



# Ghana National Climate Change Master Plan

## Action Programmes for Implementation: 2015–2020



*agriculture*



*infrastructure*



*communities*



*carbon sinks*



*ecosystems*



*health*



*water*



*gender*



*migration*



*energy*

## National Climate Change Committee (NCCC) of Ghana

This document was produced under the guidance of the National Climate Change Committee (NCCC). The NCCC is composed of representatives of the following bodies: Ministry of Environment, Science, Technology and Innovation; Ministry of Finance and Economic Planning; National Development Planning Commission; Ministry of Food and Agriculture; Ministry of Foreign Affairs and Regional Integration; Ministry of Energy and Petroleum; Energy Commission; Ministry of Health; Environmental Protection Agency; Forestry Commission of Ghana; Council for Scientific and Industrial Research; Forestry Research Institute of Ghana; Ghana Health Service; National Disaster Management Organisation; Ghana Meteorological Agency; Abantu for Development; Environmental Applications and Technology Centre (ENAPT Centre); Conservation International, Ghana; Friends of the Earth, Ghana; Embassy of the Netherlands; the Department for International Development, United Kingdom of Great Britain and Northern Ireland.

## The Ministry of Environment, Science, Technology and Innovation (MESTI)

The Ministry of Environment, Science, Technology and Innovation (MESTI) exists to: establish a strong national scientific and technological base for the accelerated sustainable development of the country to enhance the quality of life for all. The overall objective of MESTI is to ensure the accelerated socioeconomic development of the nation through the formulation of sound policies and a regulatory framework that promotes the use of appropriate environmentally friendly, scientific and technological practices and techniques.

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Climate change is considered one of the most serious threats to sustainable development globally. Studies have shown that 90% of all natural disasters afflicting the world are related to severe weather and extreme climate events. Impacts of climate change are expected in many key sectors such as environment, human health, food security, natural resources and physical infrastructure.

The national climate change master plan has been prepared with active involvement and assistance of a wide range of stakeholders. These include the management and staff of Ministry of Environment, Science, Technology and Innovation, the Environmental Protection Agency, as well as sector Ministries and agency, civil society and Non-Governmental organizations.

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Thank you all



**FREDUA AGYEMAN**  
**DIRECTOR ( ENVIRONMENT)**

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## **FORWARD BY THE MINISTER MESTI**



The integration of climate information into government policy is important because climate is a major driving factor for Ghana's economic activities. Climate information is however not easily understandable. The same has also not been factored into most of the sectors of the country's economy including national development plans and budgets.

The purpose of the national climate change master plan is to put in place robust measures needed to address most, if not all, of the challenges posed by climate change and climate vulnerability. It is important for me that this strategy has been through a very participatory process extensively conducted across the country.

It is also important for me that a number of line ministries have provided their programmes and projects towards sector-wide adaptation and mitigation against climate change. The Priority areas of the strategy builds on this programmes and projects among others and shows government's commitment to tackling climate change head-on.

This document will also serve as a guide to future national development planning framework to ensure that Ghana has a climate resilient economy to ensure low carbon development.

This document is divided into ten (10) programme areas. Chapter;

1. Develop climate-resilient agriculture and food security systems
2. Build climate-resilient infrastructure
3. Increase resilience of vulnerable communities to climate-related risks
4. Increase carbon sinks
5. Improve management and resilience of terrestrial, aquatic and marine ecosystems
6. Address impacts of climate change on human health
7. Minimize impacts of climate change on access to water and sanitation
8. Address gender issues in climate change
9. Address climate change and migration, and
10. Minimize greenhouse gas emissions.

The chapters give details of strategic focus areas of the NCCPS including task, budgets and timelines. The recommended actions given in this document should be translated into tangible programmes and projects that would benefit our communities and trigger the process of factoring climate issues in our development.

It is important to note that this is the first time Ghana has developed a document of this kind dedicated to addressing climate change as well as taking advantage of the opportunities that exist in same.

Future climate change programmes and projects will have to be developed in line with the provisions of the national climate change master plan. Consequently, this strategy is now the key government climate change agenda in the country and will inform nationwide climate change programme and development activities including sector plans and budgets. For this reason the strategy shall be circulated widely to as many stakeholders as possible for extensive coverage and use.

A handwritten signature in black ink, appearing to read 'Mahama Ayariga', with a stylized, cursive script.

**HON. MAHAMA AYARIGA (MP)**

Minister for Environment, Science, Technology and Innovation

## List of Acronyms

| ACRONYM | MEANING   | ACRONYM | MEANING  |
|---------|---|---------|--|
| AAP     | Africa Adaptation Programme                                 | FAO     | Food and Agriculture Organization of the United Nations                      |
| AESL    | Architectural & Engineering Services Limited                | FASDEP  | Food and Agriculture Sector Development Policy                               |
| BOG     | Bank of Ghana   | FBOs    | Farmer Based Organizations   |
| BPA     | Bui Power Authority   | FC      | Forestry Commission of Ghana   |
| BRRI    | Building and Road Research Institute                        | GDP     | Gross Domestic Product   |
| CAADP   | Comprehensive Africa Agriculture Development Programme      | GEF     | Global Environment Facility  |
| CBOs    | Community-based organizations                               | GES     | Ghana Education Service  |
| CC      | Climate Change  | GHG     | Greenhouse Gas   |
| CCA     | Climate Change Adaptation                                   | GhIE    | Ghana Institution of Engineers   |
| CERSGIS | Centre for Remote Sensing and Geographic Information System | GhIS    | Ghana Institution of Surveyors   |
| CHP     | Combined heat and power                                     | GHS     | Ghana Health Service   |
| CHPS    | Community-based Health Planning and Services                | GIA     | Ghana Institute of Architects  |
| COP     | Community of Practice                                       | GIDA    | Ghana Irrigation Development Authority                                       |
| CRIG    | Cocoa Research Institute of Ghana                           | GIP     | Ghana Institute of Planners  |
| CSIR    | Council for Scientific and Industrial Research              | GIS     | Geographic Information System  |
| CSOs    | Civil society organizations                                 | GMet    | Ghana Meteorological Agency  |
| CSPG    | Cross-sectoral Planning Group                               | GNFS    | Ghana National Fire Service  |
| CWSA    | Community Water and Sanitation Agency                       | GPRS    | Ghana Poverty Reduction Strategy   |
| CZIMP   | Coastal Zones Indicative Management Plan                    | GPS     | Ghana Police Service   |
| DEM     | Digital Elevation Model                                     | GSD     | Geological Survey Department   |
| DFID    | Department for International Development                    | GSGDA   | Ghana Shared Growth Development Agenda                                       |
| DRR     | Disaster Risk Reduction                                     | GSS     | Ghana Statistical Service  |
| DSW     | Department of Social Welfare                                | GWCL    | Ghana Water Company Limited  |
| DVGs    | Disaster volunteer groups                                   | HFA     | Hyogo Framework for Action   |
| DWDs    | District Water Departments                                  | HSD     | Hydrological Services Department   |
| Eco-DRR | Ecosystem management for disaster risk reduction            | ICT     | Information and communications technology                                    |
| ECOWAS  | Economic Community Of West African States                   | ICZM    | Integrated Coastal Zone Management   |
| EHSD    | Environmental Health and Sanitation Directorate             | IPCC    | Intergovernmental Panel on Climate Change                                    |
| EIA     | Environmental impact assessment                             | ISD     | Information Services Department, Ministry of Information and Media Relations |
| EOCs    | Emergency operations centres                                | IWRM    | Integrated water resources management  |
| EPA     | Environmental Protection Agency                             | KNUST   | Kwame Nkrumah University of Science and Technology                           |
| ESAPs   | Environmental sustainability action plans                   | KVIPs   | Kumasi ventilated improvised pit latrines                                    |
| ESIAs   | Environmental and social impact assessments                 | LCG     | low-carbon growth  |
|         |   | LED     | low-emissions development  |

| <b>ACRONYM</b> | <b>MEANING</b>  |
|----------------|---|
| LEDS           | low-emissions development strategies                        |
| LETs           | Low-emission technologies                                   |
| LGS            | Local Government Service                                    |
| LPG            | Liquefied petroleum gas                                     |
| LUCF           | Land Use Change and Forestry                                |
| MDGs           | Millennium Development Goals                                |
| MESTI          | Ministry of Environment, Science, Technology and Innovation |
| METASIP        | Medium Term Agriculture Sector Investment Plan              |
| MIMR           | Ministry of Information and Media Relations                 |
| MINT           | Ministry of the Interior                                    |
| MLGRD          | Ministry of Local Government and Rural Development          |
| MLNR           | Ministry of Lands and Natural Resources                     |
| MMDAs          | Metropolitan, Municipal and District Assemblies             |
| MOC            | Ministry of Communication                                   |
| MoE            | Ministry of Education                                       |
| MOELR          | Ministry of Employment and Labour Relations                 |
| MOEP           | Ministry of Energy and Petroleum                            |
| MoFA           | Ministry of Food and Agriculture                            |
| MOFAD          | Ministry of Fisheries and Aquaculture Development           |
| MoFEP          | Ministry of Finance and Economic Planning                   |
| MOGCSP         | Ministry of Gender, Children and Social Protection          |
| MOH            | Ministry of Health  |
| MOT            | Ministry of Transport                                       |
| MOTI           | Ministry of Trade and Industry                              |
| MOWAC          | Ministry of Women and Children's Affairs                    |
| MRH            | Ministry of Roads and Highways                              |
| MRV            | monitoring, reporting and verification                      |
| MSW            | municipal solid waste                                       |
| MTDPF          | Medium-Term Development Policy Framework                    |
| MTEF           | Medium-Term Expenditure Framework                           |
| MWRWH          | Ministry of Water Resources, Works and Housing              |
| NADMO          | National Disaster Management Organisation                   |
| NAMAs          | nationally appropriate mitigation actions                   |
| NCCC           | National Climate Change Committee                           |
| NCCE           | National Commission for Civic Education                     |
| NCCP           | National Climate Change Policy                              |

| <b>ACRONYM</b> | <b>MEANING</b>  |
|----------------|---|
| NDPC           | National Development Planning Commission                          |
| NEPAD          | New Partnership for Africa's Development                          |
| NESSAP         | National Environmental Sanitation Strategy and Action Plan        |
| NGOs           | Non-governmental organizations                                    |
| NHIS           | National Hospital Insurance Scheme                                |
| NMC            | National Media Commission   |
| PPP            | Public-private partnerships                                       |
| PURC           | Public Utilities Regulatory Commission                            |
| RCC            | Regional Coordinating Councils                                    |
| REDD+          | Reducing Emissions from Deforestation and Forest Degradation Plus |
| R-PP           | REDD+ Readiness Preparation Proposal                              |
| SADA           | Savannah Accelerated Development Authority                        |
| SARI           | Savanna Agricultural Research Institute                           |
| SEA            | Strategic Environmental Assessment                                |
| SHEP           | School Health Education Programme                                 |
| SMTDP          | Sector Medium-Term Development Plan                               |
| SOPs           | Standard operating procedures                                     |
| SWA Compact    | Sanitation and Water for All Compact                              |
| UNDAF          | United Nations Development Assistance Framework                   |
| UNDP           | United Nations Development Programme                              |
| UNEP           | United Nations Environment Programme                              |
| UNFCCC         | United Nations Framework Convention on Climate Change             |
| USAID          | United States International Development Agency                    |
| VRA            | Volta River Authority   |
| WASH           | Water, sanitation and hygiene sector                              |
| WHO            | World Health Organization   |
| WMO            | World Meteorological Organization                                 |
| WMP            | Waste management plan   |
| WRC            | Water Resources Commission  |
| WRI            | Water Research Institute  |
| WSMP           | Water and Sanitation Monitoring Platform                          |
| WSSDP          | Water Sector Strategic Development Plan                           |



## THE NATIONAL CLIMATE CHANGE POLICY:

### EXECUTIVE SUMMARY

Climate change is a global challenge that requires a concerted effort by all nations to address its causes and effects. Ghana's integrated response to climate change is the National Climate Change Policy (NCCP), which provides a clearly defined pathway for dealing with the challenges of climate change. The Policy takes account of the current socioeconomic context of Ghana and incorporates the opportunities and benefits of a green economy. Ghana's policy response to climate change is in three phases:

**NCCP Phase I**, which presents the policy, analyses the current situation and states the broad policy vision and objectives.

**NCCP Phase II** (the present document) sets out, by sector, the initiatives and programmes identified in the NCCP in the form of Action Programmes for implementation.

The expectation is that, after sensitization by MESTI and the National Development Planning Commission (NDPC) of Ghana, operational plans will be produced by implementing units such as district assemblies, traditional authorities and non-governmental and community-based organizations on the programmes and actions identified by all stakeholders in the process to date. That is **NCCP Phase III**.

The actual implementation is expected to be embedded, in a time-bound manner in accordance with the estimated costs, in their annual work plans and mainstreamed in their strategic plans.

In each Action Programme, specific strategies and actions, as well as estimated timelines and estimated costs, are identified for achieving each of the policy objectives. The National Climate Change Policy

addresses the four major areas of concern related to climate change and climate variability in Ghana;

- (i) Increasing greenhouse gas emissions and loss of carbon sinks;
- (ii) Increasing temperatures;
- (iii) Rainfall variability leading to extreme and unpredictable events;
- (iv) Sea-level rise.

**Increasing Greenhouse Gas (GHG) Emissions and Loss of Carbon Sinks:** Ghana's Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) reported emissions and removal of sinks from five major sectors: energy, industrial processes, agriculture, land use change and forestry (LUCF), and waste, with the highest emissions being from the energy sector.

**Increasing Temperatures:** Climate trends since 1960 show an average rate of increase in temperature by 0.21°C, per decade in Ghana. This shows a more rapid increase in the northern regions of the country. Increasing temperatures have direct and indirect implications for vulnerable communities and impacts on ecological resources and services, as well as on important infrastructure.

**Rainfall variability:** Rainfall in Ghana generally decreases from south to north. Changing rainfall patterns can result in drought and/or high total precipitation leading to extreme events such as torrential rains, flooding and pollution. Changing rainfall patterns have a direct and indirect impact on vulnerable communities, ecosystems and infrastructure.

**Sea level rise:** Available national data show a sea-level rise of 2.1 mm per year over the last 30 years (1960–1990), indicating a gradual rise of 5.8cm, 16.5cm and 34.5cm by 2020, 2025 and 2080, respectively. This increase will affect the 30 metre contour of the nation’s coastal zone, where more than 25 per cent of the population lives.

The NCCP process identified ten Policy Focus Areas for addressing Ghana’s climate change challenges and opportunities. Each of these areas has a number of specific programmes for addressing the critical actions necessary to achieve the desired objectives. The Policy Focus Areas are:

1. Develop climate-resilient agriculture and food security systems;
2. Build climate-resilient infrastructure;
3. Increase resilience of vulnerable communities to climate-related risks;
4. Increase carbon sinks;
5. Improve management and resilience of terrestrial, aquatic and marine ecosystems;
6. Address the impact of climate change on human health;
7. Minimize the impact of climate change on access to water and sanitation;
8. Address gender issues in climate change;
9. Address climate change and migration; and
10. Minimize greenhouse gas emissions.

The NCCP Action Programme for Implementation includes the details of initiatives and programmes to achieve the objectives of each Policy Focus Area. It details the mainstreaming process; the estimated costing for each sector and monitoring and evaluation; and outlines financing mechanisms and strategies for effective implementation.

**1. Develop Climate-resilient Agriculture and Food Security Systems:** Planning for the development of agriculture in Ghana has focused on increasing productivity and production; there has been little focus on addressing climatic constraints. Mainstreaming climate change and variability into food and agricultural development planning has become necessary to ensure the sustainability of achievements. Awareness-raising, capacity-building, improved training curricula and appropriate integration into existing processes will effectively mainstream climate change into the food and agricultural sector policies.

**2. Build Climate-resilient Infrastructure:** Disaster preparedness and response programmes and actions, especially with regard to climate change, have to be effectively integrated or mainstreamed into the national policy planning and budgeting process for sustainable development. Building climate-resilient infrastructure will require capacity-building, knowledge management and the adoption of a participatory approach to climate change and disaster risk reduction.

**3. Increase Resilience of Vulnerable Communities to Climate-related Risks:** This will involve action to document and improve community-based early warning systems for natural disasters and effective dissemination, especially at the local level in local languages. Timely use of strategic information should be promoted in targeted areas and modern information management systems developed. Institutional capacity of agencies involved in disaster risk management needs to be enhanced, especially within the National Disaster Management Organisation (NADMO). This includes improving their technical capacity and facilities for rapid response to disasters and disaster management as well as strengthened traditional social support systems and ensuring access to local communities.

**4. Increase Carbon Sinks:** There are linkages between policies for the management of natural resources. The current decline in Ghana’s

natural resources requires the effective mainstreaming of natural resource management into national policy planning, budgeted for appropriately. This will ensure that resources that are essential for providing important goods and services for social and economic development are used sustainably.

**5. Improve Management and Resilience of Terrestrial, Aquatic and Marine Ecosystems:** Many of the problems that Ghana needs to deal with in the face of climate change and climate change adaptation lie in the realm of improved governance and natural resource management. A key element of this is more emphasis on community-based natural resource management; this, with appropriate economic incentive measures, will result in true ecosystem-based adaptation – a triple win situation between people, the environment and adaptation.

**6. Address the Impact of Climate Change on Human Health:** Climate change and variability can have a major impact on the health of human populations. There need to be improvements in the capacity-building of health care providers and groups which would include strengthening disease surveillance and response systems. As many diseases are water borne, improved public health measures (immunization, and improved drainage, sanitation and hygiene) especially in vulnerable communities, as well as and partnerships with other agencies and NGOs for improved nutrition and provision of clean water and sanitation, will go a long way towards social protection and improved general health and wellbeing.

**7. Minimize the Impact of Climate Change on Access to Water and Sanitation:** The impact of climate change challenges the goals of access to safe water and adequate sanitation, sustained water resources management and the country's sustainable development. The actions outlined in existing national strategic documents for managing the water and environmental sanitation sectors are in accordance with the objectives of the NCCP. The mainstreaming process which includes awareness- and capacity-building at various levels, and knowledge sharing and

coordination, also requires mechanisms to address financial, economic and policy/regulatory aspects.

**8. Address Gender Issues in Climate Change:** The links between gender and climate change are increasingly being acknowledged as critical for adaptation and mitigation; this acknowledgement will enable Ghana to promote development on an equal basis. There is a need to highlight the specific ways in which gender issues can be mainstreamed in the context of climate change. This involves identifying targets of the mainstreaming process; evaluating climate change impacts on socioeconomic, sectoral and local development strategies and plans; awareness-raising and capacity-building to mainstream gender issues; evaluation of the mainstreaming process; and development of strategies and mechanisms for mainstreaming gender issues, including financial, economic and policy aspects.

**9. Address Climate Change and Migration:** Migration is an important climate change plan for both the poor and non-poor in Ghana, requiring effective mainstreaming of the six identified thematic programmes into national policy planning and budgeting processes. This requires identifying targets, evaluating climate change impacts, evaluating awareness and capacity of institutions, evaluating possible impacts of the mainstreaming process, and developing strategies and mechanisms for mainstreaming climate change and migration policies.

**10. Minimize Greenhouse Gas Emissions:** The NDPC has developed steps to mainstream and integrate cross-cutting issues in various sector strategies, as well as procedures for data collection, verification and reporting for assessing policy impacts on development. Climate-related actions and other actions not specifically targeted at climate change that lead to greenhouse gas emission reduction opportunities or low emission development strategies have also been outlined for existing national policies. Development of the road map, the capacity-building of the stakeholders and integration into the monitoring and evaluation plans will facilitate the mainstreaming process.



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 1: Agriculture and Food Systems**

## Policy Focus Area 1: Develop Climate-resilient Agriculture and Food Security Systems

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### Introduction

Climate change and climate variability form a continuously growing and major constraint to the development of the food and agriculture sector (including fisheries) in Ghana. The impact of climate change is mainly due to the increasing variability of rainfall resulting in recurrent and longer dry spells that delay and shorten the growing seasons. In addition, rainfall is becoming more intense resulting in flash floods that destroy crop lands and cause land degradation due to erosion. In the area of fisheries development, increasing numbers of coastal communities continue to experience a reduction in land areas available for agriculture due to sea erosion caused by rising sea levels.

The direct impact of these climate change effects is a continuous reduction in or destruction of livelihood sources for most rural families. At present, most rural communities are becoming increasingly aware of the effects of climate change and climate variability. While local and traditional coping strategies are available for adapting to minor impacts, most farm families lack the capacity to cope with greater impacts such as flash floods and longer dry spells that dislocate their livelihood systems. Furthermore, there is little or no capacity for collecting, analysing and disseminating climatic information to guide planning for future events.

Plans for agricultural development over the years in Ghana have been focused mainly on increasing productivity and production with little attention given to addressing climatic constraints. Mainstreaming climate change and climate variability into food and agricultural development planning has become necessary to ensure the sustainability of achievements. A process is needed that addresses all

constraints along the food and agriculture value chain, with special focus on building capacity, effective research, extension work and farmers. While the improvement in research capacity should focus on the development of information and technology, development of capacity at the extension level needs to focus on building the knowledge base. This is to engender increased understanding of the phenomenon and how to translate this knowledge into effective extension information to farmers. At the farmer level, the capacity-building effort will have to focus on expanding the understanding of farmers of current climatic trends and improving their skills to enable them to cope effectively. In addition to capacity-building, efforts need to be made in the area of variable infrastructure development that will increase the resilience of rural communities and enable them to adapt to the impact of extreme events including floods and long dry spells.

The mainstreaming of climate change adaptation is first meant to reduce the impact of the effects of climate change and climate variability on national development processes while achieving additional benefits of possible reductions in greenhouse gas emissions. To achieve an effective mainstreaming effort, the process needs to be participative and provide an opportunity for stakeholders to effectively contribute to planning policy and estimating the cost of various programmes. This participatory process, when adopted, will increase the cost of the policy processes and will call for a longer timeframe. Mainstreaming climate change adaptation into national policy processes will also increase the cost of investments, thereby putting further demands on state resources, but has the potential to result in

more sustainable socioeconomic development and a reduction in disaster risks.

