour earth mounds, vegetative barriers and improved fallow)

		☐ Promote appropriate technologies for small scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, etc. ☐ Improve efficiency of farming practices through secure land tenure, effective pricing policies and access to credit. ☐ Institute risk transfer schemes (e.g., insurance) against local supply changes, harvest failure or weather risk ☐ Promote alternative livelihood systems to diversify incomes, such as beekeeping, poultry production, piggery, snail rearing, mushroom cultivation, sustainable aquaculture, etc., ☐ Improve post-harvest capacity, e.g., storage and processing facilities and infrastructure ☐ Improve marketing policies that increase competitiveness for the domestic and international market ☐ Increase support for agricultural research, such as: ○ climate resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought, and salinity ○ agricultural diversification (livestock – crop integration as well as the management practices) as a coping strategy and for income generation ○ Technologies for small scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, etc. ○ - recycling and conversion of agricultural waste
2	Capacity building need # 1 *(Include name on the right)*	
	What is the problem? *(Explain why this capacity building need is important and what the problem is that needs to be addressed)*	

	What actions has already been taken to address the need/problem *(Think about existing programmes/policies/etc.)*	
	What additional learning actions need to be taken to address the need/problem? *(Identify 3-5 specific actions. Please include education and training-related actions.)*	
	What are the expected results of these learning actions?	
	Which institutions need to be involved in implementing the actions?	
	What would be an appropriate time-frame for implementing the actions?	
	How much will the implementation of the proposed actions cost and what are potential funding sources? *(Think about national and international, public and private sources)*	
	How will you know whether results have been achieved? *(Define at least 2 indicators)*	
3	Capacity building need # 2 *(Include name on the right)*	
	What is the problem? *(Explain why this capacity building need is important and what the problem is that needs to be addressed)*	
	What actions has already been taken to address the need/problem	

	(Think about existing programmes/policies/etc.)	
	What additional learning actions need to be taken to address the need/problem? *(Identify 3-5 specific actions. Please include education and training-related actions.)*	
	What are the expected results of these additional actions?	
	Which institutions need to be involved in implementing the actions?	
	What would be an appropriate time-frame for implementing the actions?	
	How much will the implementation of the proposed actions cost and what are potential funding sources? *(Think about national and international, public and private sources)*	
	How will you know whether results have been achieved? *(Define at least 2 indicators)*	

Annex V: List of Capacity Building Needs for National Priority Areas Identified in the National Climate Change Policy (NCCP)

"Agriculture and Food Systems"- Capacity building needs
Promote awareness for climate change issues for fisher folks and farmers
Build capacity for community-level weather data collection, analysis, and dissemination for agricultural planning
Document and promote appropriate indigenous knowledge and best practices
Promote diversified land use practices, including agro-forestry, dry land farming, urban/backyard vegetable production to reduce risk and increase the capacity of farmers to cope with floods
Design and implement programmes on fisheries management and disease control, which integrate climatic and hydrological parameters
Provide sustained support in the use of simple agronomic soil and water conservation measures (e.g., agro-forestry, crop rotation, tied ridging, mulching, contour earth mounds, vegetative barriers and improved fallow)
Promote appropriate technologies for small scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, etc.
Improve efficiency of farming practices through secure land tenure, effective pricing policies and access to credit.
Institute risk transfer schemes (e.g., insurance) against local supply changes, harvest failure or weather risk
Promote alternative livelihood systems to diversify incomes, such as beekeeping, poultry production, piggery, snail rearing, mushroom cultivation, sustainable aquaculture, etc.,
Improve post-harvest capacity, e.g., storage and processing facilities and infrastructure
Improve marketing policies that increase competitiveness for the domestic and international market
Increase support for agricultural research, such as: ○ climate resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought, and salinity ○ agricultural diversification (livestock – crop integration as well as the management practices) as a coping strategy and for income generation ○ Technologies for small scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, etc. ○ recycling and conversion of agricultural waste