A major proportion of the estimated costs of the food and agricultural sector programmes are supported by donor partner institutions at present. When climate change adaptation is effectively mainstreamed, there will be a need for an increase in these contributions; in the long term, however, we envisage that these would be reduced since development achievements would be better sustained.

### **The Mainstreaming Process**

The National Development Planning Commission (NDPC) has provided a framework to guide the development of the sector's medium-term development plan for the period 2014–2015. The process is expected to be followed by all ministries, departments and agencies, which provides for multi-stakeholder involvement in the planning process under the supervision of the Chief Director of the relevant Ministry. This process also provides for ensuring the effective mainstreaming of all cross-cutting issues including gender and environment as described within the sustainable development context with special emphasis on climate change by subjecting the medium-term development plan to a Strategic Environmental Assessment (SEA).

Although the current Food and Agriculture Sector Development Policy (FASDEP II) and its Medium Term Agriculture Sector Investment Plan (METASIP) were developed before the release of the present framework from NDPC, a similar multi-stakeholder process was followed. FASDEP II was also subjected to strategic environmental assessment (SEA) through which its inadequacy in relation to climate change was identified. It was subsequently recommended that steps be taken to address the shortcomings during implementation.

In line with principles of the Comprehensive Africa Agriculture Development Programme (CAADP) of the African Union/New Partnership for Africa's Development (NEPAD), a compact was signed among all the relevant stakeholders of the food and agriculture sector to ensure effective implementation of METASIP. Based on the compact, METASIP is being implemented under the supervision of a multi-stakeholder steering committee including the private sector, civil society and traditional rulers. The lead agency for the sector, the Ministry of Food and Agriculture (MoFA), has in place an Environment, Land and Water Management Unit, National Climate Change Task Force, with representation from all its technical directorates and Environmental Desks or Offices. The aforementioned stakeholders will undertake a review of FASDEP II and METASIP to identify critical areas for including climate change adaptation and mitigation measures towards the improvement of the overall delivery of the objectives of METASIP. The results of the review process will be subjected to further review by a broader stakeholder group, including district officers, farmer groups and civil society groups, for validation. The results of the validation process will be submitted to the METASIP Steering Committee for approval for implementation within the framework of METASIP.

Approval of the inclusion of the adaptation and mitigation measures will be followed by awareness creation at all levels to ensure that annual work plans and associated budgets at all levels appropriately capture these measures within their broad programme activity areas. Awareness creation will be given special attention at the district level, which is the main point of delivery of food and agricultural development programmes.

### **Sectoral Estimated Costing**

The Ministry of Food and Agriculture, in collaboration and with the support of the Ministry of Finance and Economic Planning, is piloting

a programme-based estimated costing process. This is based on the six programme areas of METASIP. The purpose of this process is to ensure that there is adequate funding for the delivery of all programmes within METASIP.

Climate change adaptation and mitigation measures, once tied to specific programmes within METASIP, will be appropriately covered during the estimated costing process. It is important to note that these measures will aim at improving the delivery of each programme.

### **Monitoring and Evaluation**

The Ministry of Food and Agriculture has in place a monitoring and evaluation framework for monitoring the implementation of METASIP. The framework is based on the six programme areas of the METASIP. For effective monitoring and evaluation of climate-change-related measures, the current framework will be reviewed and relevant indicators of climate change adaptation and mitigation captured.

### **Financing**

Financing of food and agricultural sector development programmes is achieved through national allocations based on annual work plans and estimated costs, and special projects supported by donor agencies. In collaboration with donor partners led by the former Canadian International Development Agency (CIDA) (now the Department of Foreign Affairs, Trade and Development Canada) MoFA adopted the sector-wide budget support programme which allows for untied funds from donor agencies to be used to complement national allocations to projects based on estimated costs. These allocations are reviewed annually, based on agreed triggers and targets. The triggers and targets are based on the national policy and programmes of the sector. Consistently over the years environmental triggers and targets have been considered to be among those that need to be achieved.

Special projects based on national priorities for the introduction and piloting of innovations to support ongoing sector programmes are basically funded by donor partners in collaboration with the Government of Ghana. The inclusion of the agreed climate change adaptation and mitigation measures into the broad sector programmes, plans and annual work plans and budgets provides an opportunity for funding under the above-mentioned funding mechanisms. The integration of the climate change adaptation and mitigation measures will increase the financial requirements for the implementation of ongoing programmes. There will therefore be a need to re-cost the METASIP to cover the balance of its implementation period so as to identify the financial gap that will need to be filled.

### **Strategies**

The following strategies will be adopted for the effective mainstreaming of climate change mitigation and adaptation into the food and agriculture sector policies, programmes and plans;

- Creating awareness at all levels of relevant stakeholders on measures to address climate change and climate variability;
- Building the capacity of extension service providers and farmers to enable them engage in discussions and analysis;
- Reviewing the training curricula of agricultural training colleges to include climate change and variability;
- Ensuring that climate change is integrated into strategic environmental assessment processes for the sector.



## Programme Areas

The Food and Agriculture Organization of the United Nations (FAO) defines climate-smart agriculture as that which sustainably increases productivity, increases resilience (adaptation), reduces greenhouse gases (mitigation) and enhances the achievement of national food security and development goals. Climate-smart agriculture aims at mainstreaming climate change considerations along the value chain in agricultural systems. The promotion and adoption of climate-smart agriculture is essential as national agricultural production and food systems are continually being constrained by climate change effects in various forms.

The efficiency of a climate-smart production system depends on increased resilience and the capacity to adapt to the effects of climate change, and mitigation of greenhouse gas emissions. This can be achieved through improving the various components through soil and nutrient management; methods of water harvesting and use; pest and disease control; enhancing ecosystem resilience; use and management of improved genetic resources (seeds and breeds, for example) and improvements in harvesting, processing and supply chains.

### Programme 1.1: Institutional Capacity Development for Research and Dissemination

**Objective:** To enhance capacity for climate change and variability related research and development towards achieving food and nutritional security.

**Justification:**

The agricultural sector is a major contributor to the socioeconomic development of Ghana. The sector is second in importance only to the services sector, contributing about 30 per cent to gross domestic product (GDP). Several studies have indicated that agriculture and food systems in Ghana are highly vulnerable due to their rudimentary

development and high dependence on natural systems, especially rainfall: irrigation is not widely used. Future climatic scenarios for Ghana indicate multi-directional changes in rainfall amounts with increases in the number and severity of extreme events. Current climate-related research activities are mostly aimed at developing drought-resistant species and varieties. Capacity for climate-related research in most institutions is limited.

To facilitate effective adaptation within the agricultural sector, there is a need for increased and continuous research and development because of the high unpredictability of climate variability and the need for continuous learning from future occurrences. At present, agriculture-related research activities are dispersed within a number of Council for Scientific and Industrial Research (CSIR) institutions, universities and other research institutions. The programme will, therefore, support the establishment of a platform for agriculture-related research institutions to coordinate their activities to achieve synergies and avoid duplication as much as possible. The programme will seek to enhance the capacity of agricultural research institutions to increase their research and development activities aimed at addressing current and future climatic effects and their impact on agriculture and food systems.

**Action:**

- 1.1.1 Improve and harmonize research activities for climate-smart agriculture.
- 1.1.2 Build institutional capacity to enhance research and development to support climate-smart agriculture.
- 1.1.3 Increase financial support for climate-smart agricultural research and development.
- 1.1.4 Support dissemination of technologies for climate-smart agriculture and sustainable fisheries.

**Timeline:** 2015–2020



**Responsibility:** Council for Scientific and Industrial Research (CSIR), universities and research institutions, Ministry of Environment, Science, Technology and Innovation, Ministry of Fisheries and Aquaculture Development, Ghana Meteorological Agency

**Estimated Cost:** US\$35,000,000

### **Programme 1.2: Development and Promotion of Climate-resilient Cropping Systems**

**Objectives:** To enhance sustainable production and food security, and reduce climate-related disasters.

**Justification:**

The agricultural sector is a major contributor to the socioeconomic development of Ghana. In terms of Gross Domestic Product (GDP), the sector is second only to the services sector with a contribution of about 30 per cent. The crops subsector is the largest contributor to agricultural GDP and the most dynamic. Over 70 per cent of the food needs of Ghana are produced locally, with national self-sufficiency in the root and tuber crops. Several studies have indicated that agriculture and food systems in Ghana are highly vulnerable due to their rudimentary nature and high dependence on natural systems, a notable example being the dependence on rainfall and the low level of development of irrigation systems. Future climatic scenarios for Ghana indicate multi-directional changes in rainfall amounts and increases in the number and severity of extreme events. Ghana, in recent years, has been experiencing extreme climatic events that result in losses at the farm and community level.

To be able to satisfactorily adapt to future climatic effects, current cropping systems need to be improved to make them resilient and able to withstand any future unexpected extreme events. At present, there

are a number of ongoing research activities aimed at the development of new farming systems and the improvement of existing ones to make them more efficient. There are also ongoing initiatives aimed at improving agroecosystems by scaling up the adoption of sustainable land management technologies.

The programme will support efforts to mainstream the effects of climate change into the design of new cropping systems while simultaneously working towards enhancing existing cropping systems to make them responsive to current and future climatic effects. The programme will also support efforts to expand the scale of adoption by farmers of other sustainable productivity-enhancing technologies, with special emphasis on those that have additional mitigation potential including conservation agriculture and agroforestry.

**Actions:**

- 1.2.1 Conduct research into climate-resilient cropping systems.
- 1.2.2 Document and promote appropriate indigenous knowledge and best practices.
- 1.2.3 Promote sustainable land management including enhanced adoption of conservation agriculture and agroforestry.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Food and Agriculture (MoFA), Council for Scientific and Industrial Research (CSIR), universities and research institutions, Ministry of Health (MOH), Ministry of Local Government and Rural Development (MLGRD), Ministry of Trade and Industry (MOTI), Cocoa Research Institute of Ghana (CRIG), NADMO, national security bodies, Metropolitan, Municipal and District Assemblies (MMDAs) (Local Government Service); civil society organizations (CSOs), (including NGOs, farmer-based organizations (FBOs) and traditional authorities), private sector organizations

**Estimated Cost:** US\$150,000,000

### Programme 1.3: Adaptation of Livestock Production Systems

**Objectives:** To achieve sustainable livestock production and reduce climate-related disasters.

**Justification:**

The agriculture sector continues to be a major contributor to the socioeconomic development of Ghana. The sector is second only to the services sector with about 30 per cent contribution to GDP despite declines in growth rate between 2008 (about 7 per cent) and 2010 (4.2 per cent). The livestock production subsector has seen improvements with a growth rate of about 5 per cent. Production systems, however, remain largely extensive with reliance on natural pastures, which are low in nutrition. Over the years, there have been efforts to improve production practices in terms of efficiency and the introduction of technologies that support semi-intensive production systems. Except for poultry and pig farming, the response has been largely minimal. As in the case of the crops subsector, livestock production in Ghana is highly vulnerable to climate change because of its extensive livestock production systems and poor management practices. The situation is further compounded by the increasing incidence of pests and diseases and the emergence of new ones.

At present, the livestock production subsector is unable to satisfy Ghana's meat requirements and the gap is filled with imports from Europe. The effects of climate change have the potential to further reduce production by the subsector, resulting in attendant increases in imports. The impacts of climate change, notably increases in pests and diseases, will require a more focused extension service delivery system. A number of projects have piloted successfully a community-based approach to the livestock extension service.

The programme will support efforts at mainstreaming climate change adaptation into activities directed towards building resilience while simultaneously enhancing productivity.

**Action:**

- 1.3.1 Undertake research and development of climate-resilient livestock production systems, including improved breeds, and pest and disease management.
- 1.3.2 Support the development of improved and nutritious feed, including pastures and fodder banks.
- 1.3.3 Establish a community-based livestock extension system.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Food and Agriculture, Council for Scientific and Industrial Research (Animal Research Institute), universities and other research institutions, civil society organizations (including NGOs and farmer-based organizations, etc.)

**Estimated Cost:** US\$15,000,000

### Programme 1.4: Support to Climate Change Adaptation Activities in Fisheries and Aquaculture

**Objective:** To ensure the sustainability of fisheries and aquaculture systems through adaptation.

**Justification:**

This subsector ranks third after the crops and the cocoa subsectors, contributing approximately 7 per cent of agricultural GDP. Production from the sector is below the national requirement and supply is supplemented by imports, although some exports are also undertaken. The fisheries subsector is dominated by operators of artisanal fisheries mostly involved in capture fisheries. Fish catches from these operators supply over 70 per cent of total landings annually from marine sources. The majority of landings are from marine sources although

catches from inland water sources have increased in recent years due to the introduction of cage/pen fish culture in addition to pond fish culture. It is estimated that artisanal fishing along the coast has reached its maximum sustainable yield and offers limited potential for expansion. Indeed fish landings are reducing from both marine and inland sources; this is partly attributable to inappropriate fishing practices.

Assessment of the impact of sea level rise indicates that coastal areas are prone to flooding and receding shorelines due to erosion, which affects the local communities. Also directly related to sea level rise are increases in salinity in estuaries and aquifers, and raised coastal water tables. It is estimated that over 1,110 km<sup>2</sup> of land area is at risk of being lost as consequence of a one-metre rise in sea level putting over 280,000 persons at risk of losing their livelihoods. Considering the expected negative impact of increasing temperatures and sea level rise on fish populations and species composition and abundance, the vulnerability of the subsector cannot be over-emphasized.

The current and future effects of climate change have the potential to further exacerbate the already precarious situation of coastal and other fisheries-dependent communities. The programme will therefore support activities that will build the resilience of these communities against present and future effects. The programme will also support actions that will seek to improve and sustain the productivity of the subsector.

**Action:**

- 1.4.1 Support research and development in the improvement of capture and culture fisheries management.
- 1.4.2 Support effective enforcement of regulations within fisheries environments.
- 1.4.3 Promote and support the scaling up of the adoption of aquaculture technologies.

- 1.4.4 Support the provision of post-harvest fish management infrastructure and other systems.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Fisheries and Aquaculture Development (Fisheries Commission)**, Council for Scientific and Industrial Research, universities and research institutions, private sector operators, national associations of fishermen (Ghana National Association of Farmers and Fishermen (GNAFF), and also others such as National Fisheries Association of Ghana (NAFAG) in Tema, Ghana Co-operative Fisheries Association, National Inland Canoe Fishermen's Council (NICFC), Ghana National Canoe Fishermen's Council (GNCFC)) civil society organizations (including NGOs and FBOs, etc.)

**Estimated Cost:** US\$45,000,000

### **Programme 1.5: Support to Water Conservation and Irrigation Systems**

**Objectives:** To ensure availability of water for multiple uses in a changing climate while reducing the risk of flood-related disasters in rural communities.

**Justification:**

The limited availability of water is a major constraint to agricultural production in Ghana and encourages high dependence on rainfall. Increasing variability and unpredictability of rainfall in all agro ecological zones exacerbates the situation. In addition, the rainfall periods that define the growing seasons are becoming shorter, resulting in crop losses, longer dry periods and a drastic reduction in fodder for animal grazing. Although rainfall is becoming more unpredictable, the frequency of high-intensity rains is increasing, resulting in flash floods and a potential for disastrous events in rural communities. Such high-

intensity rains, however, provide great opportunities for harvesting and storing rainwater for multiple uses which would simultaneously enable communities to withstand these flood conditions.

The development of irrigation in Ghana is thought to be only 4 per cent of its potential, focusing mostly on the production of rice and high-value horticultural crops. Recently the Government has moved from the development of large-scale government-managed irrigation schemes to the promotion of user-managed small-scale irrigation schemes. In addition, there are several private farmer-managed irrigation activities utilizing various water sources, including domestic wastewater.

Water conservation and rainwater harvesting within rural communities would not only provide water for domestic use but would also support small-scale irrigated agricultural activities, including the production of high-value short-duration crops, and supply water for animals. Experience from rural communities indicates lower levels of poverty in communities with water storage and conservation structures compared with regional averages. The current programme therefore seeks to expand ongoing activities in the area of water storage and conservation, and expand small-scale irrigation infrastructure and access to irrigation technologies by farmers.

**Action:**

- 1.5.1 Develop multi-purpose water harvesting and storage facilities.
- 1.5.2 Promote in-field water harvesting and conservation.
- 1.5.3 Expand small-scale irrigation development.
- 1.5.4 Enhance extension support for small-scale irrigated agriculture operations.

**Timeline:** 2015–2020

**Responsibility:**

**Metropolitan, Municipal and District Assemblies (MMDAs) (departments of agriculture)**, NADMO, Irrigation Development Authority (IDA), Water Resources Commission, CSIR, universities and other research institutions; civil society organizations (NGOs, farmer-based organizations, etc.), private sector operators.

**Estimated Cost:** US\$50,000,000

### **Programme 1.6: Risk Transfer and Alternative Livelihood Systems**

**Objectives:** To secure existing and provide alternative climate-resilient livelihoods to rural communities.

**Justification:**

Farming and rural communities are mostly dependent on natural resources for their livelihoods and are therefore very vulnerable to extreme weather events. In Ghana, because of the scale of production and low use of technology associated with production systems, substantial losses can occur even in the face of more usual events. These losses in many cases comprise the loss of household food and sources of income, further compounding an already precarious situation.

From the northern savannah, which experiences only one season of rainfall and a long dry period, able-bodied youth undertake a seasonal migration to the south to engage in menial jobs to earn the income needed to procure food and other essentials for their families.

There are no established systems for the transfer of risks associated with agricultural production systems. This has resulted in total losses of food and capital including financial losses when unexpected events strike, making it difficult for farmers to pay back loans. GIZ is currently providing support to a pilot weather-indexed crop insurance

scheme in the northern savannah zone with emphasis on cereals. This pilot programme seeks to learn lessons so as to develop a risk transfer (insurance) scheme of wider scope and coverage. This programme is consistent with the Food and Agriculture Sector Development Policy (FASDEP) and its Medium Term Agriculture Sector Investment Plan (METASIP).

Alternative livelihood systems aim to diversify the sources of income of households with the objective of reducing the impact of potential stress conditions and disasters. A number of alternative livelihood schemes are currently being rolled out in various parts of the country, especially in the northern savannah zone, such as programmes under the Ghana National Aquaculture Development Plan. The livelihood programmes range from agriculture-related activities through skills training programmes to commerce.

The present programme will seek to expand the scope and coverage of current efforts while building synergies with ongoing activities towards increasing benefits to target communities.

**Action:**

- 1.6.1 Develop and establish agriculture- and fisheries-based insurance schemes.
- 1.6.2 Support alternative livelihood programmes.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Food and Agriculture**, National Disaster Management Organisation (NADMO), Metropolitan, Municipal and District Assemblies (MMDAs) (Local Government service), Ministry of Gender, Children and Social Protection, Ministry of Fisheries and Aquaculture Development, financial institutions, National Insurance Commission; insurance institutions, civil society organizations (NGOs, FBOs, etc.)

**Estimated Cost:** US\$55,000,000

### Programme 1.7: Improved Post-harvest Management

**Objectives:** To ensure sustainable food security and household income in a changing climate.

**Justification:**

A major constraint of the agriculture and food systems in Ghana is the high level of post-harvest losses. It is estimated that post-harvest losses reach as high as 30 per cent and beyond in some commodities resulting in drastic reductions in production volumes and incomes of operators along commodity value chain. The high post-harvest losses are precipitated by environmental conditions and low access of operators to post-harvest technologies, including infrastructure. Environmental conditions resulting from climate change effects, such as high humidity during periods of harvest of cereals, and increasing pest populations and diversity, further compound the situation.

To ensure stable food supply and medium- to long-term food security, the need for effective post-harvest management cannot be over-emphasized especially in the face of the increasing incidence of extreme weather events. The Government through its current agriculture sector policy is rolling out a number of initiatives to reduce post-harvest losses, including the provision of processing (drying, cleaning, treatment, etc.), and storage facilities. In addition, the Government is supporting small- to medium-scale enterprises through various financial mechanisms to undertake value addition of various commodities.

The programme will seek to expand the scope of the Government's efforts towards enhancing access by operators along the value chain to improved post-harvest technologies and infrastructure.



**Action:**

- 1.7.1 Support the provision of processing and storage infrastructure (for example, for cassava).
- 1.7.2 Promote value addition to perishable commodities (for example, tomatoes).

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Food and Agriculture**, Council for Scientific and Industrial Research (CSIR), Metropolitan, Municipal and District Assemblies (MMDAs), Ministry of Trade and Industry (MOTI), Ministry of Gender, Children and Social Protection, universities and other research institutions; private sector, financial institutions, civil society organizations (NGOs and farmer-based organizations, etc.)

**Estimated Cost:** US\$100,000,000

### Programme 1.8: Improved Marketing Systems

**Objectives:** To reduce fluctuations in food prices and improve household income.

**Justification:**

For most farmers, marketing represents a major constraint, resulting in the depletion of potential income. Marketing is most troublesome during the period of harvesting; most farmers sell their produce at giveaway prices just to make some income to address domestic needs, and due to availability of large volumes and the perishability of crops. At present there are no comprehensive marketing strategies and mechanisms for food commodities within the country which results in great fluctuations in prices between periods of harvest and periods of limited availability. Climate change will widen the gaps in food production and availability, which will have a consequent effect on food prices. In addition, the road infrastructure linking producing areas

to marketing centres is weak and in some cases non-existent, resulting in long travel times that lead to high rates of product loss and high selling prices to the final consumer.

Ghana has the opportunity, however, of learning from the cocoa subsector, where a guaranteed pricing mechanism has been used for the purchase of produce from farmers. This mechanism has been the most motivating factor for ensuring continuous production by farmers of cocoa. At present, the National Food Buffer Stock Company (NAFCO), established to stockpile grains for food security and emergencies, is using a guaranteed pricing mechanism to purchase produce from farmers. The offered prices are, however, determined solely by the company.

This programme will seek to improve and climate-proof marketing infrastructure including roads and other transport systems to facilitate easy handling and marketing of produce.

**Action:**

- 1.8.1 Climate-proof transportation between production and market centres.
- 1.8.2 Establish comprehensive pricing mechanisms for special food commodities in response to climate change.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Trade and Industry**, Metropolitan, Municipal and District Assemblies (MMDAs) (Local Government service), Ministry of Food and Agriculture (MoFA), CSIR, Ministry of Roads and Highways (Department of Feeder Roads), Ministry of Gender, Children and Social Protection; Federation of Associations of Ghanaian Exporters, the private sector, financial institutions, civil society organizations (NGOs and farmer-based organizations, etc.).

**Estimated Cost:** US\$500,000,000

## FOCUS AREA 1: DEVELOP CLIMATE-RESILIENT AGRICULTURE AND FOOD SECURITY SYSTEMS

### Programme 1.1: Institutional Capacity Development for Research and Dissemination

#### Action 1.1.1: Improve and harmonize research activities for climate-smart agriculture

Purpose of action: To improve coordination and synergies in research and development

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Functional platform for climate change research and development | <ul style="list-style-type: none"> <li>Integrated plan for climate change research and development</li> </ul> | <ul style="list-style-type: none"> <li>Document on integrated climate change research</li> </ul> | <ul style="list-style-type: none"> <li>Research institutes committed to work on platform</li> </ul> |

#### **Tasks:**

1.1.1.1 Assess current mechanisms for agriculture and climate change research to identify complementarities.

1.1.1.2 Establish a platform for coordinating innovative climate-change-related research for transformation of agriculture.

1.1.1.3 Support activities of agriculture and climate change research platform including resource mobilization for research.

#### **Outcomes:**

I. Well-coordinated agriculture and climate change research.

II. Complementary research activities resulting in increased effectiveness of research funding.

#### Action 1.1.2: Build institutional capacity to enhance research and development to support climate-smart agriculture

Purpose of action: To increase research and development activities

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Increased research capacity for climate change research and development. | <ul style="list-style-type: none"> <li>Number of qualified personnel available for climate research</li> <li>Institutions equipped with necessary resources for climate research</li> </ul> | <ul style="list-style-type: none"> <li>Personnel at post in research institutions and conducting climate change research</li> <li>Resources available and being used for research activities</li> </ul> | <ul style="list-style-type: none"> <li>Funds provided for capacity-building activities</li> <li>Limited interest in climate research</li> </ul> |

#### **Tasks:**

1.1.2.1 Assess capacity, including human resources and funding mechanisms, of research institutes for effective climate-change-related research for

| agricultural transformation research, to identify financing gaps<br>1.1.2.2 Develop and prepare costing for capacity development action plan<br>1.1.2.3 Support implementation of the institutional capacity development action plan  |  |  |  |
|---|--|--|--|
| <b>Outcome:</b><br>Increased availability of innovative climate-smart technologies and methodologies.   |  |  |  |
| <b>Action 1.1.3: Increase financial support for climate-smart agricultural research and development</b><br>Purpose of action: To expand and sustain research and development activities   |  |  |  |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Increased support for climate-smart agricultural research   | <ul style="list-style-type: none"> <li>Increased budget allocation to research in climate-smart agriculture</li> <li>Increased grants to support research for climate-smart agriculture</li> </ul> | <ul style="list-style-type: none"> <li>Sectoral and institutional annual estimated costs</li> <li>Research proposals accepted by granting organizations</li> </ul> | <ul style="list-style-type: none"> <li>Climate change mainstreamed into annual budgetary framework</li> <li>Adequate budgetary allocations</li> <li>Increased competition for limiting international funding for research</li> </ul> |
| <b>Tasks:</b><br>1.1.3.1 Make available inventories for climate-smart-agriculture-related technologies, identify gaps and identify priority areas for action.<br>1.1.3.2 Develop a well-coordinated climate-smart-agriculture-related research and development plan, complete with estimated costs.<br>1.1.3.3 Mainstream action plan in annual work plans and budget.<br>1.1.3.4 Undertake resource mobilization from international funds to complement Government of Ghana support. |  |  |  |
| <b>Outcomes:</b><br>Increased availability of climate-smart technologies to support adaptation and disaster risk reduction.   |  |  |  |
| <b>Action 1.1.4: Support dissemination of technologies for climate-smart agriculture and sustainable fisheries</b><br>Purpose of action: To ensure availability of relevant technology to farmers   |  |  |  |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Climate-smart agricultural technologies disseminated to end users   | Number and types of climate-smart agricultural technologies available to end users/beneficiaries   | <ul style="list-style-type: none"> <li>Information and training materials, demonstrations, etc.</li> </ul>   | <ul style="list-style-type: none"> <li>Technologies are user friendly and locally adaptable</li> <li>Funds for research cover dissemination</li> </ul>   |



**Tasks:**

- 1.1.4.1 Take stock of available (local and international) extension and information materials.
- 1.1.4.2 Adapt and develop a variety of relevant extension and information materials on technologies.
- 1.1.4.3 Train government extension staff and other extension service providers (CSOs) on technologies developed.
- 1.1.4.4 Support on-the-ground technology dissemination activities, for example to farmer field schools, farmer extension, etc.

**Outcomes:**

- I. Farmers integrate technologies into their production systems.
- II. Farmers experience increased productivity.
- III. Reduction in losses associated with unexpected extreme weather events.

**Programme 1.2: Development and Promotion of Climate-resilient Cropping Systems****Action 1.2.1: Conduct research into climate-resilient cropping systems**

Purpose of action: To increase availability of technologies for climate-resilient cropping systems

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>New cropping systems developed for all agro ecological zones | <ul style="list-style-type: none"> <li>• Number of new cropping systems and technologies developed</li> </ul> | <ul style="list-style-type: none"> <li>• Research reports</li> </ul> | <ul style="list-style-type: none"> <li>• Adequate funds provided to research activities</li> </ul> |

**Tasks:**

- 1.2.1.1 Develop an integrated proposal for climate-smart agricultural research and development with emphasis on cropping systems including pests and diseases.
- 1.2.1.2 Undertake expenditure review to identify funding gaps.
- 1.2.1.3 Provide funds to climate-smart-agricultural-related research activities.

**Outcome:**

Cropping systems more resilient to climatic change and variability.

**Action 1.2.2: Document and promote appropriate indigenous knowledge and best practices**

Purpose of action: To scale up use of good indigenous and traditional coping strategies

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification                                   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Good indigenous/ traditional practices identified and documented | <ul style="list-style-type: none"> <li>List of good indigenous practices documented</li> </ul> | <ul style="list-style-type: none"> <li>Reports</li> </ul> | <ul style="list-style-type: none"> <li>Relevant indigenous practices are available</li> </ul> |

**Tasks:**

- 1.2.2.1 Conduct a field assessment to identify all indigenous farming practices relevant to coping with climatic changes.
- 1.2.2.2 Undertake a participatory assessment of identified practices to ascertain their contribution to adaptation and resilience.
- 1.2.2.3 Document best practices for further improvement.
- 1.2.2.4 Disseminate best practices using various innovative platforms and media.

**Outcome:**

Farmers increasingly use indigenous best practices in their production systems.

**Action 1.2.3: Promote sustainable land management including enhanced adoption of conservation agriculture and agroforestry**

Purpose of action: To increase productivity of cropping systems on a sustainable basis and reduce greenhouse gas emissions

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Farmers use new cropping systems and improved land management practices | <ul style="list-style-type: none"> <li>Number of farmers using improved land management practices</li> <li>Cropping area under improved land management</li> <li>Percentage increase in vegetative cover of agriculture land</li> </ul> | <ul style="list-style-type: none"> <li>Survey reports</li> <li>GIS mapping reports</li> <li>Quarterly, half-yearly and annual reports</li> </ul> | <ul style="list-style-type: none"> <li>Land tenure supportive of farmer investment into land development</li> </ul> |

**Tasks:**

- 1.2.3.1 Identify, document and validate best practices and lessons learned from ongoing land management programmes.

- 1.2.3.2 Build extension capacity (staff training, materials development, provision of resources, etc.) to extend the promotion and adoption of best practices.
- 1.2.3.3 Support the adoption of best practices using a variety of extension methods, including farmer training, farmer-to-farmer extension, training of trainers e-extension, etc.

**Outcomes:**

- I. Farm productivity increases on a sustainable basis.
- II. Productivity losses due to unexpected climatic events decrease.
- III. Biodiversity in agriculture landscapes increases.

**Programme 1.3: Adaptation of Livestock Production Systems****Action 1.3.1: Undertake research and development of climate-resilient livestock production systems, including improved breeds, and pest and disease management**

Purpose of action: To make available climate-resilient animal production systems, including breeds tolerant to extreme conditions

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|--|--|--|---|
| <b><u>Output:</u></b><br>Improved livestock production systems, including breeds for all agro ecological zones | <ul style="list-style-type: none"> <li>Number of improved livestock production systems developed</li> <li>Number of improved breeds</li> </ul> | <ul style="list-style-type: none"> <li>Research reports</li> <li>Survey reports</li> </ul> | <ul style="list-style-type: none"> <li>Adequate funding provided for research activities</li> </ul> |

**Tasks:**

- 1.3.1.1 Develop an integrated proposal for research and development with emphasis on livestock systems including pests and diseases.
- 1.3.1.2 Undertake a review of estimated costs to identify funding gaps.
- 1.3.1.3 Provide funds to support research activities including valorization of indigenous breeds.

**Outcomes:**

Livestock production systems more resilient to climate change

**Action 1.3.2: Support the development of improved and nutritious feed, including pastures and fodder banks**

Purpose of action: To increase the availability of improved nutritious feed including pastures so as to improve the health and wellbeing, and consequent productivity, of farm animals.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Improved feed formulations and improved pastures developed   | <ul style="list-style-type: none"> <li>Number of technologies available to farmers</li> <li>Area under improved pasture</li> </ul> | <ul style="list-style-type: none"> <li>Information materials, demonstrations, etc.</li> <li>Surveys</li> </ul> | <ul style="list-style-type: none"> <li>Adequate funds to support development activities</li> <li>Access to land for pasture improvement</li> </ul> |
| <b>Tasks:</b><br>1.3.2.1 Conduct an assessment of the nutritional quality of available feed sources within the context of climate change and variability.<br>1.3.2.2 Facilitate collaborative efforts between government and the private sector to develop and produce improved animal feeds.<br>1.3.2.3 Conduct field assessments (including tenure) to identify suitable lands for development of improved pastures in areas of comparative advantage.<br>1.3.2.4 Support the development of improved pastures complete with year-round watering facilities. |  |  |  |
| <b>Outcomes:</b><br>I. Increased livestock productivity.<br>II. Reduced bush burning.<br>III. Reduced conflicts between crop and livestock producers.  |  |  |  |
| <b>Action 1.3.3: Establish a community-based livestock extension system</b><br>Purpose of action: To promote improved livestock management practices   |  |  |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Farmers use improved livestock management practices  | <ul style="list-style-type: none"> <li>Number of farmers using improved practices</li> </ul>                                       | <ul style="list-style-type: none"> <li>Survey reports</li> </ul>   | <ul style="list-style-type: none"> <li>Improved practices effectively disseminated</li> </ul>  |
| <b>Tasks:</b><br>1.3.3.1 Develop and promote policy to establish community-based livestock extension system.   |  |  |  |

1.3.3.2 Identify and train community livestock workers on improved management practices including disease management.

1.3.3.3 Equip and support trained community livestock workers to provide extension services including creating awareness.

**Outcomes:**

I. Livestock productivity increases on a sustainable basis.

II. Livestock mortality rates reduce.

## Programme 1.4: Support to Climate Change Adaptation Activities in Fisheries and Aquaculture

### Action 1.4.1: Support research and development in the improvement of capture and culture fisheries management

Purpose of action: To improve fisheries management under climate change conditions

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>New technologies and/or strategies to improve management of fisheries resources | <ul style="list-style-type: none"> <li>Number of technologies and/or strategies</li> </ul> | <ul style="list-style-type: none"> <li>Research reports and strategic documents</li> </ul> | <ul style="list-style-type: none"> <li>Adequate funds provided to support fisheries research activities</li> </ul> |

**Tasks:**

1.4.1.1 Review current fisheries (capture and culture) resources management to identify research needs in addressing the effects of climate change.

1.4.1.2 Develop research and development programme for effective management of resources and improvement of productivity.

1.4.1.3 Undertake a review of estimated costs to identify funding gaps.

1.4.1.4 Provide support to undertake fisheries resources management research and technology development.

**Outcomes:**

I. Improved and sustainable management of fisheries resources.

II. Improved management technology on aquaculture disseminated to fish farmers.

### Action 1.4.2: Support effective enforcement of regulations within fisheries environments

Purpose of action: To protect and improve management of fisheries resources

| Output/Tasks/Outcomes | Objectively Verifiable Indicators | Sources of Verification | Assumptions and Risks |
|-----------------------|-----------------------------------|-------------------------|-----------------------|
|-----------------------|-----------------------------------|-------------------------|-----------------------|

|  |   |   |   |
|--|---|---|---|
| <b>Output:</b><br>1.4.2: Reduction in bad and inappropriate fishing practices  | <ul style="list-style-type: none"> <li>Number of arrests and prosecutions within a stipulated period</li> </ul> | <ul style="list-style-type: none"> <li>Reports</li> </ul>       | <ul style="list-style-type: none"> <li>Law enforcement agencies have adequate resources</li> </ul>                    |
| <b>Tasks:</b><br>1.4.2.1 Disseminate widely the Fisheries Act, 2002, to create awareness at all levels.<br>1.4.2.2 Support law enforcement agencies to strictly enforce the provisions of the Fisheries Act.<br>1.4.2.3 Collaborate with Fish Farmers Association to regulate and monitor the activities of members.   |   |   |   |
| <b>Outcomes:</b><br>Fish populations and fish species diversity are increased.   |   |   |   |
| <b>Action 1.4.3: Promote and support the scaling up of the adoption of aquaculture technologies</b><br>Purpose of action: To increase fish production while reducing the pressure on natural resources   |   |   |   |
| <b>Output/Tasks/Outcomes</b>   | <b>Objectively Verifiable Indicators</b>  | <b>Sources of Verification</b>                                  | <b>Assumptions and Risks</b>  |
| <b>Output:</b><br>Increase in aquaculture activities   | <ul style="list-style-type: none"> <li>Number of farmers using aquaculture production systems</li> </ul>        | <ul style="list-style-type: none"> <li>Survey report</li> </ul> | <ul style="list-style-type: none"> <li>Credit facilities available to support the adoption of technologies</li> </ul> |
| <b>Tasks:</b><br>1.4.3.1 Develop a dissemination programme for the promotion of aquaculture technologies.<br>1.4.3.2 Develop the capacity of extension staff to effectively disseminate aquaculture technologies.<br>1.4.3.3 Establish a credit facility to support the adoption of aquaculture technologies, including the establishment or expansion of fingerling production centres. |   |   |   |
| <b>Outcomes:</b><br>I. Fish farms productivity increased, on sustainable basis.<br>II. Increased share of aquaculture production in the domestic market.<br>III. Reduction in national fish imports.<br>IV. Increase in fish stocks in natural water bodies (marine and fresh water).  |   |   |   |

**Action 1.4.4: Support the provision of post-harvest fish management infrastructure and other systems**

Purpose of action: To support a sustainable supply of fish on the local market

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b> Reduce post-harvest losses during peak harvesting period   | <ul style="list-style-type: none"> <li>Prices and species offered on the local market</li> </ul> | <ul style="list-style-type: none"> <li>Survey reports</li> </ul> | <ul style="list-style-type: none"> <li>Funds provided for infrastructure development</li> </ul> |
| <b>Tasks:</b><br>1.4.4.1 Develop a comprehensive programme for the creation of sustainable post-harvest infrastructure (for example, using renewable energy sources) in fishing communities.<br>1.4.4.2 Disseminate improved post-harvest management technologies to enhance the shelf life and quality of fish.<br>1.4.4.3 Build the capacity of fish processors to apply improved post-harvest management technologies, through the establishment of technology incubation centres to provide the necessary advisory support .<br>1.4.4.4 Provide credit facilities to support fish processors. |  |  |   |
| <b>Outcomes:</b><br>I. Year-round availability of diversified fish species on the local market.<br>II. Diversified fish products developed for the local market.<br>III. Reduction in national fish imports.  |  |  |   |

**Programme 1.5: Support to Water Conservation and Irrigation Systems****Action 1.5.1: Develop multi-purpose water harvesting and storage facilities**

Purpose of action: To harvest, store and conserve rainwater for future use and reduce the potential risk of flooding

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Water harvesting and storage infrastructure | <ul style="list-style-type: none"> <li>Number of harvesting and storage facilities built</li> </ul> | <ul style="list-style-type: none"> <li>Field visits and monitoring reports</li> <li>Survey reports</li> </ul> | <ul style="list-style-type: none"> <li>Listed as priority in district development plans</li> </ul> |

**Tasks:**

- 1.5.1.1 Conduct flood and drought mapping exercises to identify potential locations for water harvesting and storage infrastructure.
- 1.5.1.2 Conduct an assessment of technologies (local and international) and design of water harvesting and storage infrastructure for various purposes.
- 1.5.1.3 Allow for the construction and management of water harvesting and storage infrastructure within MMDA medium-term development plans.
- 1.5.1.4 Construct water harvesting and storage infrastructure.
- 1.5.1.5 Advocate for a policy that includes water harvesting in the building code.

**Outcomes:**

- I. Increased availability of water for multiple uses.
- II. Reduction in the risk potential of flood-related disasters.
- III. Diversification of sources of household income.

**Action 1.5.2: Promote in-field water harvesting and conservation**

Purpose of action: To ensure efficient use of rainwater for crop production

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification                                     | Assumptions and Risks  |
|---|--|---|--|
| <b><u>Output:</u></b><br>Farmers use in-field water conservation technologies | <ul style="list-style-type: none"> <li>• Number of farmers using in-field water conservation technologies</li> <li>• Types of in-field water harvesting technologies being used</li> </ul> | <ul style="list-style-type: none"> <li>• Reports</li> </ul> | <ul style="list-style-type: none"> <li>• Variety of technologies available to farmers</li> </ul> |

**Tasks:**

- 1.5.2.1 Develop a manual of in-field water harvesting and conservation technologies.
- 1.5.2.2 Build capacity of extension service providers to disseminate technologies to farmers.
- 1.5.2.3 Support the dissemination of technologies to farmers.

**Outcomes:**

- I. Increased efficiency of rainwater use.
- II. Reduced water stress-related crop failures.



**Action 1.5.3: Expand small-scale irrigation development**

Purpose of action: To increase irrigation of agricultural production

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Increase in small-scale irrigation infrastructure | <ul style="list-style-type: none"> <li>Number of small-scale irrigation facilities</li> </ul> | <ul style="list-style-type: none"> <li>Reports, surveys</li> </ul> | <ul style="list-style-type: none"> <li>Law enforcement agencies well resourced to safeguard the equipment or the increased crop yields</li> </ul> |

**Tasks:**

- 1.5.3.1 Conduct an assessment of the irrigation potential in all agro ecological zones.
- 1.5.3.2 Prepare a small-scale irrigation development plan.
- 1.5.3.3 Develop small-scale irrigation facilities.
- 1.5.3.4 Undertake capacity-building for farmers for the management of the irrigation facilities.

**Outcomes:**

- I. Increase in irrigated agricultural practices and increased yields.
- II. Reduction in percentage of crop losses.

**Action 1.5.4: Enhance extension support for small-scale irrigated agriculture operations**

Purpose of action: To increase irrigation efficiency at farm level

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b><br>Use of efficient irrigation technologies by farmers | <ul style="list-style-type: none"> <li>Number and types of technologies</li> </ul> | <ul style="list-style-type: none"> <li>Survey reports</li> </ul> | <ul style="list-style-type: none"> <li>Farmers able to access technologies</li> </ul> |

**Tasks:**

- 1.5.4.1 Develop a manual of available improved irrigation practices (technologies and methods).
- 1.5.4.2 Develop capacity of extension staff to effectively disseminate information on improved irrigation practices.
- 1.5.4.3 Establish a financial mechanism to support the adoption by farmers of irrigation technologies.

**Outcomes:**

- I. Increased efficiency of water use through the introduction of irrigation.
- II. Increase production from small-scale irrigated agriculture.
- III. Increased household incomes.

**Programme 1.6: Risk Transfer and Alternative Livelihood Systems****Action 1.6.1: Develop and establish agriculture- and fisheries-based insurance schemes**

Purpose of action: To support the transfer of agriculture-associated risks

| Output/Tasks/Outcomes                                      | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Functional agricultural insurance scheme | <ul style="list-style-type: none"> <li>Number of farmers registered on the scheme</li> <li>Number of farmers who have benefited from the scheme</li> </ul> | <ul style="list-style-type: none"> <li>Database of insurance companies, farmer surveys and monitoring reports</li> </ul> | <ul style="list-style-type: none"> <li>Insurance and financial institutions are willing to participate in the scheme</li> </ul> |

**Tasks:**

- 1.6.1.1 Conduct a study to map out potential agriculture-associated risks.
- 1.6.1.2 Collaborate with relevant stakeholders (including micro-credit institutions) to design a risk transfer mechanism (including traditional risk transfer).
- 1.6.1.3 Create awareness and disseminate details of scheme to target beneficiaries.
- 1.6.1.4 Implement the scheme.

**Outcome:**

Reduction in disruption of household livelihoods due to extreme weather events.

**Action 1.6.2: Support alternative livelihood programmes**

Purpose of action: To expand the scope and income sources of households.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks |
|---|---|--|-----------------------|
| <b>Output:</b><br>1.6.2: Increased access to alternative livelihood options | <ul style="list-style-type: none"> <li>Number of farmers accessing alternative livelihood options</li> <li>Number and type of alternative livelihood options available</li> </ul> | <ul style="list-style-type: none"> <li>Reports, surveys</li> </ul> |                       |

**Tasks:**

- 1.6.2.1 Map out and assess ongoing alternative livelihood programmes to determine their relevance.
- 1.6.2.2 Develop an integrated, multi-stakeholder alternative livelihood support programme.
- 1.6.2.3 Build institutional capacity for the implementation of the programme.
- 4.6.2.4 Implement alternative livelihood support programme.

**Outcomes:**

- I. Increased resilience of rural household income sources.
- II. Reduction in seasonal rural–urban migration.