Disaster preparedness and response - Capacity building needs
Climate-resilient infrastructure
Research on appropriate infrastructure design standards that meet higher requirements against extreme weather-related natural hazard events
Improve hydro-meteorological observation networks to provide better climate data and information, and communicate early warning for natural hazards
Collect relevant data on coastal zone geomorphology, surface water flows and groundwater for modelling coastal flooding
Provide enabling policy environment to ensure climate resilience in urban planning, construction codes and management
Revise design standards, building codes and spatial planning to include climate change parameters
Construct proper storm drainage systems, riverbank protection, buffer zones, afforestation along embankments and other measures to reduce flooding

Construct channels, water collecting reservoirs and dams to contain floods and store water for the dry season
Encourage relocation of settlements and economic activities from climate-related disaster prone areas
Use ICT in monitoring climate events and providing an early warning system
Develop and implement strategies to change systems and make people adapted to climate change, e.g., harvesting rainwater and storage of grains can aid communities in adapting
Ensure that rural communities have reliable access to markets, key services and lifeline facilities
Develop climate resilient standards for key coastal infrastructure and protection of coastal communities from storm surges, coastal flooding and sea level rise
Resilience of vulnerable communities to climate related risks
Document and improve community-based early warning systems for natural disasters and effective dissemination, especially at the local level in local languages
Improve awareness and provide skills training to ensure preparedness on climate change and adaptation strategies
Avoid mal-adaptation by reversing trends that increase vulnerability
Improve public adaptation strategies, including provision of wells, boreholes, road infrastructure, land tenure administration reform, education, etc
Enhance awareness of financial instruments to protect investments and assets
Strengthen the institutional framework for disaster risk response and management
Provide supporting social safety nets for communities
Strengthen traditional social support systems

Natural resource management - Capacity building needs
Carbon sinks
Improve legislatives to effectively address land use rights and land tenure systems
Improve regulatory mechanisms to reduce illegal logging and chainsaw lumbering
Improve the efficiency of production, harvesting, conversion and use of wood fuels, e.g., improved efficiency in cook stoves, community/family woodlot programmes, charcoal producer associations, community land use and natural resource planning
Promote, through increased funding and opportunities, plantation development and management in off-reserve areas for private and public-private partnerships
Rehabilitate degraded natural ecosystems through enrichment planting in degraded forest reserves and off-reserve areas
Support agro-forestry programmes initiated to conserve trees in association with crops
Promote the establishment and consolidation of bio-reserves and buffers of forest
Resilience of terrestrial and aquatic ecosystems
Promote effective spatial planning and land zoning, mapping and production of land resource management plans at all levels.
Improve mechanisms for fair and equitable sharing of natural resource benefits, including defining tenure rights, minimizing the encroachment of forest reserves and reduce conflict over permitted farms and communities
Support scientific research, including traditional and indigenous knowledge, monitoring, and collaboration with national and international institutions
Improve knowledge capacity for effective management of natural resources, for example, through sustained extension activities in soil and water conservation
Apply technologies to provide information for detection and early warning systems for weather related hazards
Support awareness creation and dissemination programmes
Encourage and promote community based activities to improve land and water quality

Establish ecological networks or biological corridors to link fragmented forests, e.g., the establishment of Community
Promote afforestation to enhance dry season flows in basins
Protect river courses, and de-sedimentation of reservoirs
Promote Resources Management Areas (CREMAs) or linking up with existing CREMAs for synergy
Promote economic and social incentive measures for successful natural resource management