**Programme 1.7: Improved Post-harvest Management****Action 1.7.1: Support the provision of processing and storage infrastructure**

Purpose of action: To ensure medium- to long-term storage of food commodities

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Processing and storage facilities available | <ul style="list-style-type: none"> <li>• Number and location of the facilities</li> </ul> | <ul style="list-style-type: none"> <li>• Field surveys and monitoring reports</li> </ul> | <ul style="list-style-type: none"> <li>• Funds are available</li> </ul> |

**Tasks:**

- 1.7.1.1 Conduct a study to map out existing available processing and storage facilities and their condition.
- 1.7.1.2 Conduct needs assessment of facilities within each MMDA.
- 1.7.1.3 Develop a programme to undertake the rehabilitation of existing facilities and the provision of new ones.
- 1.7.1.4 Facilitate the establishment of public-private partnerships for the implementation of the programme.
- 1.7.1.5 Implement the infrastructure provisioning programme.

**Outcomes:**

- I. Reduction in post-harvest losses of staple food commodities.
- II. Increased food security.
- III. Improved household incomes.

**Action 1.7.2: Promote value addition to perishable commodities**

Purpose of action: To ensure year-round availability of commodities

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks |
|---|---|---|-----------------------|
| <b>Output:</b><br>Variety of forms of various food commodities  | <ul style="list-style-type: none"> <li>Number of forms of various food commodities</li> </ul> | <ul style="list-style-type: none"> <li>Recipes, market surveys</li> </ul> |                       |
| <b>Tasks:</b><br>1.7.2.1 Enhance support for research into technologies for value addition.<br>1.7.2.2 Establish technology incubation centres for training of private entrepreneurs.<br>1.7.2.3 Establish financial mechanism to support the operations of graduates of technology incubation centres.<br>1.7.2.4 Sustain awareness on consumption of value added forms of food items. |   |   |                       |
| <b>Outcomes:</b><br>I. Increased variety of forms of various food commodities.<br>II. Improved food security.<br>III. Diversified income sources for households.  |   |   |                       |

**Programme 1.8: Improved Marketing Systems****Action 1.8.1: Climate-proof transportation between production and market centres**

Purpose of action: To reduce the cost of transportation and losses

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b> Improved transportation of food commodities  | <ul style="list-style-type: none"> <li>Number of hours of travel between production and market centre</li> </ul> | <ul style="list-style-type: none"> <li>Field surveys and monitoring reports</li> </ul> | <ul style="list-style-type: none"> <li>Funds provided for roads maintenance, and expansion</li> </ul> |
| <b>Tasks:</b><br>1.8.1.1 Facilitate ease of carting farm produce to the nearest aggregation sites (main road).<br>1.8.1.2 Prioritize the construction or improvement of roads linking production and market centres.<br>1.8.1.3 Undertake construction and/or improvement of prioritized roads.<br>1.8.1.4 Develop a programme to improve other modes of transport including water and rail.<br>1.8.1.5 Facilitate the acquisition of specialized vehicles by transport companies for carting food commodities. |  |  |   |

**Outcomes:**

- I. Reduction in post-harvest losses.
- II. Reduction in fluctuations in food prices.
- III. Increased food security.

**Action 1.8.2: Establish comprehensive pricing mechanisms for special food commodities in response to climate change**

Purpose of action: To ensure year-round availability of commodities and improved income for farmers

| Output/Tasks/Outcomes                           | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|---|---|--|--|
| <b>Output:</b><br>Relatively stable food prices | <ul style="list-style-type: none"> <li>• Prices of food commodities at different periods</li> </ul> | <ul style="list-style-type: none"> <li>• Market surveys</li> </ul> | <ul style="list-style-type: none"> <li>• Market players respect established mechanism</li> </ul> |

**Tasks:**

- 1.8.2.1 Review current pricing mechanisms for food commodities and other agriculture produce.
- 1.8.2.2 Develop proposals for establishing an acceptable pricing mechanism based on agreed standards.
- 1.8.2.3 Identify and facilitate the development of agricultural marketing cooperatives.
- 1.8.2.4 Validate and implement the proposed pricing mechanism.
- 1.8.2.5 Undertake sustained awareness-raising on adopted pricing mechanism to ensure acceptance.

**Outcomes:**

- I. Reduction in food price fluctuations.
- II. Reduction in conflicts between sellers and buyers.
- III. Uniformity in pricing of commodities within locations.

## Summary

### Timeline

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 1: Agriculture and Food Systems  |       |  | Lead Org    | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Budget US\$        |
|--|-------|--|-------------|------|---|------|---|------|---|------|---|------|---|------|---|--------------------|
|  |       |  |             | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                    |
| <b>Programme Area 1.1: Institutional capacity development for research and dissemination</b> |       |  | <b>CSIR</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>35,000,000</b>  |
| Actions  | 1.1.1 | Improve and harmonize research activities for climate-smart agriculture  |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
|  | 1.1.2 | Build institutional capacity to enhance research and development to support climate-smart agriculture  |             | x    | x |      | x |      | x |      | x |      | x |      | x |                    |
|  | 1.1.3 | Increase financial support for climate-smart agricultural research and development   |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
|  | 1.1.4 | Support dissemination of technologies for climate-smart agriculture and sustainable fisheries  |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
| <b>Programme Area 1.2: Development and promotion of climate-resilient cropping systems</b>   |       |  | <b>MoFA</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>150,000,000</b> |
|  | 1.2.1 | Conduct research into climate-resilient cropping systems   |             | x    |   | x    |   | x    |   | x    |   | x    |   | x    |   |                    |
|  | 1.2.2 | Document and promote appropriate indigenous knowledge and best practices   |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
|  | 1.2.3 | Promote sustainable land management including enhanced adoption of conservation agriculture and agroforestry                                     |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
| <b>Programme Area 1.3: Adaptation of livestock production systems</b>                        |       |  | <b>MoFA</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>15,000,000</b>  |
|  | 1.3.1 | Undertake research and development of climate-resilient livestock production systems, including improved breeds, and pest and disease management |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
|  | 1.3.2 | Support the development of improved and nutritious feed, including pastures and fodder banks   |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |
|  | 1.3.3 | Establish a community-based livestock extension system   |             | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                    |

|   |       |   |              |   |   |   |   |   |   |   |   |   |   |   |   |  |                    |
|---|-------|---|--------------|---|---|---|---|---|---|---|---|---|---|---|---|--|--------------------|
| <b>Programme Area 1.4: Support to climate change adaptation activities in fisheries and aquaculture</b> |       |   | <b>MOFAD</b> |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>45,000,000</b>  |
|   | 1.4.1 | Support research and development in the improvement of capture and culture fisheries management       |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.4.2 | Support effective enforcement of regulations within fisheries environments                            |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.4.3 | Promote and support the scaling up of the adoption of aquaculture technologies                        |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.4.4 | Support the provision of post-harvest fish management infrastructure and other systems                |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
| <b>Programme Area 1.5: Support to water conservation and irrigation systems</b>                         |       |   | <b>MMDA</b>  |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>50,000,000</b>  |
|   | 1.5.1 | Develop multi-purpose water harvesting and storage facilities   |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.5.2 | Promote in-field water harvesting and conservation  |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.5.3 | Expand small-scale irrigation development   |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.5.4 | Enhance extension support for small-scale irrigated agriculture operations                            |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
| <b>Programme Area 1.6: Risk transfer and alternative livelihood systems</b>                             |       |   | <b>MoFA</b>  |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>55,000,000</b>  |
|   | 1.6.1 | Develop and establish agriculture- and fisheries-based insurance schemes                              |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.6.2 | Support alternative livelihood programmes   |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
| <b>Programme Area 1.7: Improved post-harvest management</b>   |       |   | <b>MoFA</b>  |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>100,000,000</b> |
|   | 1.7.1 | Support the provision of processing and storage infrastructure  |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.7.2 | Promote value addition to perishable commodities  |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
| <b>Programme Area 1.8: Improved marketing systems</b>   |       |   | <b>MOTI</b>  |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>500,000,000</b> |
|   | 1.8.1 | Climate-proof transportation between production and market centres                                    |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |
|   | 1.8.2 | Establish comprehensive pricing mechanisms for special food commodities in response to climate change |              | x | x | x | x | x | x | x | x | x | x | x | x |  |                    |

## Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 1: Agriculture and Food Systems</b>  | <b>Lead Org</b> | <b>2015</b> | <b>2016</b> | <b>2017</b>  | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|---|-----------------|-------------|-------------|--------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 1.1: Institutional capacity development for research and dissemination</b>            | <b>CSIR</b>     | 2,916,668   | 2,916,666   | 5,833,333.00 | 5,833,333   | 8,750,000   | 8,750,000   | <b>35,000,000</b>          |
| <b>Programme Area 1.2: Development and promotion of climate-resilient cropping systems</b>              | <b>MoFA</b>     | 40,000,000  | 30,000,000  | 25,000,000   | 20,000,000  | 20,000,000  | 15,000,000  | <b>150,000,000</b>         |
| <b>Programme Area 1.3: Adaptation of livestock production systems</b>                                   | <b>MoFA</b>     | 4,000,000   | 3,500,000   | 2,500,000    | 2,000,000   | 1,500,000   | 1,500,000   | <b>15,000,000</b>          |
| <b>Programme Area 1.4: Support to climate change adaptation activities in fisheries and aquaculture</b> | <b>MOFAD</b>    | 11,250,000  | 11,250,000  | 7,500,000    | 7,500,000   | 3,750,000   | 3,750,000   | <b>45,000,000</b>          |
| <b>Programme Area 1.5: Support to water conservation and irrigation systems</b>                         | <b>MMDA</b>     | 15,000,000  | 10,000,000  | 8,500,000    | 7,500,000   | 5,500,000   | 3,500,000   | <b>50,000,000</b>          |
| <b>Programme Area 1.6: Risk transfer and alternative livelihood systems</b>                             | <b>MoFA</b>     | 17,000,000  | 12,000,000  | 8,500,000    | 7,500,000   | 6,500,000   | 3,500,000   | <b>55,000,000</b>          |
| <b>Programme Area 1.7: Improved post-harvest management</b>   | <b>MoFA</b>     | 25,000,000  | 25,000,000  | 16,666,666   | 16,666,668  | 8,333,333   | 8,333,333   | <b>100,000,000</b>         |
| <b>Programme Area 1.8: Improved marketing systems</b>   | <b>MOTI</b>     | 125,000,000 | 125,000,000 | 83,333,333   | 83,333,333  | 41,666,666  | 41,666,668  | <b>500,000,000</b>         |





## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 2: Build Climate-resilient Infrastructure**

## Policy Focus Area 2: Build Climate-resilient Infrastructure

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### Introduction

Disaster preparedness and response programmes and actions, especially with regard to climate change, have to be integrated into and mainstreamed in the national policy planning and budgeting process of Ghana for a number of reasons, including the following:

- The severely disruptive effects of disasters strike almost all sectors of the economy. A single disaster can wipe away decades of development. For instance, flooding can destroy farms, food stores, livestock, buildings, roads, and utility and service facilities; it can disrupt socioeconomic activities, and can even result in casualties.
- Disasters that Ghana frequently experiences include flooding, windstorm, rainstorm, drought and bushfires. About 85 per cent of the resources and efforts of the National Disaster Management Organisation (NADMO) are used to address issues related to hydro-meteorological disasters.
- Ghana's economy largely relies on climate-sensitive sectors, in particular agriculture, energy and forestry. Agriculture is currently one of the biggest contributors to Ghana's Gross Domestic Product (GDP). Approximately 70 per cent of the population depends directly or indirectly on agriculture (fisheries, crops and livestock farming). Any climate-related disaster is, therefore, likely to affect the economy of Ghana, especially that of the more vulnerable rural communities who depend largely on rain-fed agriculture and comprise the majority of the population.
- Climate change and climate variability may pose serious challenges to national development and achievement of the

Millennium Development Goals (MDGs) if mechanisms are not put in place to ensure resilience in development.

- Ghana is a signatory to a number of global interventions on climate change and disasters. For example, Ghana is a party to the United Nations Framework Convention on Climate Change (UNFCCC), by which national governments are expected to take climate change issues into consideration in national development planning. The Hyogo Framework for Action (HFA), 2005–2015, on the other hand, aims at reducing substantially the number of casualties as well as the socioeconomic and environmental losses resulting from disasters.
- Ghana has demonstrated serious commitment to poverty reduction and sustainable development through initiatives such as the Ghana Poverty Reduction Strategy (GPRS) and the Ghana Shared Growth and Development Agenda (GSGDA), 2010–2013 and 2014–2017.

### Challenges

Challenges faced include but are not limited to:

- Insufficient attention given to integrating climate change and its consequent disasters into Ghana's national development planning and budgeting process
- Duplication of effort and limited allocation of resources to climate change activities
- Inadequate capacity and ineffective coordination at all levels (national, sectoral, district)
- A low level of awareness of hazards and knowledge about how to manage them

- The high level of poverty, especially in the most vulnerable communities
- Inadequate capacity

### **Current Status**

The Environmental Protection Agency (EPA) in conjunction with the National Development Planning Commission (NDPC) is working closely with all ministries, departments and agencies (MDAs) to mainstream climate change in their plans and the estimated costing process. The focus here is on how to weave needs related to climate change into other socioeconomic activities and determine a complete development strategy for the various sectors.

### **Way Forward**

- Effectively mainstream climate change and disaster risk reduction issues into Ghana's national policy planning and budgetary issues to build a society resilient to disasters for sustainable development.
- To develop consensus, build capacity and adopt a participatory approach to climate change and disaster risk reduction issues at all times.

### **Mainstreaming at the National Level**

Effective mainstreaming of climate change and disaster risk reduction issues requires that they be integrated into all levels of the planning framework that will eventually result in the implementation of climate change and disaster risk reduction programmes and activities. In effect, mainstreaming is seen as a concerted effort to influence processes, policies and programmes that have a significant bearing particularly on climate change with the aim of making them more "climate friendly".

The term "national level" refers mainly to the medium-term development plans, which are based on the broad national policy framework and plans. This is a way to promote effective

disbursement of funds to, and control of resources at, all levels (national, sectoral, district). Sectoral and district policies, plans and programmes are all fused into the national policy document.

### **How to Mainstream Climate Change and Disaster Risk Reduction at the National Level**

Mainstreaming has been considered at the four main processes, that is: Policy Formulation and Planning, Estimated Costing, Implementation, and Monitoring and Evaluation. The following five major steps are to be undertaken at the policy formulation and planning stage:

- Review of policies, plans, programmes and projects
- Composition of cross-sectoral planning group (CSPG)
- Public consultation
- Approval of national policy
- Dissemination of final national policy

### **Review of Policies, Plans, Programmes and Projects**

The review focuses on, among other things, annual programme reports, socioeconomic impact assessments, set targets, awareness-raising and capacity development, strategic environmental assessments (SEA) and other sectoral strategies and studies that are of relevance. The aim is to be able to draft a working paper on a national policy framework for the consideration of other relevant stakeholders.

### **Composition of Cross-Sectoral Planning Group (CSPG)**

The membership of the group should be well chosen and should include representatives from the ministries, departments and agencies of central government, development partners, non-governmental organizations (NGOs) and specialized institutions, individual experts and professionals in related fields, and at least one specialist in climate change and disaster risk reduction who will be in a position to explain further to the other group members the need to integrate climate change and disaster risk reduction issues into the review

process. The group should refer to sectoral draft policies provided by the members, as well as relevant policies from other countries. It is expected that the planning group would produce a review of a national policy framework that incorporates climate change and disaster risk reduction issues. In a nutshell, the input of this group should summarize the concerns of the nation with regard to the national development agenda.

### **Public Consultation**

Workshops, meetings, and seminars have to be organized for various stakeholders including community-based organizations (CBOs), NGOs, faith-based organizations (FBOs) and civil society organizations (CSOs), including people with disabilities, organized professional bodies, traditional authorities and trade unions; development partners; and government including the executive branch, the legislature and the judiciary. For effective mainstreaming, it is necessary for these groups to be educated on the impact of climate change and disaster risk reduction on national development to enable members of the above-mentioned groups to make an input and take a policy direction. Public consultation is necessary to facilitate the understanding, awareness and successful implementation of the climate change and disaster risk reduction programmes and activities.

### **Approved National Policy Framework**

Before the National Policy Framework is approved as a working document, it is necessary to ensure that issues related to climate change and disaster risk reduction are prominently featured. The need to address climate change and disaster risk reduction issues has to be accepted as a national priority and a sine qua non to sustainable development.

### **Dissemination of Final National Climate Change Policy**

The approved National Policy Framework will be disseminated nationwide to create awareness of the policies, and also to inform

citizens of government priorities. The responsible ministries, departments and agencies and stakeholders should verify that their programmes and activities in relation to climate change and disaster risk reduction have been fully captured in the document.

### **Estimated Costing, Implementation, and Monitoring and Evaluation**

Estimating the cost of programmes, actions and tasks follows the Medium-term Expenditure Framework (MTEF) costing process, which links estimated costs to policy. There are four budget lines (categories of expenditure), these being: Administration, Personnel Emoluments, Service, and Investment.

#### **Estimated Costing**

The estimated costing process involves preparation and approval stages:

##### Preparation Stage

- Revision of economic indicators, with climate change and disaster risk reduction indicators captured.
- Determination of actual allocated funding, including climate change and disaster risk reduction funds.
- Preparation and circulation of estimated costing guidelines by the Ministry of Finance and Economic Planning (MoFEP) with sectoral budgets by ministries, departments and agencies approved by the cabinet.
- Verification that the budget allows for climate change and disaster risk reduction issues.
- Revision of ministry, department and agency policies, programmes, and project implementation plans, to include climate change and disaster risk reduction issues.
- Cross-sectoral policy hearing held at MoFEP with emphasis on climate change and disaster risk reduction issues. Danger

highlighted of not prioritizing climate change and disaster risk reduction issues with regard to sustainable development.

#### Approval

- Parliamentary hearing of ministry, department and agency cost estimates. Parliamentarians must be made aware that climate change and disaster risk reduction issues cannot be compromised.
- Presentation of estimates and the passage of the necessary appropriations bills by Parliament must, without fail, include climate change and disaster risk reduction issues.

#### **Implementation**

- Prepare general work description to cover personnel emoluments and administration expenses, and estimated monthly expenditure based on the work plan, procurement plan and cash plan for services and investment featuring climate change and disaster risk reduction issues.
- Request release of funds to implement activities including those related to climate change and disaster risk reduction.
- Carry out climate change and disaster risk reduction activities (based on the approved programme of action) for which funds have been released.

#### **Monitoring and Evaluation**

- Conduct weekly, monthly, quarterly and mid-year reviews of projects and activities with emphasis on climate change and disaster risk reduction issues. Monitoring will focus on the set targets and timelines stated in the work plan.
- Carry out annual review of expenditure against budget, and economic indicators, focusing on climate change and disaster risk reduction issues.

#### **General strategies include but are not limited to the following:**

- Prioritize issues and programmes based on impacts, social needs assessments, and funding available and estimated costs.
- Promote community and individual participation and information-sharing.
- Adopt a participatory approach in programme identification, policy formulation, and project planning, costing and implementation.
- Develop performance review formats.
- Ensure timely access to benefits of the programmes by target groups.
- Maximize beneficial impacts at all levels (national, sectoral, district).
- Develop appropriate work plans for each programme activity and put in place follow-up procedures, subject to availability of resources.
- Develop suitable programme of action and related budget featuring climate change and disaster risk reduction.
- Ensure effective monitoring and evaluation.
- Build on capacity and expertise.

#### **Programme Areas**

##### **Mainstreaming Current Themes, Programmes and Actions**

The current themes, of (i) building climate-resilient infrastructure, and (ii) increasing the resilience of vulnerable communities to climate-related risks, and their corresponding programmes, actions and tasks will be mainstreamed into the national development policy based on the foregoing processes and approaches. However, special emphasis will be given to the following strategies:

- Identifying targets of the mainstreaming process.

- Evaluating the impact of climate change on socioeconomic, sectoral and local development strategies and plans.
- Evaluating awareness of and capacity for mainstreaming in the context of the themes.
- Evaluating the possible impacts (both negative and positive) of the mainstreaming process.
- Developing strategies and mechanisms for mainstreaming in thematic areas including financial, economic and policy aspects.

The application of ecosystem management for disaster risk reduction and climate change adaptation is accepted by the Government of Ghana as an area of “no regrets” investment. Sustainable ecosystems management affects all three fundamental elements of disaster risk – hazards, exposure and vulnerability. The United Nations Environment Programme (UNEP) has established that factoring (mainstreaming) environmental sustainability and risk reduction into public investments and development planning reduces loss and damage while supporting social development investments and development planning and tackling drivers of risk.

## Programme 2.1: Build Capacity to Design Climate-resilient Infrastructure

**Objective:** To ensure appropriate design and construction of climate-resilient infrastructure.

**Justification:**

Climate-related disasters invariably affect the infrastructure of a country. However, the development of infrastructure should take into account climate change and the occurrence of climate-related disasters. Good design and planning ensure proper road networks, effective use of utilities, and alignment of houses to allow for natural phenomena such as sea-level rise, temperature change, flooding, and wind- and rainstorms. Population density notwithstanding, Ghana's urban population is expected to increase from 52 per cent of the total population in 2010 to around 65 per cent in 2030 based on a projected urban rate of increase of around 3 per cent per year. The Greater Accra Region alone constitutes 16.3 per cent of the total population of Ghana with an annual growth rate of 3.1 per cent (2.5 per cent is the annual intercensal average); and with an urban and rural population of 90.5 per cent and 9.5 per cent, respectively. The Greater Accra Metropolitan Area constitutes 7.5 per cent of the population of Ghana (2010 census: Ghana Statistical Service). The number of people living in slums in Ghanaian cities was estimated at 5 million, with a growth rate of 1.8 per cent per annum in 2001. This situation is pronounced in Accra, Kumasi and Tamale (see *Ghana Shared Growth and Development Agenda (GSGDA), 2010–2013, Vol. 1 – Policy Framework*, December, 2010). This puts pressure on the existing infrastructure.

The peri-urban communities, occupied by migrant settlers and low-income urban dwellers, have deplorable conditions in respect of infrastructure, services and housing quality. The impact of climate-related hazards such as floods is significant due to the weak infrastructure resulting from poor planning and decision-making, and

the lack of appropriate building codes and design standards and methods.

The infrastructure considered in this programme includes buildings (such as living and office accommodation, schools, hospitals, churches, mosques, recreational facilities and shopping malls), roads and drains.

**Action:**

- 2.1.1 Ensure that design standards, relevant codes (for example, the Building Code and regulations, and electricity rules and regulations) and spatial planning include parameters related to climate change and variability, and future scenarios.
- 2.1.2 Strengthen the administrative and technical capacity of stakeholder organizations in the planning, design, building and construction industry to integrate climate change adaptation and disaster risk reduction in their development agenda.
- 2.1.3 Support research into appropriate infrastructure design standards for climate-related events.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Water Resources, Works and Housing (MWRWH) and Ministry of Local Government and Rural Development (MLGRD), Ministry of Environment, Science, Technology and Innovation (MESTI), Building and Road Research Unit (BRRI), Environmental Protection Agency (EPA), Metropolitan, Municipal and District Assemblies (MMDAs), Ministry of Roads and Highways (MRH), National Disaster Management Organisation (NADMO), other ministries, departments and agencies, Savannah Accelerated Development Authority (SADA); Architectural & Engineering Services Limited (AESL); Ghana Institution of Engineers (GhIE), Health Improvement and Promotion Alliance, Ghana (HIP), Ghana Health Informatics Association (GHIA), Ghana Institution of Surveyors (GhIS), other professional bodies; United Nations agencies, non-governmental organizations (NGOs).



**Estimated Cost:** US\$10,500,000

## **Programme 2.2: Knowledge Management and Coordination**

**Objective:** To ensure that knowledge on climate change risks and climate change adaptation is authentic, is given importance, and is easily accessible.

### **Justification:**

Climate-related disasters, including floods and bush fires, affect many sectors in the national development agenda, such as agriculture, forestry, energy, health, transport, education, water resources and human settlement. Managing the risks associated with climate change events, therefore, requires a multisectoral, multi-disciplinary approach. High professional standards and adequate resources are essential for the production of reliable scientific data and information. Unfortunately, some institutions still maintain knowledge and technology in forms that need to be effectively organized for proper management and access.

Terminologies, methodologies and approaches in data capture and analysis, and modelling of climate hazards, need to be harmonized in line with international best practices. Extensive collections of data and information may be readily available from established scientific agencies within the country and from international agencies such as the World Meteorological Organization. In addition, the rich knowledge of individual experts on climate change adaptation could be harnessed through a community of practice. In all cases, access to knowledge should be made easy through the use of internet facilities. Knowledge on climate change adaptation should also be made a priority through effective coordination.

### **Action:**

- 2.2.1 Improve institutional coordination in hydro-meteorological networks to provide better climate data and information that is easily accessible to the general public.
- 2.2.2 Use information and communications technology (ICT) in monitoring and evaluating climate events and providing an early warning system.
- 2.2.3 Support the establishment of a community of practice as a knowledge management tool at all levels (national, regional, district).
- 2.2.4 Develop and improve upon mechanisms for effective coordination of climate change adaptation and disaster risk reduction at the national, regional and local levels.

**Timeline:** 2015–2020

### **Responsibility:**

**Ghana Meteorological Agency (GMet)**, NADMO, EPA, MESTI, Hydrological Services Department (HSD), Centre for Remote Sensing and Geographic Information System (CERSGIS), Geological Survey Department (GSD), MLGRD, National Media Commission, NDPC, SADA, Savanna Agricultural Research Institute (SARI), Volta River Authority (VRA), Bui Power Authority (BPA), Water Resources Commission (WRC), MWRWH, Ministry of Information and Media Relations (MIMR), MoFEP, Ministry of Health (MOH), CSIR, universities and other research institutions, MMDAs, Regional Coordinating Councils (RCC); United Nations agencies, Africa Adaptation Programme (AAP), World Bank, World Meteorological Organization (WMO), Economic Community of West African States (ECOWAS); NGOs; stakeholder institutions.

**Estimated Cost:** US\$6,500,000



### Programme 2.3: Climate-resilient Sectoral and Local Development Planning

**Objective:** To ensure that climate change adaptation is an integral part of the sectoral and local development agenda.

**Justification:**

The impact of climate change and climate variability in Ghana is real and could be disastrous. Floods (riverine, urban and coastal) and coastal erosion have in recent years devastated many communities. Lives have been lost, infrastructure has been destroyed and at times a whole community has had to be resettled. This poses a challenge for sectoral and urban planning, since there is no sector (for example, health, transport, education, agriculture) that is not affected directly or indirectly. To mitigate the effects therefore calls for a multi-faceted, multidisciplinary, multisectoral, all-hazard and fully participatory approach, as opposed to ad hoc measures in response to emergencies.

There is an urgent need to develop, strengthen and adopt policies to ensure that climate change adaptation and disaster risk reduction are given priority at the local level, with strong involvement of local actors – these are the victims of disasters and form the institutional basis for implementation. To achieve climate resilience, effective mechanisms and institutional framework are needed, where climate change (adaptation and mitigation) are factored into all facets of national development planning and budgeting at the local level.

**Action:**

- 2.3.1 Develop and strengthen intersectoral linkages and collaboration for effective climate change adaptation and mitigation.
- 2.3.2 Provide an enabling policy environment to include and enforce climate resilience in land-use planning, construction, and codes and regulations.
- 2.3.3 Develop competencies of local authorities and communities on hazard, vulnerability and risk assessment.

- 2.3.4 Encourage private sector participation in climate change adaptation and mitigation at the local level.

**Timeline:** 2015–2020

**Responsibility:**

**National Development Planning Commission (NDPC) and Ministry of Water Resources, Works and Housing (MWRWH),** EPA, GMet, MESTI, MLGRD, MoFEP, MDAs, MMDAs, NADMO, academia and research institutions, Ghana Standards Authority, Attorney General's Department, Ministry of the Interior (MINT), SADA, WRC; United Nations Development Programme (UNDP); AESL, development partners, CSOs, NGOs, professional bodies, private sector.

**Estimated Cost:** US\$20,000,000

### Programme 2.4: Ensure that Existing Key Infrastructure is Climate proof

**Objective:** To retrofit existing key infrastructure to make it climate resilient.

**Justification:**

The general effective design and construction practice incorporates extensive specialist techniques to reduce the impact of natural hazards upon physical structures. In Ghana, the absence of a national building code and regulations governing approved design and construction practice, coupled with limited supervision, has contributed to unsafe infrastructure. The problem is compounded by the poor maintenance culture.

The result is that most of the existing key infrastructure, such as schools, hospitals, and roads, needs extensive retrofitting to make it climate proof. Climate-related hazards such as windstorms, heavy rainfall, floods and fires, have a different impact on different

components of infrastructure. For instance, windstorm may affect the roof of a building, while floods may affect the foundations and parts of the superstructure. A thorough assessment of all components is necessary, especially for key infrastructure of post-disaster significance.

Any mechanism to make the infrastructure climate resilient should therefore involve vulnerability and risk assessments of the components to specific hazards, retrofitting by a competent workforce based on suitable design and order of priority, and ensuring that it is preserved thereafter through effective maintenance practices. A motivation scheme should be designed to encourage retrofitting of privately owned key infrastructure facilities.

**Action:**

- 2.4.1 Ensure that the vulnerability of existing infrastructure, especially those facilities that provide key services, is properly assessed.
- 2.4.2 Ensure the retrofitting of existing key infrastructure based on the order of priority.
- 2.4.3 Establish an appropriate reward scheme to encourage good retrofitting and maintenance practices.

**Timeline:** 2015–2020

**Responsibility:**

**Local government service (LGS) and National Disaster Management Organisation (NADMO)**, academia, EPA, Ghana National Fire Service (GNFS), GMet, MESTI, MINT, MLGRD, MMDAs, MWRWH, MoFEP, WRC.

**Estimated Cost:** US\$8,000,000

## Programme 2.5: Flood Prevention Activities

**Objective:** To undertake activities to prevent or reduce flood hazards.

**Justification:**

Flooding has been a serious problem in Ghana. The 1968 floods affected almost every part of the country. Major rivers, including the Pra, Ofin and Ankobra, overflowed their banks. Transportation (rail and vehicular) was seriously impeded and many commercial activities were halted. Serious flooding has been experienced ever since – and recently in 1999, 2001, 2007, 2008, 2009, 2010 and 2011. In 2007, the floods affected the Northern region more seriously: 61 people died; 25,923 houses were affected (damaged, collapsed, or washed away); 70 feeder roads were destroyed and over 97,000 hectares of farmland were destroyed. The Government and other international agencies spent about US\$25 million in relief and recovery activities. In 2009, the damage cost was approximately US\$5,800,000 and 51,965 people were affected in the other seven regions (Western, Central, Brong-Ahafo, Volta, Ashanti, Eastern and Greater Accra). The serious urban floods in the cities such as Accra compound the problem.

Unfortunately, not much has been done to prevent floods. A holistic approach should include construction of flood-prevention structures, such as embankments, reservoirs along flood plains, storm sewers in the urban areas, and resettlement. Other approaches could include hillside protection, conservation of wetlands, attitudinal change to sanitation, and land-use planning.

**Action:**

- 2.5.1 Support relocation of settlements and economic activities to non-flood areas.
- 2.5.2 Construct adequate storm drainage systems, buffer zones and riverbank protection, undertake afforestation along embankments, and desilt waterways to reduce flooding.
- 2.5.3 Construct channels, water-collection reservoirs and dams to contain floods and store water for the dry season.

**Timeline:** 2015–2020

**Responsibility:**

**National Disaster Management Organisation (NADMO) and Ministry of Water Resources, Works and Housing (MWRWH),** BPA, EPA, Forestry Commission of Ghana (FC), HSD, MDA's, MLGRD, MMDAs, Ministry of Food and Agriculture (MoFA), MoFEP, RCC, SADA, VRA, WRC; development partners, professional bodies, private sector.

**Estimated Cost:** US\$30,000,000

### **Programme 2.6: Develop Climate-resilient Infrastructure for Key Services**

**Objective:** To ensure constant provision of key services in climate-related disaster situations.

**Justification:**

Climate-related disasters often affect key services which may include water supply, electricity supply, telecommunications, health, transportation, education, security and financial services. Major destruction of physical infrastructure for any of the indicated services will drastically affect the economic and socio-cultural activities of the communities, and at times, the health of the people.

Provision of key services is normally cost intensive and, as a developing country, support is sometimes obtained from outside donors or NGOs who insist on sustainable development. Ghana is progressively committed to sustainable development. It is therefore imperative and incumbent on the Government of Ghana to ensure that infrastructure for such key services is climate resilient and able to support sustainable development.

A situation where floods, windstorms, tidal floods and coastal erosion destroy a portion of the infrastructure is to be avoided. For instance, rural roads should not be blocked by floods or landslides – this would

stall economic activities. A constant supply of clean water is of highest priority – it is essential to public health and emergency services.

Any approaches to the provision of infrastructure should therefore be based on the common objective of improving the living standards of the communities at all times and have minimal impact on the environment.

**Action:**

- 2.6.1 Support the development of climate-proof infrastructure that provides key services to increase the resilience of communities during extreme climate events.
- 2.6.2 Ensure a safe and constant water supply, including during times of flood and drought.
- 2.6.3 Ensure that rural communities have access to all-weather roads and reliable access to markets and key services.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Water Resources, Works and Housing (MWRWH),** BPA, Community Water and Sanitation Agency (CWSA), Department of Feeder Roads, GMets, Ghana Water Company Limited (GWCL), Ministry of Transport (MOT), MLGRD, MMDAs, Ministry of Communications (MOC), MoFEP, NADMO, VRA; development partners, NGOs, professional bodies, private sector.

**Estimated Cost:** US\$12,000,000

## Programme 2.7: Protection of Coastal Resources and Communities

**Objective:** To ensure that coastal resources and communities are protected from climate hazards.

**Justification:**

As in many countries, the coastline of Ghana is also the location of human settlements. The coastal zone constitutes 7 per cent of the total land area, but it is home to 25 per cent of the population, and the site of major infrastructure, such as the thermal power plant at Aboadze and the ports.

Unfortunately, the coastline is being threatened by coastal erosion. Over the last 30 years, there has been a sea level rise of 2.1 mm per year, resulting in estimated erosion of 3 metres every year. This indicates a rise in sea level of 5.8 cm, 16.5 cm and 34.5 cm by 2020, 2050 and 2080, respectively. It is inferred that by 2020 Ghana would be losing up to 81.3 metres of its coastline every year and the coastline would have receded by 465 metres due to erosion, resulting in a loss of 1,100 sq. km. of land, displacing about 132,000 people. There are about 30 erosion hot spots along the coastline, the severest being located along the eastern coast.

Old sea defence structures at places like Axim need to be rebuilt. The new ones at Keta have caused increasing erosion problems in the adjoining areas to the east. Generally, the construction of coastal infrastructure affects sea-wave dynamics and concentrates energy in adjacent unprotected areas. Sustainable solutions may require further studies of the entire littoral zone to better understand the sediment, wave-climate characterization, geomorphology, and all other factors related to the zone and potential consequences of human activity. For example, human activities such as sand and pebble mining, and destruction of wetlands and vegetation, compound the problems

experienced. Provision of coastal infrastructure could be very costly. A holistic approach is therefore needed for a sustainable solution.

**Action:**

- 2.7.1 Collect relevant data on coastal zone geomorphology, surface water flows and groundwater for modelling coastal flooding and seawater intrusion.
- 2.7.2 Improve legislation and the institutional framework for effective coastal zone management.
- 2.7.3 Construct climate-resilient key coastal infrastructure to protect the communities from storm surges, coastal flooding, sea level rise and ecosystem degradation such as deforestation.
- 2.7.4 Promote an enabling environment for coastal dwellers to adopt best practices.

**Timeline:** 2015–2020

**Responsibility:**

**National Disaster Management Organisation (NADMO) and the Environmental Protection Agency (EPA)**, academia and research institutions, Attorney General's Department, Ghana Ports & Harbours Authority, GMets, HSD, MESTI, Ministry of Energy (MOE), MMDAs, MWRWH, NDPC, WRC, Water Research Institute (WRI); GSD, AAP, AESL, NGOs, professional bodies, traditional authorities.

**Estimated Cost:** US\$250,000,000

## FOCUS AREA 2: BUILD CLIMATE-RESILIENT INFRASTRUCTURE

### Programme 2.1: Build Capacity to Design Climate-resilient Infrastructure

#### Action 2.1.1: Ensure that design standards, relevant codes and spatial planning include parameters related to climate change and variability, and future scenarios

Purpose of action: To incorporate climate change parameters in building and construction designs.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Existing regulations, building codes and spatial planning reviewed to include climate change parameters.   | <ul style="list-style-type: none"> <li>Practitioners are using the Building Code</li> </ul>   | <ul style="list-style-type: none"> <li>Reviewed building code, regulations and by-laws</li> <li>A single Building Code document is available</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> </ul> |
| <b>Tasks:</b><br>2.1.1.1 Review existing legislation, regulations and by-laws to regulate the building and construction industry in line with international best practices.<br>2.1.1.2 Review and enforce relevant codes, and especially the Ghana Building Code, design standards and spatial planning to incorporate climate change parameters.<br>2.1.1.3 Develop mechanisms to ensure that all future construction, both government and non-government, conform to relevant codes and in particular the Ghana Building Code, regulations and by-laws.<br>2.1.1.4 Merge the Ghana Building Code and the National Building Regulations, LI 1630 (1996), into one comprehensive “Building Code” document. |   |   |   |
| <b>Outcome:</b><br>New buildings and construction are climate resilient because practitioners conform to the provisions in relevant codes, especially the Building Code.   |   |   |   |
| <b>Action 2.1.2: Strengthen the administrative and technical capacity of stakeholder organizations in the planning, design, building and construction industry to integrate climate change adaptation and disaster risk reduction into their development agenda</b>  |   |   |   |
| Purpose of action: To ensure that climate change adaptation is integrated into the development agenda of stakeholder institutions  |   |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Administrative and technical capacity of stakeholder organizations is  | <ul style="list-style-type: none"> <li>Practitioners have incorporated climate change adaptation in their areas of expertise</li> </ul> | <ul style="list-style-type: none"> <li>Training manuals and reports</li> <li>Equipment and materials, adequate funds</li> </ul>                         | <ul style="list-style-type: none"> <li>Availability of funds</li> </ul> |

| strengthened to integrate climate change adaptation and disaster risk reduction in their development agenda.   |   | <ul style="list-style-type: none"> <li>National Building Council in place</li> </ul>   |   |
|--|---|--|---|
| <b>Tasks:</b> <p>2.1.2.1 Conduct training needs assessment of the various practitioners (engineers, architects, surveyors, artisans, and others) and develop training manuals.</p> <p>2.1.2.2 Train practitioners (engineers, architects, surveyors, artisans, and others), using the participatory approach, in the application of climate change adaptation methods in planning, design, construction and operations.</p> <p>2.1.2.3 Ensure availability of adequate resources (financial, materials, equipment) to the stakeholder institutions.</p> <p>2.1.2.4 Support the establishment of a “National Building Council” as a “one-stop shop” for the administration and enforcement of the “Building Code” and spatial planning.</p> |   |  |   |
| <b>Outcomes:</b> <p>I. The stakeholder organizations perform better because of the training provided.</p> <p>II. There is proper inspection of projects and construction, and buildings are climate resilient because of the existence of the National Building Council.</p>   |   |  |   |
| <b>Action 2.1.3: Support research into appropriate infrastructure design standards for climate-related events</b>  |   |  |   |
| Purpose of action: To develop appropriate infrastructure design standards through research.  |   |  |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Appropriate infrastructure design standards developed for climate-related events   | <ul style="list-style-type: none"> <li>The industry is making good use of the research findings</li> <li>Communities are learning from the pilot projects to construct in similar ways</li> </ul> | <ul style="list-style-type: none"> <li>Report on research findings</li> <li>Pilot projects in the high-risk areas</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds and materials</li> </ul> |
| <b>Tasks:</b> <p>2.1.3.1 Support appropriate research on the impact of high winds, storm surge and heavy rains on infrastructure and the influence on appropriate design and development.</p> <p>2.1.3.2 Ensure that research findings are incorporated into development planning and design efforts.</p> <p>2.1.3.3 Ensure collaboration with suitable partners in research and development of climate-related disaster-resilient pilot projects in selected high risk areas.</p>   |   |  |   |



## 2.1.3.4 Support networking among relevant research institutions and communities inside and outside Ghana.

**Outcomes:**

- I. The building and construction industry has successfully applied the research findings and the impact of heavy rainfall, high winds and storm surges is no longer a threat to the infrastructure.
- II. Communities in some areas in high risk areas are putting up affordable houses which are resilient to storm surge, heavy rains and high winds.

**Programme 2.2: Knowledge Management and Coordination****Action 2.2.1: Improve institutional coordination in hydro-meteorological networks to provide better climate data and information that is easily accessible to the general public**

Purpose of action: To provide internationally acceptable hydro-meteorological data and information.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Better climate data and information provided because of improved coordination of hydro-meteorological networks.   | <ul style="list-style-type: none"> <li>• GMet and other hydro-meteorological agencies use common terminologies</li> <li>• Constant exchange of data and information between GMet and other agencies</li> <li>• Strong partnership with supporting agencies</li> </ul> | <ul style="list-style-type: none"> <li>• Documents on accepted terminologies, methodologies and approaches</li> <li>• List of networked agencies</li> <li>• List of exchange programmes</li> </ul> | <ul style="list-style-type: none"> <li>• Willingness of international agencies to network with GMet</li> <li>• Availability of funds</li> </ul> |
| <b>Tasks:</b><br>2.2.1.1 Review and harmonize all terminologies, methodologies and approaches in gathering, analysing and modelling climate-related data and information and in line with international best practices.<br>2.2.1.2 Strengthen networks with international, regional and sub-regional hydro-meteorological organizations (e.g., WMO), participate in exchange programmes and visits, and strengthen procedures for using available expertise.<br>2.2.1.3 Ensure effective collaboration among the climate-related agencies, including CWSA, CSIR, BRRI, GMet, GWCL, HSD, WRC and research institutions and universities, and compliance with terminologies, methodologies and approaches.<br>2.2.1.4 Strengthen contacts and partnerships with other international agencies such as in the United Nations system, AAP, World Bank, DfID, NGOs and the private sector for continued support, including in the areas of provision of funds, equipment and expertise. |   |  |   |

**Outcomes:**

- I. Data and information from GMet and other related agencies are accepted worldwide because of use of uniform terminologies and good quality of output.
- II. GMet enjoys increasing support from donor agencies and development partners.