Equitable social development - Capacity building needs
Human health
Establish community health groups and development of capacity to identify health risks and facilitate access to services and decision-makers
Strengthen technical capacity to manage climate change related health risks
Strengthen disease surveillance systems through early warning
Improve on data sharing and develop health information management systems for diseases including climate sensitive diseases at all levels of the health delivery system
Map disease incidence and identification of vulnerable groups for climate-sensitive diseases
Strengthen existing units within the health delivery system to manage climate related epidemics.
Collaborate with relevant stakeholders to improve nutrition through increased food processing capacity, food banks, nutrition education, and food storage and quality control.
Improve surveillance systems for existing and new disease risks and ensure health systems are geared up to meet future demands
Mainstream climate change health risks into decision-making at local and national health policy levels.
Identify, document and incorporate climate-relevant traditional knowledge into health delivery systems and practices
Develop structures to effectively manage and disseminate information on climate change health risk.
Water and Sanitation
Develop rainwater harvesting and increased use of shallow wells, dugouts and dams for water use
Make water accessible for domestic, agricultural, industrial, and commercial use and energy production
Recycle of water for domestic and industrial purposes
Develop efficient irrigation drainage systems to increase returns flows
Build capacity in water resources management in relevant sectors
Promote water supply and sanitation delivery practices that build resilience to climate change
Develop and introduce flood and drought monitoring and control systems Improvement in social support system
Develop and implement environmental sanitation strategies to adapt to climate change
Strengthen District Assemblies to assume a central role in supporting community management of water and sanitation facilities
Reduce methane from landfills through waste reduction and recycling
Improve construction of hydropower schemes, irrigation systems and water supply infrastructure to improve efficiency
Implement drinking water and sanitation programmes in areas at risk from climate change (e.g., coastal areas, flood-and drought-prone areas)
Provide economic incentives to manage water resources including watersheds to furnish a sustainable and clean supply of water in addition to other ecosystem services and climate benefits
Improve in the status of environmental sanitation through strengthening of institutions and enforcement of laws
Gender issues

Generate gender-specific information including sex-disaggregated data for determining the gender impacts of climate change
Develop effective gender and climate change goals and gender sensitive indicators
Mainstream gender into climate change policy formulation, planning monitoring and evaluation
Identify and analyse gender-specific needs, impacts, protection and support measures related to climate change and variability such as floods, droughts and diseases
Promote gender equitable financing as a means of responding to the gender differential impacts of climate change.
Increase the resilience of vulnerable groups including women and children, through the development of community-led adaptation, livelihood diversification, better access to basic services and social protection (safety nets, insurance) and scaling up
Integrated biomass strategies for food, fuel, fodder, and other basic needs including income generation
Promote effective and equal participation of men and women in climate change policy and decision-making processes
Strengthen the implementation of gender responsiveness in disaster risk management
Migration
Promote vocational training - especially for youth, in places with high in-migration potential migrants
Facilitate movement between source and destination areas through improved transport systems
Facilitate flows of remittances and goods and services between source and destination areas
Target social transfers and safety nets; including migrants in the social safety nets Improve access to microcredit among migrants
Promote alternative livelihood programmes to develop skills among rural dwellers
Facilitate the proper utilization of rural and peri-urban lands by improving land use and land management schemes (move to natural resources)
Increase accessibility to quality health care for in-migrants
Mainstream migration into national development frameworks

Energy, Industrial and Infrastructural Development - Capacity building needs
Improve technical capacities, data collection and documentation systems for GHG emissions inventories and reporting
Research on transfer of low emission technology such as natural gas combined cycle, natural gas distribution system, and mini and small hydro.
Assist the private sector by way of incentives, and financial and technical support
Training for business leaders to appreciate the impact of climate change on their business
Increase research and development on clean energy sources
Support public awareness of efficient use of energy and of renewable energy sources
Establish efficient infrastructures and mechanisms for processing and use of by-products from oil fields to prevent gas flaring
Establish sustainable recycling and waste management technologies that generate energy (e.g., biomass energy, biogas, methane, etc.) and reduce emissions from solid and liquid waste, especially in urban areas.
Establish effective mechanisms for reducing volume of waste, and controlled and safe disposal of unavoidable wastes
Design of incentives and financing mechanisms, to encourage and support the use of renewable sources of energy.
Promote energy efficiency and management activities that include new and innovative energy efficiency methodologies and techniques in various sectors, especially power generation, oil and gas, transport, biomass, industry, and waste

Republic of Ghana

National Climate Change and Green Economy Learning Strategy

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