**Action 2.2.2: Use ICT in monitoring and evaluating climate events and providing an early warning system**

Purpose of action: To be able to effectively monitor and evaluate climate events and develop an early warning system.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Climate events are monitored and evaluated using ICT to make essential information immediately available   | <ul style="list-style-type: none"> <li>Communities are given real-time briefings on the status of climate events</li> </ul> | <ul style="list-style-type: none"> <li>Guidelines for monitoring and evaluation exist</li> <li>GMet and other institutions operate websites for climate-related events</li> <li>Suitable computers and software</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> </ul> |
| <b>Tasks:</b><br>2.2.2.1 Develop and implement appropriate guidelines for monitoring and evaluating climate events at all levels (national, regional, district, zonal)<br>2.2.2.2 Establish a comprehensive information management system to gather, process, store (create database) and disseminate information; and facilitate monitoring, evaluation and assessment of the impact of climate-related events.<br>2.2.2.3 Promote the use of current information, communication and space-based technologies and related services (internet, website, Twitter) to facilitate information sharing, and monitoring and evaluation of climate-related events.<br>2.2.2.4 Ensure that the stakeholder institutions (GMet, HSD, NADMO, etc.) build capacity through training of staff, provision of computers and software, and networking arrangements.<br>2.2.2.5 Ensure effective communication channels with and provide timely and regular updates to district, regional and national emergency operations centres (EOCs) for enhancing early warning. |   |  |   |
| <b>Outcomes:</b><br>I. Climate events are monitored and evaluated correctly and the public has access to quality data and information.<br>II. Vulnerable communities are given timely warnings to minimize or avert the impact of climate-related hazards.   |   |  |   |



**Action 2.2.3: Support the establishment of a community of practice as a knowledge management tool at all levels (national, regional, district)**

Purpose of action: To promote and harness individual expert knowledge on climate change adaptation and disaster risk reduction for the benefit and use of the community.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Communities of practice established at all levels (national, regional, district).  | <ul style="list-style-type: none"> <li>Knowledge of climate change adaptation and disaster risk reduction is enhanced in all communities</li> </ul> | <ul style="list-style-type: none"> <li>Workshop documents</li> <li>Existence of communities of practice</li> </ul> | <ul style="list-style-type: none"> <li>Willingness of individual experts</li> </ul> |
| <b>Tasks:</b><br>2.2.3.1 Organize sensitization workshops for relevant experts and stakeholder institutions on the concept of communities of practice.<br>2.2.3.2 Support the formation of communities of practice at all levels (national, regional, district).<br>2.2.3.3 Ensure that opportunities are created for open dialogue and sharing of ideas (knowledge of climate change adaptation) by the communities of practice.<br>2.2.3.4 Encourage community of practice members to access internet facilities to join international groups of experts in climate change adaptation and disaster risk reduction. |   |  |   |
| <b>Outcome:</b><br>The response of communities to climate change adaptation and disaster risk reduction has noticeably increased because of injection of practical experience from the communities of practice.  |   |  |   |

**Action 2.2.4: Develop and improve upon mechanisms for effective coordination of climate change adaptation and disaster risk reduction at the national, regional and district levels**

Purpose of action: For organizing and advancing knowledge of climate change adaptation and disaster risk reduction at the national, regional and district levels.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Mechanisms for effective coordination of climate change adaptation and disaster risk reduction have been developed and improved upon at the national, regional and district levels | <ul style="list-style-type: none"> <li>Updated knowledge on climate change adaptation is understood and incorporated into policies, plans and development efforts at the national, regional and district levels</li> </ul> | <ul style="list-style-type: none"> <li>Coordination mechanisms for climate change adaptation exist at various levels of government</li> </ul> | <ul style="list-style-type: none"> <li>Knowledge on climate change adaptation is authentic</li> <li>Availability of funds</li> </ul> |

**Tasks:**

- 2.2.4.1 Assess the existing multilevel interministerial (national, regional and district) coordination mechanisms for climate change adaptation and sustainable development.
- 2.2.4.2 Establish an interministerial coordination mechanism for climate change adaptation and disaster risk reduction to advocate for their inclusion in policies and sectoral plans.
- 2.2.4.3 Improve on multi-stakeholder coordination mechanisms for climate change adaptation and disaster risk reduction at the national, regional and district levels.
- 2.2.4.4 Improve the capacity of NADMO for coordination of the National Platform for Disaster Risk Reduction and Climate Change Adaptation (national, regional, district).

**Outcomes:**

- I. Knowledge of climate change adaptation is regarded as a priority and is factored into policies and plans of all systems of development.
- II. The communities have updated knowledge on climate change adaptation through the activities of the National Platform for Disaster Risk Reduction and Climate Change Adaptation.

**Programme 2.3: Climate-Resilient Sectoral and Local Development Planning****Action 2.3.1: Develop and strengthen intersectoral linkages and collaboration for effective climate change adaptation and mitigation**

Purpose of action: To ensure active participation of all sector agencies in climate change adaptation programmes.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Intersectoral linkages and collaboration strengthened leading to effective climate change adaptation.  | <ul style="list-style-type: none"> <li>Stakeholder institutions have been meeting regularly</li> <li>Conscious efforts of sector agencies to address climate change adaptation issues</li> <li>No interruption in climate change adaptation programmes and activities</li> </ul> | <ul style="list-style-type: none"> <li>Minutes of regular meetings</li> <li>Specific tools</li> <li>Focal points appointed in sector ministries, departments and agencies</li> <li>Increased financial support</li> <li>Workshop reports</li> <li>Reviewed development plans</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> <li>Enough office space at the ministries, departments and agencies for nodal offices</li> </ul> |
| <b>Tasks:</b><br>2.3.1.1 Strengthen collaboration between major stakeholder institutions and ministries, departments and agencies, including the National Development Planning Commission (NDPC), Ministry of Local Government and Rural Development (MLGRD), Ministry of Finance and Economic |  |   |  |

|   |  |   |  |
|---|--|---|--|
|   | Planning (MoFEP), Ministry of Environment, Science, Technology and Innovation (MESTI) and the Environmental Protection Agency (EPA).   |   |  |
| 2.3.1.2   | Develop specific tools for integrating climate change adaptation, disaster risk reduction and environmental sanitation into various development sectors (water management, health, agriculture, tourism, energy, etc.).  |   |  |
| 2.3.1.3   | Establish focal points in all sector ministries, departments and agencies, and encourage key sector ministries and district/local governments to prepare sectoral climate change adaptation, disaster risk reduction and environmental sanitation strategies and plans and integrate them into development programmes. |   |  |
| 2.3.1.4   | Support inter-agency and multi-stakeholder joint workshops for training and for developing institutional options for climate change adaptation coordinating structures.  |   |  |
| 2.3.1.5   | Review all sectoral development plans and identify funding mechanisms in national sectoral budgets to ensure provision of further financial support for climate change adaptation.   |   |  |
| <b>Outcomes:</b>  |  |   |  |
| Overlapping roles and responsibilities of ministries, departments and agencies are eliminated, and each sector’s development is climate resilient.                  |  |   |  |
| <b>Action 2.3.2: Provide an enabling policy environment to include and enforce climate resilience in land-use planning, construction, and codes and regulations</b> |  |   |  |
| Purpose of action: To ensure that all urban infrastructures, including settlements, are climate resilient.  |  |   |  |
| <b>Output/Tasks/Outcomes</b>  | <b>Objectively Verifiable Indicators</b>   | <b>Sources of Verification</b>  | <b>Assumptions and Risks</b>   |
| <b>Output:</b><br>Enabling policy environment provided and includes climate resilience in land-use planning, construction and codes.                                | <ul style="list-style-type: none"><li>Urban and local communities build in accordance with design standards</li><li>Local communities in the north use local raw materials for affordable houses</li></ul>   | <ul style="list-style-type: none"><li>Reviewed legislation, by-laws and local codes</li><li>Design standards, construction guidelines</li><li>Training reports</li><li>Action plans and planning schemes</li><li>Climate-resilient houses in the north of the country</li></ul> | <ul style="list-style-type: none"><li>Availability of funds</li><li>Experts to review legislation</li><li>Availability of land and land-use plan in the north of the country</li></ul> |
| <b>Tasks:</b>   |  |   |  |
| 2.3.2.1   | Review and harmonize local government legislation, by-laws and codes on sustainable development with clear policy orientation on climate change adaptation.  |   |  |
| 2.3.2.2   | Provide technical support to district authorities (Metropolitan, Municipal and District Assemblies) to draft and disseminate their climate   |   |  |

|  |   |   |  |
|--|---|---|--|
| change adaptation and disaster risk reduction action plans and planning schemes so as to ensure the active involvement of communities in the plans, in line with national climate change adaptation and disaster risk reduction policy and guidelines. |   |   |  |
| 2.3.2.3  | Develop appropriate design standards, construction guidelines (based on the Ghana Building Code) and a climate rating system for buildings, structures and infrastructure in the local communities.                             |   |  |
| 2.3.2.4  | Develop and strengthen the capacity of relevant local government institutions (through training of staff and provision of other resources) to ensure the development of climate-resilient communities.                          |   |  |
| 2.3.2.5  | Launch an approved Rural Housing Development Initiative that uses local resources (human and material) to provide climate-resilient housing that is affordable and culturally appropriate.                                      |   |  |
| <b>Outcomes:</b>   |   |   |  |
| I. The local/urban communities have climate-resilient houses and infrastructure and their living standards have improved.  |   |   |  |
| II. A much greater number of affordable houses spring up in the country.   |   |   |  |
| <b>Action 2.3.3: Develop competencies of local authorities and communities on hazard, vulnerability and risk assessment</b>  |   |   |  |
| Purpose of action: To enable communities to assess their risk levels in the light of the prevailing hazards.   |   |   |  |
| <b>Output/Tasks/Outcomes</b>   | <b>Objectively Verifiable Indicators</b>  | <b>Sources of Verification</b>  | <b>Assumptions and Risks</b>   |
| <b>Output:</b><br>Competencies of local communities developed on hazard, vulnerability and risk assessment.  | <ul style="list-style-type: none"><li>Communities are able to undertake community hazard mapping and risk assessment</li><li>Collaboration with neighbouring assemblies on climate change adaptation issues</li></ul>           | <ul style="list-style-type: none"><li>Training materials and workshop reports</li><li>Local hazard and risk maps for 30 communities</li></ul> | <ul style="list-style-type: none"><li>Commitment of the local communities</li><li>Experts in community hazard and risk mapping available</li><li>Availability of funds</li></ul> |
| <b>Tasks:</b>  |   |   |  |
| 2.3.3.1  | Organize training workshops for community hazard mapping and risk assessment for identified groups within the communities.  |   |  |
| 2.3.3.2  | Adopt methodology and implementation arrangements for disaster and climate hazard, vulnerability and risk profiling at the local level (pilot flood risk assessment in 30 selected districts or areas in the country).          |   |  |
| 2.3.3.3  | Provide support to local authorities to update their hazard and risk assessments regularly and to communicate local hazard trends, risk reduction and climate change adaptation measures to the communities.                    |   |  |
| 2.3.3.4  | Ensure that local-level risk assessments are linked to and supportive of the assessments from neighbouring local government authorities, and in line with national climate change adaptation and disaster risk reduction plans. |   |  |
|  |   |   |  |

**Outcomes:**

- I. There is improved community understanding of their risk levels and commitment to adaptation initiatives and strategies.
- II. Neighbouring local authorities show common commitment and have mobilized support for adaptation activities and any emergencies.

**Action 2.3.4: Encourage private sector participation in climate change adaptation and mitigation at the local level**

Purpose of action: support in terms of funds, expertise, technology and logistics.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Private sector participation increased in climate change adaptation at the local level.  | <ul style="list-style-type: none"> <li>• Increased private sector participation</li> <li>• Key sector institutions perform better</li> </ul> | <ul style="list-style-type: none"> <li>• Agreements with private sector organizations</li> <li>• Available logistics</li> </ul> | <ul style="list-style-type: none"> <li>• Willingness to participate of the private sector and civil society organizations</li> </ul> |
| <b>Tasks:</b><br>2.3.4.1 Establish formal partnerships with the private sector, NGOs and civil society organizations, in particular those that are already involved in implementing community-based disaster management programmes, for the purpose of reducing climate-related hazards.<br>2.3.4.2 Establish standby agreements with the private sector to ensure support to logistics capacity of key institutions, especially NADMO, for emergency response, evaluation and monitoring (emergency standard operating procedures (SOPs) for boats, ambulances, communication equipment, etc.). |  |   |  |
| <b>Outcomes:</b><br>I. Emergency response operations are successful because of improved logistics support to key institutions such as NADMO and the Ghana National Fire Service.<br>II. Climate-related disasters in the local areas have considerably reduced because of the strong partnerships forged between local area government and the private sector, NGOs and civil society organizations.   |  |   |  |

## Programme 2.4: Ensure that existing Key Infrastructure is Climate Proof

### Action 2.4.1: Ensure that the vulnerability of existing infrastructure, especially those facilities that provide key services, is properly assessed

Purpose of action: To have a database on the extent to which the key infrastructure is vulnerable to climate hazards.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Vulnerabilities of key infrastructure properly assessed and database created. | <ul style="list-style-type: none"> <li>Vulnerable components of key infrastructure are easily located</li> <li>Community reaction to the situation</li> </ul> | <ul style="list-style-type: none"> <li>Locations of vulnerable key infrastructure</li> <li>Comprehensive database</li> </ul> | <ul style="list-style-type: none"> <li>Availability of resources</li> </ul> |

#### Tasks:

- 2.4.1.1 Conduct an audit of existing key infrastructure facilities in the area and prioritize their levels of vulnerability and risk to climate hazards.
- 2.4.1.2 Classify all key infrastructure in the area as: buildings and structures (such as schools, hospitals, etc.); transportation (such as surface transport, air transport); water and public health (such as water supply, waste water); and utilities (including electricity, telecommunications).
- 2.4.1.3 Make an inventory of the components of each class of existing key infrastructure that are vulnerable to specific climate hazards (for example, heavy rains, high winds, floods).
- 2.4.1.4 Identify ownership, such as government owned or privately owned.
- 2.4.1.5 Develop and maintain a comprehensive and well-secured database.

#### Outcomes:

- I. Communities have been made aware of the extent of vulnerability and are clamouring for remedial measures to be put in place.
- II. The comprehensive database helps decision-makers and experts to make informed decisions.

### Action 2.4.2: Ensure the retrofitting of existing key infrastructure based on the order of priority

Purpose of action: For existing key infrastructure to be made climate resilient.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Existing key infrastructure has been retrofitted and is climate resilient. | <ul style="list-style-type: none"> <li>Improved resilience of existing key infrastructure to climate-related disasters</li> <li>Continuous use of such facilities by the people</li> </ul> | <ul style="list-style-type: none"> <li>Design standards, specifications and good practice guides</li> <li>Funds mobilized</li> <li>The existing key infrastructure that has been retrofitted</li> </ul> | <ul style="list-style-type: none"> <li>Availability of competent specialists and skilled workforce</li> </ul> |

| <b>Tasks:</b><br>2.4.2.1 Review and study the design standards, specifications and old practice guides and revise them to incorporate climate-proof standards, prioritizing them according to the importance of the vulnerable components.<br>2.4.2.2 Ensure that preference is given to those existing infrastructure facilities of post-disaster significance (for example, hospitals, schools, access roads for supply and distribution of emergency relief items, etc.).<br>2.4.2.3 Support the retrofitting of existing key infrastructure facilities by competent specialists and workforce to ensure they are climate proof in accordance with the revised specifications.<br>2.4.2.4 Support the mobilization of resources, in particular from development partners, NGOs, the United Nations system and the private sector. |   |  |   |
|--|---|--|---|
| <b>Outcomes:</b><br>I. Communities have regular access to key facilities (hospitals, schools, and similar infrastructure) without interruption even when there have been climate-related disasters.<br>II. Improved culture of maintenance as people retrofit their houses and other structures to make them climate proof.  |   |  |   |
| <b>Action 2.4.3: Establish an appropriate reward scheme to encourage good retrofitting and maintenance practices</b><br>Purpose of action: To encourage both government officials and the private sector to retrofit existing key infrastructure.  |   |  |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Effective reward schemes developed and maintenance culture improved  | <ul style="list-style-type: none"> <li>Willingness of both government officials and private sector to retrofit existing infrastructure</li> </ul> | <ul style="list-style-type: none"> <li>Reward and financial schemes and guidelines exist</li> <li>Retrofitted government and private key infrastructure</li> <li>Existence of trained workforce</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> </ul> |
| <b>Tasks:</b><br>2.4.3.1 Develop sustainable schemes (for example, financial reward, promotion, etc.) and guidelines for the government and private sectors to reward and motivate stakeholders to undertake retrofitting and follow good maintenance practice of existing key infrastructure.<br>2.4.3.2 Ensure periodic review of schemes and guidelines and proper retrofitting and maintenance of key infrastructure facilities such as hospitals, schools, roads, etc.<br>2.4.3.3 Support virtually free training for and education of owners, professionals, managers, executives and technicians on retrofitting, operation and maintenance of strategic infrastructure.  |   |  |   |
| <b>Outcomes:</b><br>I. There is healthy competition among government officials and the private sector for retrofitting existing infrastructure.<br>II. Retrofitted structures are stronger and safer because the workforce has received additional training.   |   |  |   |

## Programme 2.5: Flood Prevention Activities

### Action 2.5.1: Support relocation of settlements and economic activities to non-flood areas

Purpose of action: To prevent or appreciably reduce impacts of floods on vulnerable communities.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Settlements and economic activities have been successfully located in non-flood areas. | <ul style="list-style-type: none"> <li>Communities are no longer threatened by floods</li> <li>Economic activities have improved</li> </ul> | <ul style="list-style-type: none"> <li>New settlements in the Northern Region and other areas</li> <li>Incentives such as farmlands</li> </ul> | <ul style="list-style-type: none"> <li>Availability of flood risk maps and flood zoning plans</li> <li>Availability of funds</li> </ul> |

#### Tasks:

- 2.5.1.1 Encourage communities threatened by serious floods to relocate to safer places (for example, communities at the estuary of the Ankobra River in Western Region); this should include sensitization to encourage them to discard old beliefs and myths.
- 2.5.1.2 Provide adequate incentives and support such as funds, allocation of “flood-proof” farmlands, building materials, agricultural inputs and livelihood support.
- 2.5.1.3 Support the on-going resettlement programmes as part of the disaster risk reduction and climate change adaptation measures (World Bank project for the North following the flood risk assessment of September 2011).
- 2.5.1.4 Ensure that new settlements conform to proper engineering design and construction.

#### Outcomes:

- I. As a result of the relocation, communities no longer suffer from destruction of infrastructure due to floods, and the general lifestyle of the people and their economic situation have improved.
- II. Communities build in accordance with proper engineering design and construction practice.

### Action 2.5.2: Construct adequate storm drainage systems, buffer zones and riverbank protection, undertake afforestation along embankments and desilt waterways to reduce flooding

Purpose of action: To reduce flooding by protecting the river banks and avoiding the effects of storms.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Proper storm drainage and riverbank protection systems constructed. | <ul style="list-style-type: none"> <li>Urban streets and river and stream banks are no longer flooded</li> <li>Communities no longer encroach upon buffer zones</li> </ul> | <ul style="list-style-type: none"> <li>Storm drains, levees, trees planted along rivers and streams, dams and desilted waterways</li> </ul> | <ul style="list-style-type: none"> <li>Flood risk maps and flood zoning plans available</li> <li>Funds available</li> </ul> |



**Tasks:**

- 2.5.2.1 Ensure that storm sewers are properly installed in urban centres (for example, Accra, Takoradi) to keep water from flooding the streets; and channel storm water into nearby streams.
- 2.5.2.2 Support the construction of embankments, levees or walls along some river or stream channels that are known to be prone to flooding.
- 2.5.2.3 Support the planting of trees and protect the vegetative cover along the banks of main drainage systems (rivers, dams, streams) to protect watersheds and the communal water resources, and in line with the Riparian Buffer Zone Policy.
- 2.5.2.4 Ensure that buffer zones created along the various streams, rivers and dams are not destroyed by community members.

**Outcomes:**

- I. Movement of vehicles and human traffic is no more impeded by street floods,
- II. No more loss of life and destruction of property due to floods, following the construction of levees or walls along river and stream channels.

**Action 2.5.3: Construct channels, water-collection reservoirs and dams to contain floods and store water for the dry season**

Purpose of action: To reduce flooding but ensure availability of enough water for the communities even in the dry season.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Channels, reservoirs and dams constructed to contain flooding and also to store water for the dry season. | <ul style="list-style-type: none"> <li>Street flooding in the urban centres has stopped</li> <li>Flooding in the flood plains is effectively controlled</li> <li>There is enough water to support socioeconomic activities during the dry season and in times of drought, especially in the Northern Region</li> </ul> | <ul style="list-style-type: none"> <li>Modified channels</li> <li>Drainage channels in the urban centres</li> <li>Earth dams and channels in the Northern Region</li> <li>Channels, catchment reservoirs and dams</li> </ul> | <ul style="list-style-type: none"> <li>Flooding zoning plans and flood risk maps available</li> <li>Availability of resources including funds</li> </ul> |

**Tasks:**

- 2.5.3.1 Modify stream channels by either widening, deepening or rerouting them to increase water flow and contain floods.
- 2.5.3.2 Construct effective drainage channels and desilt and clean existing ones just before floods to enhance run-off and reduce urban floods in areas such as Accra and Takoradi.
- 2.5.3.3 Construct earth dams and channels in the Northern Region, especially in the farming communities to harness and store rainwater for use during the dry season and droughts.
- 2.5.3.4 Support the construction of flood water diversion channels and catchment reservoirs and dams along flood plains to contain floods by controlling run-off and spillage; this also ensures the storage of enough water for the dry season and in droughts.

**Outcomes:**

- I. Floods in the urban centres have been curtailed and urban dwellers are no longer affected by them.
- II. Floods in the flood plains are being effectively controlled and communities have become resilient to flood hazards.
- III. People otherwise affected by drought, especially in the Northern Region, have enough water for their domestic and commercial activities during periods of drought.

**Programme 2.6: Develop Climate-resilient Infrastructure for Key Services****Action 2.6.1: Support the development of climate-proof infrastructure that provides key services to increase the resilience of communities during extreme climate events**

Purpose of action: To make the communities more resilient in the face of extreme climate events.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|---|--|---|--|
| <b>Output:</b><br>Communities have become more resilient to extreme climate events because of the provision of climate-proof infrastructure.  | <ul style="list-style-type: none"> <li>Communities' readiness for climate-proof infrastructure and settlements</li> <li>Fewer number of casualties and less property damage after climate disasters</li> </ul> | <ul style="list-style-type: none"> <li>Proper land-use plan</li> <li>Policies exist for sustainable buildings in the communities</li> <li>Climate-proof infrastructure</li> <li>Training reports and manuals</li> </ul> | <ul style="list-style-type: none"> <li>Availability of climate hazard and risk zoning maps</li> <li>Availability of funds</li> </ul> |
| <b>Tasks:</b> <ul style="list-style-type: none"> <li>2.6.1.1 Ensure that there is a proper land-use plan for the vulnerable communities, indicating suitable site locations with facilities for the provision of key services such as water supply, access roads, electricity and telecommunications.</li> <li>2.6.1.2 Review and revise design standards, specifications and good construction practices and incorporate climate-proof parameters.</li> <li>2.6.1.3 Support and adopt policies which demand that all new settlements, important infrastructure facilities (especially those that provide key services) and all government buildings should be climate proof.</li> <li>2.6.1.4 Ensure that work on all new development infrastructure, settlements and government buildings is carried out by competent professionals (architects, engineers, planners, etc.) and a skilled workforce, and with proper supervision, monitoring and evaluation.</li> <li>2.6.1.5 Develop the requisite capacity (through training and provision of resources) of stakeholder institutions that are responsible for the administration of and compliance with design standards, qualifications and good construction practice.</li> </ul> |  |   |  |
| <b>Outcomes:</b> <ul style="list-style-type: none"> <li>I. Resilience of communities to extreme climate events has remarkably improved, and there is virtually no key infrastructure in the community that is not climate proof.</li> <li>II. The communities have developed a positive attitude to climate change adaptation and insist that all settlements and infrastructure should be climate proof.</li> </ul>  |  |   |  |

**Action 2.6.2: Ensure a safe and constant water supply, including during times of flood and drought**

Purpose of action: To ensure continuous functioning of key services such as hospitals, the public health sector and society as a whole.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|---|---|--|--|
| <b>Output:</b><br>Constant and safe water supplied during times of floods and droughts. | <ul style="list-style-type: none"> <li>The communities enjoy a constant and safe water supply</li> <li>Key services such as hospitals and schools continue to function with a constant supply of water</li> </ul> | <ul style="list-style-type: none"> <li>Harvested rain water</li> <li>Licence and regulations for water tankers</li> <li>Boreholes and wells.</li> <li>Policies and procedures to conserve water</li> </ul> | <ul style="list-style-type: none"> <li>Availability of resources.</li> </ul> |

**Tasks:**

- 2.6.2.1 Ensure that installations such as reservoirs are located in less vulnerable areas, and are constructed in conformity with acceptable design and construction standards.
- 2.6.2.2 Develop mechanisms to harness and conserve rainwater in anticipation of emergencies (such as constructing earth dams in the Northern Region to harness rainwater in anticipation of droughts).
- 2.6.2.3 Support the construction of boreholes and wells through both government and enhanced private sector participation (including NGOs).
- 2.6.2.4 Support the licensing and regulation of the provision of tankered water supplies to ensure constant water supply especially to key areas such as hospitals and schools.
- 2.6.2.5 Develop and strengthen policies and procedures to conserve water, reduce demand and re-use treated waste water especially after a hazard event.

**Outcomes:**

Communities enjoy a constant supply of clean and safe water during extreme climate events.

**Action 2.6.3: Ensure that rural communities have access to all-weather roads and reliable access to markets and key services**

Purpose of action: To avoid undue interruption in the socioeconomic activities of the community.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Access to markets and key services is regular because of all-weather roads. | <ul style="list-style-type: none"> <li>Continuous business between the rural community and the urban area</li> <li>Income levels of the rural people have increased</li> <li>High performance of the stakeholder institutions</li> </ul> | <ul style="list-style-type: none"> <li>Database of vulnerable rural roads</li> <li>Effective design and construction guidelines</li> <li>Training documents</li> <li>Retrofitted components of rural roads</li> </ul> | <ul style="list-style-type: none"> <li>Availability of resources</li> </ul> |

**Tasks:**

- 2.6.3.1 Assess all roads in the rural communities and develop a database of the vulnerable ones.
- 2.6.3.2 Develop and adopt guidelines for design standards and construction practice for rural roads so that they are not affected by climate-related hazards such as floods and landslides.
- 2.6.3.3 Retrofit the most vulnerable components, such as old bridges, culverts, segments liable to floods and slope instability.
- 2.6.3.4 Develop regular maintenance strategies to clear vulnerable sections of the rural roads of any form of blockade (such as debris from landslides and floods); and widen segments that are narrow.
- 2.6.3.5 Develop the administrative and technical capacity (through training of staff and provision of resources) of the stakeholder institutions responsible for construction and maintenance of rural roads.

**Outcomes:**

Socioeconomic activities continue unimpeded; foodstuffs and forest products are sent to the urban areas whilst other goods and services are sent to the rural communities on a regular basis.

## Programme 2.7: Protection of Coastal Resources and Communities

### Action 2.7.1: Collect relevant data on coastal zone geomorphology, surface water flows and groundwater for modelling coastal flooding and seawater intrusion

Purpose of action: To develop proper modelling techniques for coastal flooding and seawater intrusion, for effective coastal zone management.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Relevant data collected for modelling coastal flooding and seawater intrusion. | <ul style="list-style-type: none"> <li>New land-use plans are being used based on the coastal flooding models</li> <li>Communities are warned of impending floods</li> </ul> | <ul style="list-style-type: none"> <li>Database and documented data</li> <li>Modelled maps of coastal flooding</li> <li>Techniques for modelling coastal flooding</li> <li>Documented research results</li> </ul> | <ul style="list-style-type: none"> <li>Modelling software available</li> <li>Availability of funds</li> </ul> |

**Tasks:**

- 2.7.1.1 Establish a standard format and a systematic process of collecting and accessing data and maps on coastal flooding.
- 2.7.1.2 Collect appropriate data and maps (historical, hydrological and geological), on coastal flooding based on the agreed format; and use a digital elevation model (DEM – 3D) to locate streamlets and streamlines.
- 2.7.1.3 Develop geographic information system (GIS) based data processing mechanisms and prepare a preliminary coastal flood hazard map.

2.7.1.4 Develop suitable modelling techniques and methodologies for coastal flooding based on actual historical data and on potential scenarios (for example, climate-induced flooding).

2.7.1.5 Support and coordinate research activities to update data and information for modelling and enhanced coastal zone management.

**Outcomes:**

Coastal zone management is now improved due to quality data and modelling techniques for coastal flooding.

**Action 2.7.2: Improve legislation and the institutional framework for effective coastal zone management**

Purpose of action: To ensure legal enforcement of the Integrated Coastal Zone Management Strategy.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b> Legislation for coastal zone management and institutional framework improved.   | <ul style="list-style-type: none"> <li>Guidelines for development are being followed by the communities</li> <li>Development is taking place only in approved areas</li> </ul> | <ul style="list-style-type: none"> <li>Revised legislation and guidelines</li> <li>Training documents</li> <li>Properly located key infrastructure</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> </ul> |
| <p><b>Tasks:</b></p> <p>2.7.2.1 Revise existing legislation and policies on coastal zone management and redefine roles of the key institutions.</p> <p>2.7.2.2 Review and update existing plans (for example, Coastal Zones Indicative Management Plan (CZIMP) on integrated coastal zone management (ICZM)), and make them more functional.</p> <p>2.7.2.3 Develop guidelines for specific littoral segments; this should address specific issues and remedial measures appropriate to the specific littoral area.</p> <p>2.7.2.4 Develop administrative and technical capacity through training of key stakeholder institutions such as the EPA and Metropolitan, Municipal and District Assemblies to ensure strict compliance with the guidelines.</p> <p>2.7.2.5 Ensure that no development, especially of key infrastructure, takes place in these specific areas without strictly following the guidelines.</p> |  |   |   |
| <p><b>Outcomes:</b></p> <p>There is noticeable improvement in infrastructural development in the coastal areas, because communities follow appropriate guidelines.</p>   |  |   |   |

**Action 2.7.3: Construct climate-resilient key coastal infrastructure to protect the communities from storm surges, coastal flooding, sea level rise and ecosystem degradation such as deforestation**

Purpose of action: To protect the communities from the action of the sea and harmful and unsustainable human practices.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Protective key infrastructure constructed along the coast to prevent damage resulting from storm surges, coastal flooding and sea level rise, and from ecosystem degradation.  | <ul style="list-style-type: none"> <li>The various communities are enjoying a respite from the climate hazards</li> </ul>                              | <ul style="list-style-type: none"> <li>Engineering design and construction standards</li> <li>Sea defence structures are in place</li> <li>Forests and coastal mangrove forests and wetlands have been maintained</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds and technical expertise</li> </ul> |
| <b>Tasks:</b><br>2.7.3.1 Develop engineering design and construction standards for appropriate structures such as groynes to stop erosion and sea defence walls for specific littoral segments.<br>2.7.3.2 Construct appropriate sea defence structures at Axim, Princess Town and Aketekyi along the west coast and at suitable sites.<br>2.7.3.3 Redesign and construct appropriate sea defence structures in areas just east of Keta (that is, from Akplorwotokor to Aflao) to stop the increase in erosion in those areas caused by the sea defence structures at Keta.<br>2.7.3.4 Establish forests along the coast (e. g. coastal mangrove forests) and ensure the safety of wetlands. |  |  |   |
| <b>Outcome:</b><br>The communities (for example, those from Keta to Aflao) are putting up good houses and developing good infrastructure because they are no longer threatened by erosion and climate hazards.   |  |  |   |
| <b>Action 2.7.4: Promote an enabling environment for coastal dwellers to adopt best practices</b><br>Purpose of action: For the communities to keep the coastal environment clean and to prevent further ecosystem degradation.  |  |  |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>An enabling environment has been created for environmental best practices to be followed by the communities.   | <ul style="list-style-type: none"> <li>Most people have adopted best practices</li> <li>The recalcitrant people are being severely punished</li> </ul> | <ul style="list-style-type: none"> <li>Incentives in place, e.g., building materials, livelihood support</li> <li>Rewards and punishments in effect</li> <li>Recreational facilities</li> </ul>                              | <ul style="list-style-type: none"> <li>Availability of funds</li> </ul>                         |

**Tasks:**

- 2.7.4.1 Educate the communities on the harmful effects of human activities such as sand and pebble mining, dumping of refuse along the beaches, destroying wetlands and mangroves.
- 2.7.4.2 Provide incentives to motivate the communities to adopt best practices: incentives could include provision of alternative building materials (e.g., brick and landcrete – a concrete in which the sand component is replaced by laterite), and livelihood support that provides an alternative, sustainable source of income.
- 2.7.4.3 Institute appropriate reward and punitive measures to encourage compliance and to discourage non-compliance respectively with existing legislation.

**Outcomes:**

- I. Many people including tourists patronize the beaches because they are environmentally clean and safe.
- II. Income levels of the communities increase as they now do genuine and lucrative business at the beaches.
- III. The severity of climate events is reduced due to ecosystem recovery.

## Summary

### Timeline

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| <b>Policy Focus Area 2: Build Climate-Resilient Infrastructure</b>                   |  | <b>Lead Org</b>     | <b>2015</b> |          | <b>2016</b> |          | <b>2017</b> |          | <b>2018</b> |          | <b>2019</b> |          | <b>2020</b> |          | <b>Estimated Cost US\$</b> |
|--|--|---------------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|----------------------------|
| Action   |  |                     | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> |                            |
| <b>Programme Area 2.1: Build capacity to design climate-resilient infrastructure</b> |  | <b>MWRWH /MLGRD</b> |             |          |             |          |             |          |             |          |             |          |             |          | <b>10,500,000</b>          |
| 2.1.1  | Ensure that design standards, relevant codes and spatial planning include parameters related to climate change and variability, and future scenarios   |                     | x           | x        | x           | x        | x           | x        |             |          |             |          |             |          |                            |
| 2.1.2  | Strengthen the administrative and technical capacity of stakeholder organizations in the planning, design, building and construction industry to integrate climate change adaptation and disaster risk reduction in their development agenda |                     | x           | x        | x           | x        | x           | x        |             |          |             |          |             |          |                            |
| 2.1.3  | Support research into appropriate infrastructure design standards for climate-related events   |                     | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        |                            |
| <b>Programme Area 2.2: Knowledge management and coordination</b>                     |  | <b>GMet</b>         |             |          |             |          |             |          |             |          |             |          |             |          | <b>6,500,000</b>           |
| 2.2.1  | Improve institutional coordination in hydro-meteorological networks to provide better climate data and information that is easily accessible to the general public   |                     | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        |                            |
| 2.2.2  | Use information and communications technology (ICT) in monitoring and evaluating climate events and providing an early warning system  |                     | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        |                            |
| 2.2.3  | Support the establishment of a community of practice as a knowledge management tool at all levels (national, regional, district)   |                     | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        |                            |
| 2.2.4  | Develop and improve upon mechanisms for effective coordination of climate change adaptation and disaster risk reduction at the national, regional and local levels.  |                     | x           | x        | x           | x        |             |          |             |          |             |          |             |          |                            |



| <b>Programme Area 2.3: Climate-resilient sectoral and local development planning</b> |  | <b>NDPC and MWRWH</b>  |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>20,000,000</b> |
|--|--|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------|
| 2.3.1  | Develop and strengthen intersectoral linkages and collaboration for effective climate change adaptation and mitigation   |                        | x | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 2.3.2  | Provide an enabling policy environment to include and enforce climate resilience in land-use planning, construction, and codes and regulations                       |                        | x | x | x | x | x | x |   |   |   |   |   |   |   |                   |
| 2.3.3  | Develop competencies of local authorities and communities on hazard, vulnerability and risk assessment   |                        | x | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 2.3.4  | Encourage private sector participation in climate change adaptation and mitigation at the local level  |                        | x | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| <b>Programme Area 2.4: Ensure that existing key infrastructure is climate proof</b>  |  | <b>LGS and NADMO</b>   |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>8,000,000</b>  |
| 2.4.1  | Ensure that the vulnerability of existing infrastructure, especially those facilities that provide key services, is properly assessed                                |                        | x | x | x | x | x | x |   |   |   |   |   |   |   |                   |
| 2.4.2  | Ensure the retrofitting of existing key infrastructure based on the order of priority  |                        |   |   | x | x | x | x | x | x | x | x | x | x | x |                   |
| 2.4.3  | Establish an appropriate reward scheme to encourage good retrofitting and maintenance practices  |                        | x | x | x | x |   |   |   |   |   |   |   |   |   |                   |
| <b>Programme Area 2.5: Flood prevention activities</b>                               |  | <b>NADMO and MWRWH</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>30,000,000</b> |
| 2.5.1  | Support relocation of settlements and economic activities to non-flood areas   |                        | x | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 2.5.2  | Construct adequate storm drainage systems, buffer zones and riverbank protection, undertake afforestation along embankments, and desilt waterways to reduce flooding |                        | x | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 2.5.3  | Construct channels, water-collection reservoirs and dams to contain floods and store water for the dry season.   |                        |   |   | x | x | x | x | x | x | x | x | x | x | x |                   |
| <b>Programme Area 2.6: Develop climate-resilient infrastructure for key services</b> |  | <b>MWRWH</b>           |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>12,000,000</b> |
| 2.6.1  | Support the development of climate-proof infrastructure that provides key services to increase the resilience of communities during extreme climate events.          |                        | x | x | x | x | x | x | x | x | x | x | x | x | x |                   |

|  |  |                      |   |   |   |   |   |   |   |   |   |   |   |   |                    |
|--|--|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|
| 2.6.2  | Ensure a safe and constant water supply, including during times of flood and drought.  |                      | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 2.6.3  | Ensure that rural communities have access to all-weather roads and reliable access to markets and key services.  |                      | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 2.7: Protection of coastal resources and communities</b> |  | <b>NADMO and EPA</b> |   |   |   |   |   |   |   |   |   |   |   |   | <b>250,000,000</b> |
| 2.7.1  | Collect relevant data on coastal zone geomorphology, surface water flows and groundwater for modelling coastal flooding and seawater intrusion.  |                      | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 2.7.2  | Improve legislation and the institutional framework for effective coastal zone management.   |                      | x | x | x | x | x | x |   |   |   |   |   |   |                    |
| 2.7.3  | Construct climate-resilient key coastal infrastructure to protect the communities from storm surges, coastal flooding, sea level rise and ecosystem degradation such as deforestation. |                      | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 2.7.4  | Promote an enabling environment for coastal dwellers to adopt best practices.  |                      | x | x | x | x | x | x | x | x | x | x | x | x |                    |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 2: Build Climate-Resilient Infrastructure</b>                    | <b>Lead Organization</b> | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|---|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 2.1: Build capacity to design climate-resilient infrastructure</b>  | <b>MWRWH/MLGRD</b>       | 2,100,000   | 3,150,000   | 3,150,000   | 1,050,000   | 525,000     | 525,000     | <b>10,500,000</b>          |
| <b>Programme Area 2.2: Knowledge management and coordination</b>                      | <b>GMet</b>              | 1,625,000   | 1,625,000   | 1,300,000   | 650,000     | 650,000     | 650,000     | <b>6,500,000</b>           |
| <b>Programme Area 2.3: Climate-resilient sectoral and local development planning</b>  | <b>NDPC/MWRWH</b>        | 4,000,000   | 4,000,000   | 3,000,000   | 3,000,000   | 3,000,000   | 3,000,000   | <b>20,000,000</b>          |
| <b>Programme Area 2.4: Ensure that existing key infrastructure is climate proof</b>   | <b>LGS/NADMO</b>         | 800,000     | 2,000,000   | 2,000,000   | 1,600,000   | 800,000     | 800,000     | <b>8,000,000</b>           |
| <b>Programme Area 2.5: Flood prevention activities</b>                                | <b>NADMO/MWRWH</b>       | 7,500,000   | 9,000,000   | 9,000,000   | 1,500,000   | 1,500,000   | 1,500,000   | <b>30,000,000</b>          |
| <b>Programme Area 2.6: Develop climate-resilient infrastructures for key services</b> | <b>MWRWH</b>             | 2,400,000   | 2,400,000   | 2,400,000   | 2,400,000   | 1,200,000   | 1,200,000   | <b>12,000,000</b>          |
| <b>Programme Area 2.7: Protection of coastal resources and communities</b>            | <b>NADMO/EPA</b>         | 37,500,000  | 62,500,000  | 37,500,000  | 37,500,000  | 37,500,000  | 37,500,000  | <b>250,000,000</b>         |



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 3: Increase Resilience of Vulnerable Communities to Climate-related Risks**

## Policy Focus Area 3: Increase Resilience of Vulnerable Communities to Climate-related Risks

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### Introduction

Disaster preparedness and response programmes and actions, especially with regard to climate change, have to be integrated and mainstreamed in the national policy planning and budgeting process of Ghana for a number of reasons:

- The severely disruptive effects of disasters strike almost all sectors of the economy. A single disaster can wipe away decades of development. For instance flooding can destroy farms, food stores, livestock, buildings, roads, and utility and service facilities; it can disrupt socioeconomic activities, and can even result in human casualties.
- Disasters that Ghana frequently experiences include flooding, windstorm, rainstorm, drought and bushfires. About 85 per cent of the resources and efforts of the National Disaster Management Organisation (NADMO) are used to address issues related to hydro-meteorological disasters.
- Ghana's economy largely relies on climate-sensitive sectors, in particular agriculture, energy and forestry. Agriculture is currently the second biggest contributor to Ghana's Gross Domestic Product (GDP). Approximately 70 per cent of the population depends directly or indirectly on agriculture (fisheries, crops and livestock farming). Any climate-related disaster is, therefore, likely to affect the economy of Ghana, especially that of the more vulnerable rural communities who depend largely on rain-fed agriculture and comprise the majority of the population.

- Climate change and climate variability may pose serious challenges to national development and achievement of the Millennium Development Goals (MDGs) if mechanisms are not put in place to ensure resilience in development.
- Ghana is a signatory to a number of global interventions on climate change and disasters. For example, Ghana is a party to the United Nations Framework Convention on Climate Change (UNFCCC), by which national governments are expected to take climate change issues into consideration in national development planning. The Hyogo Framework for Action (HFA), 2005–2015, on the other hand, aims at reducing substantially the number of casualties as well as the socioeconomic and environmental losses resulting from disasters.
- Ghana has demonstrated a serious commitment to poverty reduction and sustainable development through initiatives such as the Ghana Poverty Reduction Strategy (GPRS) and the Ghana Shared Growth and Development Agenda (GSGDA), 2010–2013.

### Challenges

Challenges faced include but are not limited to:

- Insufficient attention given to integrating climate change and its consequent disasters into Ghana's national development planning and budgeting process
- Duplication of effort and limited allocation of resources to climate change activities
- Inadequate capacity and ineffective coordination at all levels (national, sectoral, district)

- A low level of awareness of hazards and knowledge about how to manage them
- The high level of poverty, especially in the most vulnerable communities
- Inadequate capacity

### **Current Status**

The Environmental Protection Agency (EPA) in conjunction with the National Development Planning Commission (NDPC) is working closely with all the ministries, departments and agencies to mainstream climate change in their plans and the estimated costing process. The focus here is on how to weave needs related to climate change into other socioeconomic activities and determine a complete development strategy for the various sectors.

### **Way Forward**

- Effectively mainstream climate change and disaster risk reduction issues into Ghana's national policy planning and budgetary issues to build a society resilient to disasters for sustainable development.
- To develop consensus, build capacity and adopt a participatory approach to climate change and disaster risk reduction issues at all times.

### **Mainstreaming at the National Level**

Effective mainstreaming of climate change and disaster risk reduction issues requires that they be integrated into all levels of the planning framework that will eventually result in the implementation of climate change and disaster risk reduction programmes and activities. In effect, mainstreaming is seen as a concerted effort to influence processes, policies and programmes that have a significant bearing particularly on climate change with the aim of making them more “climate friendly”.

The term “national level” refers mainly to the medium-term development plans, which are based on the broad national policy framework and plans. This is a way to promote effective disbursement of funds to and control of resources at all levels (national, sectoral, district). Sectoral and district policies, plans and programmes are all fused into the national policy document.

### **How to Mainstream Climate Change and Disaster Risk Reduction at the National Level**

Mainstreaming has been considered at the four main processes, that is: Policy Formulation and Planning, Estimated Costing, Implementation, and Monitoring and Evaluation. The following five major steps are to be considered:

- Review of policies, plans, programmes and projects
- Composition of cross-sectoral planning group (CSPG)
- Public consultation
- Approval of national policy
- Dissemination of final national policy

### **Review of Policies, Plans, Programmes and Projects**

The review focuses on, amongst others things, annual programme reports, socioeconomic impact assessments, set targets, awareness-raising and capacity development, strategic environmental assessments (SEA) and other sector strategies and studies that are of relevance. The aim is to be able to draft a working paper on a national policy framework for the consideration of other relevant stakeholders.

### **Composition of Cross-Sector Planning Group (CSPG)**

The membership of the group should be well chosen and should include representatives from the ministries, departments and agencies of central government, development partners, non-governmental organizations (NGOs) and specialized institutions, individual experts and professionals in related fields, and at least one

specialist in climate change and disaster risk reduction who will be in a position to explain further to the other group members the need to integrate climate change and disaster risk reduction into the review process. The group should refer to sectoral draft policies provided by the members, as well as relevant policies from other countries. It is expected that the planning group would produce a review of a national policy framework that incorporates climate change and disaster risk reduction issues. In a nutshell, the input of this group should summarize the concerns of the nation with regard to the national development agenda.

### **Public Consultation**

Workshops, meetings, and seminars have to be organized for various stakeholders including community-based organizations (CBOs), NGOs, civil society organizations (CSOs), faith-based organizations (FBOs), people with disabilities, organized professional bodies, traditional authorities, trade unions, development partners, and government including the executive branch, the legislature and the judiciary. For effective mainstreaming, it is necessary for this group (stakeholders) to be educated on the impact of climate change and disaster risk reduction on national development to enable members to make an input and take a policy direction. Public consultation is necessary to at least facilitate the understanding, awareness and the successful implementation of the climate change and disaster risk reduction programmes and activities.

### **Approved National Policy Framework**

Before the National Policy Framework is approved as a working document, it is to be ensured that issues of climate change and disaster risk reduction are prominently featured. The need to address climate change and disaster risk reduction issues has to be accepted as a national priority and a sine qua non to sustainable development.

### **Dissemination of Final National Climate Change Policy**

The approved National Policy Framework will be disseminated nationwide to create awareness of the policies, and also to inform citizens of government priorities during the period. Responsible ministries, departments and agencies and stakeholders are to verify that their programmes and activities in relation to climate change and disaster risk reduction have been fully captured in the document.

### **Estimated Costing, Implementation, and Monitoring and Evaluation**

Estimated costing of programmes, actions and tasks follows the Medium-term Expenditure Framework (MTEF) costing process, which links estimated costs to policy. There are four budget lines (categories of expenditure), these being: Administration, Personnel Emoluments, Service, and Investment.

### **Estimated Costing**

The estimated costing process involves preparation and approval stages:

#### Preparation Stage

- Revision of economic indicators, with climate change and disaster risk reduction indicators captured.
- Determination of actual funding, including climate change and disaster risk reduction funds.
- Preparation and circulation of estimated costing guidelines by the Ministry of Finance and Economic Planning (MoFEP) with sectoral budgets by ministries, departments and agencies approved by the cabinet.
- Verification that the budget allows for climate change and disaster risk reduction issues.
- Revision of ministry, department and agency policies, programmes, and project implementation plans, to include climate change and disaster risk reduction issues.

- Cross-sectoral policy hearing held at MoFEP with emphasis on climate change and disaster risk reduction issues. Danger highlighted of not prioritizing climate change and disaster risk reduction issues with regard to sustainable development.

#### Approval

- Parliamentary hearing of ministry, department and agency cost estimates. Parliamentarians must be made aware that climate change and disaster risk reduction issues cannot be compromised.
- Presentation of estimates and the passage of the necessary appropriations bills by Parliament must, without fail, include climate change and disaster risk reduction issues.

#### **Implementation**

- Prepare general work description to cover personnel emoluments and administration expenses, and estimated monthly expenditure based on the work plan, procurement plan and cash plan for services and investment, featuring climate change and disaster risk reduction issues.
- Request release of funds to implement activities including those related to climate change and disaster risk reduction.
- Carry out climate change and disaster risk reduction activities (based on the approved programme of action) for which funds have been released.

#### **Monitoring and Evaluation**

- Conduct weekly, monthly, quarterly and mid-year review of projects and activities with emphasis on climate change and disaster risk reduction issues. Monitoring will focus on the set targets and timelines stated in the work plan.
- Carry out annual review of expenditure against budget, and economic indicators, focusing on climate change and disaster risk reduction issues.

(Reference: Nelson, W., et. al. 2010. *Guidebook on integrating Climate Change and Disaster Risk Reduction into National Development, Policies and Planning in Ghana*. Environmental Protection Agency, Ghana)

#### **General strategies include but not limited to the following:**

- Prioritize issues and programmes based on impacts, social needs assessments, and funding available and estimated costs.
- Promote community and individual participation and information-sharing.
- Adopt a participatory approach in programme identification, policy formulation, and project planning, costing and implementation.
- Develop performance review formats.
- Ensure lasting benefits to target groups and communities by meeting set targets.
- Maximize beneficial impacts at all levels (national, sectoral, district).
- Develop appropriate work plans for each programme activity and put in place follow-up procedures, subject to availability of resources.
- Develop suitable programme of action and related budget featuring climate change and disaster risk reduction.
- Ensure effective monitoring and evaluation.



- Build on capacity and expertise.

### **Programme Areas**

#### **Mainstreaming Current Themes, Programmes and Actions**

The current themes, of (i) building climate-resilient infrastructure and (ii) increasing the resilience of vulnerable communities to climate-related risks, and their corresponding programmes, actions and tasks will be mainstreamed into the national development policy based on the foregoing processes and approaches. However, special emphasis will be given to the following strategies:

- Identifying targets of the mainstreaming process.
- Evaluating the impact of climate change on socioeconomic, sectoral and local development strategies and plans.
- Evaluating the awareness of and capacity for mainstreaming in the context of the themes.
- Evaluating the possible impacts (both negative and positive) of the mainstreaming process.
- Developing strategies and mechanisms for mainstreaming in thematic areas including financial, economic and policy aspects.

### Programme 3.1: Early Warning Mechanisms

**Objective:** Ensure efficient early warning to vulnerable communities.

**Justification:**

Effective climate change adaptation, disaster risk reduction and disaster preparedness require the operation of a well-coordinated, centralized early warning system (EWS). Unfortunately, the early warning system in Ghana is not comprehensive and does not include risk assessment, technical monitoring and warning, documentation, dissemination and local preparedness.

The scientific systems are almost fully centralized and include those of the Ghana Meteorological Agency (GMet), which provides warnings of approaching storms, and the Ministry of Health and Ghana Health Service (which provide information on disease outbreak). The GMet system operates a modern satellite-based scientific early warning system in accordance with World Meteorological Organization (WMO) standards.

With regard to a community-based approach, the local communities in almost all the regions have a way of minimizing or averting the impact of climate-related hazards such as floods. This is based on indigenous early warning systems, mainly in the form of “folk wisdom” or cultural adaptation. In terms of understanding community vulnerability, the indigenous early warning systems could make the greatest contribution. There has been very little effort, however, devoted to research to document or explain indigenous approaches to coping mechanisms. Information on early warning systems is not comprehensively documented and recorded in a database to facilitate research, analysis, and further development. The staff of the community-based organizations (CBOs) and disaster volunteer groups (DVGs) need to be trained to enable them to better participate in these mechanisms.

The strategy is to build capacity within the country to reduce risks resulting in disasters by putting in place a well-documented and integrated early warning system that is both scientific and people centred.

**Action:**

- 3.1.1 Document and disseminate appropriate community-based indigenous early warning systems on climate-related disasters.
- 3.1.2 Establish effective hazard monitoring and early warning systems with a sound scientific and technological basis.
- 3.1.3 Enhance the technical capacity of GMet and other related institutions such as the Water Resources Commission (WRC), the universities and the Geological Survey Department (GSD).

**Timeline:** 2015–2020

**Responsibility:** National Disaster Management Organisation (NADMO) and the Ghana Meteorological Agency (GMet), Environmental Protection Agency (EPA, Ghana National Fire Service (GNFS), Ghana National Petroleum Corporation (GNPC), GSD, Hydrological Services Department (HSD), Ministry of Environment Science, Technology and Innovations (MESTI), Ministry of Food and Agriculture (MoFA), Ministry of Finance and Economic Planning (MoFEP), Savannah Accelerated Development Authority (SADA), WRC; academia and research institutions, traditional authorities; Africa Adaptation Programme (AAP), DVGs, NGOs, transboundary institutions.

**Estimated Cost:** US\$11,500,000

### Programme 3.2: Public Education on Adaptation Skills

**Objective:** To raise public awareness of climate change and adaptation response options.

**Justification:**

It is the responsibility of everybody (the individual, communities, organizations, agencies and government) to minimize the impact of natural disasters. As such, it is appropriate that the public clearly understands the issues concerning climate change and the need for adaptation. Individuals, communities and organizations need to be made aware of their specific roles and responsibilities. This requires that they be trained to develop the requisite skills and attitudes for adaptation. The training must adopt a participatory, experience-based and analytical approach, and cover a cross-section of society. The community-based organizations must be trained to develop plans, inform constituents and raise the ability of individuals to prevent and deal with climate-related hazards and possible disasters.

Public awareness campaigns should target groups such as government officials, politicians, professional bodies and the security services. Educational materials should be in English and in local dialects. Strong partnerships with the media, private sector, NGOs and the development partners are essential. Campaigns should use media outlets such as television, radio and newspapers, and take advantage of opportunities provided such as at public gatherings (durbars) and movies. Climate change adaptation and disaster risk reduction are to be integrated into the mainstream school curricula for awareness creation and effective adaptation.

**Action:**

3.2.1 Promote the use of information and communications technology (ICT) and information systems to enhance access to public information on climate change adaptation.

- 3.2.2 Create an enabling environment for the media, build awareness and establish clear working relationships and links to ensure the media are well placed to support the concept and practice of climate change adaptation.
- 3.2.3 Increase public awareness on climate change adaptation and provide skills training to ensure preparedness in the face of climate change and knowledge of adaptation strategies.
- 3.2.4 Develop appropriate public relation strategies in the key stakeholder institutions to highlight the need for climate change adaptation and their role in that process.
- 3.2.5 Mainstream climate change adaptation, disaster risk reduction and environmental sustainability in the school curricula at all levels.

**Timeline:** 2015–2020

**Responsibility:** MESTI and EPA, Council for Scientific and Industrial Research (CSIR), Ghana Education Service (GES), GNFS, GSD, Institute of Environmental and Sanitation Studies, University of Ghana (IESS), Information Services Department, Ministry of Information and Media Relations (ISD), ministries, departments and agencies, Ministry of Local Government and Rural Development (MLGRD), Metropolitan, Municipal and District Assemblies (MMDAs), Ministry of Communications (MOC), MoFEP, NADMO; Catholic Relief Services (CRS), the media, NGOs, private sector, professional bodies, stakeholder institutions; United Nations agencies.

**Estimated Cost:** US\$ 12,000,000

### Programme 3.3: Rapid Response and Disaster Management

**Objective:** To ensure delivery of efficient emergency response to climate-induced disasters.

**Justification:**

Climate-related disasters such as floods and fires could have serious consequences, including fatalities, in particular during the emergency phase and especially in communities that are virtually helpless. The rapid response phase in the disaster management continuum is the shortest yet it is the phase that requires the most decisive action to save and protect lives. The success of this phase largely depends on the effective mobilization and judicious use of resources (human, material and financial). It requires a timely and coordinated approach with roles and responsibilities clearly defined at the strategic, operational and tactical levels. There should be clear and effective plans and a response strategy which are understood by all key players, who should be highly committed.

There should be standard operating procedures (SOPs), properly equipped emergency operations centres (EOCs) with trained personnel, safe havens and access roads for supply, distribution and evacuation. It is therefore necessary to build the capacity of all stakeholder institutions to undertake rapid response, including the community-based organizations (CBOs) and the disaster volunteer groups (DVGs). As first responders, the CBOs and DVGs should be committed to emergency operations.

NADMO, as the primary coordinating and implementing agency, must build capacity for proper coordination of activities and distribution of relief items. There should be an effective relationship with international support agencies such as the Office of the High Commissioner for Refugees (UNHCR), United Nations agencies, the

International Organization for Migration (IOM) and the local NGO consortium established by NADMO.

**Action:**

- 3.3.1 Strengthen the institutional framework for disaster risk response and management.
- 3.3.2 Enhance the institutional capacity of agencies in disaster risk management, especially that of NADMO.
- 3.3.3 Improve the technical capacity of and facilities in communities for rapid response to disasters and disaster management.
- 3.3.4 Review, update, adopt and disseminate the national disaster management strategies and emergency preparedness and response policy and framework (such as the Emergency Response Plans for Floods).

**Timeline:** 2015–2020

**Responsibility:** NADMO, Attorney General's Department, Ghana Armed Forces (GAF), GMet, GNFS, Ghana Police Service (GPS), ISD, ministries, departments and agencies, MESTI, Ministry of the Interior (MINT), MLGRD, MMDAs, Ministry of Defence (MOD), NDPC, Regional Coordinating Councils (RCCs); development partners, NGOs, service providers.

**Estimated Cost:** US\$8,000,000

### Programme 3.4: Improved Key Public Social Services

**Objective:** To ensure that the key public social services function at all times.

**Justification:**

Climate-related disasters have been known to have a drastic impact on some key public services such as education, health, road transport and telecommunications. For instance, about 95 per cent of the passenger

and freight burden is carried by road transport in Ghana. However, from the following climate-related events, and in particular those of 1984, 1992, 1995, 2007, 2009 and 2010, road transport continues to experience rapid deterioration as a result of higher rainfall.

The floods of 2007 displaced about 10,000 people in the Upper East Region. The educational calendar was disrupted to a certain extent as some teachers and schoolchildren could not get to school. In times of drought, schoolchildren spend a lot of time searching for water and wood for fuel. In the health sector, limited access to medical facilities often results in fatalities, including casualties among clinical and administrative staff. This is especially so when there is an increase in the levels of climate-related diarrhoea diseases, such as cholera, and others such as malaria and meningitis.

In general, disruption in the provision of such social services affects wealth and socioeconomic activities and the social cohesion of the society. This is because the disruption could, among other things, lead to loss of productive time, loss of local markets and trade opportunities, loss of confidence by investors and possibly withdrawal of investment in the provision of such services.

However, integrating climate change adaptation and capacity-building into national, regional and district development planning demands adequate financial resources and appropriate strategies. The general strategy is to make public social services resilient to climate change and to ensure the regular provision of such services, and also to improve on investments.

**Action:**

3.4.1 Ensure that the key public social services are of a standard that they are able to recover after climate-related disasters.

3.4.2 Review and increase investments in existing social services and infrastructure; encourage support of service provision by public–private partnerships and NGOs.

**Timeline:** 2015–2020

**Responsibility:** NADMO and MMDAs, EPA, GNFS, GPS, ministries, departments and agencies, MESTI, MLGRD, MoFEP, MWRWH, SADA; NGOs, private sector; UN agencies.

**Estimated Cost:** US\$5,000,000

### Programme 3.5: Financial Support and Insurance Schemes

**Objective:** To reduce the impact of disasters through risk-sharing mechanisms.

**Justification:**

Even though the Government, together with NGOs and other benevolent agencies, provides funds to support climate change adaptation, additional funds are needed to cater for the numerous activities that should take place. Projects on climate change adaptation for the various sectors and communities are many and diverse. For instance, in the health sector, the number of patients is likely to increase as a result of climate change, requiring a corresponding increase in infrastructure and staffing. The same can be said of all the other sectors, including education, utilities, transport, etc., albeit in different ways.

Funding constraints with regard to sustainable development call for resource mobilization. Bearing in mind the investment, assets in disaster-prone areas must be properly protected through appropriate financial instruments. Policies and action plans should therefore

incorporate current and projected climate-related risks, based on appropriate data and information and/or maps.

Affected communities need to recover from the impact of disasters. The cost of rehabilitation and reconstruction including settlement could be prohibitive. In view of limited funding and the enormity of the problems, the communities should take out insurance policies against climate-related hazards as a form of risk sharing.

**Action:**

- 3.5.1 Enhance awareness of the potential of insurance to protect investments and assets in disaster-prone areas.
- 3.5.2 Mobilize adequate financial resources for climate change adaptation, emergency response and disaster management.
- 3.5.3 Provide supporting social safety nets, especially for vulnerable communities.

**Timeline:** 2015–2020

**Responsibility:** NADMO, Attorney General's Department, Bank of Ghana (BoG), Centre for Remote Sensing and Geographic Information System (CERSGIS), ministries, departments and agencies, MESTI, MLGRD, MMDAs, MoFEP, Parliament, SADA; United Nations agencies, United Nations Development Programme (UNDP); financial institutions, insurance institutions, private sector, NGOs.

**Estimated Cost:** US\$7,500,000

### Programme 3.6: Social Support Systems

**Objective:** To improve the living conditions of vulnerable communities so as to make the communities more resilient.

**Justification:**

Improved living conditions of individuals are likely to make them more resilient to the impact of climate-related disasters. Social support should target the priority needs of vulnerable communities, which will support

the individuals who make up the community, as well as of the individuals. The communities may be supported with social amenities such as water, education, good access to land, road infrastructure, and sanitation facilities (toilets, waste dumps, drainage, and similar facilities). The support should therefore include technical assistance and materials, and capacity-building to enable each community to install, operate and maintain the necessary infrastructure within its own area. Capacity-building for the individual, on the other hand, is required through livelihood support programmes to enable him or her to become productive in the community. Livelihood support for the urban poor should offer the option to live in the community or migrate to the rural areas. This is to reduce the incidence of rural-urban migration and prioritize local entrepreneurship. Social needs analysis and prioritizing the needs of the community and the individual is very important. The social support provided should assist the community to become resilient to climate-related disasters. There should be a reward scheme to encourage climate change adaptation, and punitive measures to discourage negative attitudes and practices.

**Action:**

- 3.6.1 Improve public climate change adaptation strategies.
- 3.6.2 Create and support livelihood empowerment programmes in rural and urban areas to improve productivity and income of vulnerable communities.
- 3.6.3 Rationalize a system of incentives, deterrents and alternatives to encourage behavioural change.
- 3.6.4 Strengthen traditional social support systems.

**Timeline:** 2015–2020

**Responsibility:** EPA and NADMO, Attorney General's Department, GMet, ministries, departments and agencies, MESTI, MLGRD, MMDAs, MoFA, traditional authorities; AAP, United Nations agencies; benevolent societies, civil society platforms, development partners, landowners, NGOs, religious bodies, Seventh-day Adventists (SDA).

**Estimated Cost:** US\$7,500,000



## FOCUS AREA 3: INCREASE RESILIENCE OF VULNERABLE COMMUNITIES TO CLIMATE-RELATED RISKS

### Programme 3.1: Early Warning Mechanisms

#### Action 3.1.1: Document and disseminate appropriate community-based indigenous early warning systems on climate-related disasters

Purpose of action: To make indigenous early warning more reliable and easily accessible to the communities.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Indigenous early warning systems well documented and database created in a Geographic Information System (GIS) format  | <ul style="list-style-type: none"> <li>Documents are being used by the communities</li> </ul>   | <ul style="list-style-type: none"> <li>Documents (both hard and soft copies)</li> <li>Database</li> </ul>   | <ul style="list-style-type: none"> <li>Availability of funds on time</li> <li>Commitment of Assemblies and CBOs</li> <li>Community members willing to volunteer information</li> </ul>          |
| <b>Tasks:</b><br>3.1.1.1 Identify target communities prone to climate-change-related disasters.<br>3.1.1.2 Document indigenous early warning systems according to the localities, districts and regions, and harmonize them.<br>3.1.1.3 Establish a database in a GIS format.<br>3.1.1.4 Ensure that the final document is distributed to the communities. |   |   |   |
| <b>Outcome:</b><br>Indigenous early warning systems have become relatively reliable and the communities' resilience to climate-related hazards has improved.   |   |   |   |
| <h4>Action 3.1.2: Establish effective hazard monitoring and early warning systems with a sound scientific and technological basis</h4>   |   |   |   |
| Purpose of action: To ensure performance efficiency of the early warning systems based on state-of-the-art technology.   |   |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Scientifically proven and technologically sound early warning systems established.   | <ul style="list-style-type: none"> <li>High level of government commitment</li> <li>GMet warning systems are more reliable and respected worldwide</li> </ul> | <ul style="list-style-type: none"> <li>Existence of legislative instrument for monitoring early warning systems</li> <li>Availability of inventory of early warning systems</li> <li>Well-functioning early warning equipment exists</li> </ul> | <ul style="list-style-type: none"> <li>Sustained government interest</li> <li>Availability of funds</li> <li>Technological support from the UN system</li> <li>Constant power supply</li> </ul> |

**Tasks:**

- 3.1.2.1 Support the development of the legal and policy framework for prioritizing early warning systems.
- 3.1.2.2 Undertake an inventory of early warning systems.
- 3.1.2.3 Develop capacity-building strategy for early warning systems for all stakeholders.
- 3.1.2.4 Train staff of GMet on the use and maintenance of early warning systems equipment.
- 3.1.2.5 Establish communication and implementation mechanisms for disseminating the information (radio, TV, cell phones and other forms of communication) to ensure that communities take precautionary measures to avert the impact of disasters.

**Outcomes:**

- I. Communities take the issue of early warnings seriously because of enforced legislation.
- II. Early warning data has become concise and acceptable worldwide because of enhanced capacity of staff.
- III. Community resilience to climate-related hazards has improved because of timely warnings.

### Action 3.1.3: Enhance the technical capacity of GMet and the other related institutions such as the Water Resources Commission (WRC) and the Geological Survey Department (GSD)

Purpose of action: Enhance performance levels of key institutions through capacity-building.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Capacity and performance level of GMet, WRC and the GSD enhanced | <ul style="list-style-type: none"> <li>GMet provides reliable data and information on climate-related disasters such as floods and droughts</li> <li>The community is benefiting from GSD ability to locate epicentres and determine magnitudes of earthquakes</li> </ul> | <ul style="list-style-type: none"> <li>Available data and reports</li> <li>Renovated weather stations exists</li> <li>Seismic observatory exists</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> <li>Qualified personnel to install equipment</li> <li>An environment conducive to the installation of equipment</li> </ul> |

**Tasks:**

- 3.1.3.1 Ghana Meteorological Agency and other research institutions to build their capacity for producing data pertaining to potential climate-related disasters such as floods and drought.
- 3.1.3.2 Support GMet capacity-building: train staff, renovate weather stations and establish a numerical weather predictions service.
- 3.1.3.3 Ensure that established early warning centres are adequately staffed (even if by on-call personnel), well-resourced and have power back-up facilities.



3.1.3.4 Ensure the development of the institutional capacity of the Geological Survey Department.

3.1.3.5 Undertake research on key environmental issues such as climate change and health.

**Outcomes:**

I. The performance of GMet and the GSD has been enhanced, and the public perception of them is relatively favourable.

II. High-quality information is available for use by decision-makers, planners and engineers.

III. Timely forecasting and early warning of climate-related hazards.

### Programme 3.2: Public Education on Adaptation Skills

#### Action 3.2.1: Promote the use of information and communications technology (ICT) and information systems to enhance access to public information on climate change adaptation

Purpose of action: To ensure that the general public has access to quality information on climate change adaptation.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Modern information management system developed and public access to information on climate change adaptation improved.   | <ul style="list-style-type: none"> <li>Public does not experience difficulty in accessing information on climate change adaptation</li> </ul> | <ul style="list-style-type: none"> <li>Communications and outreach equipment exists</li> <li>Public education materials are available</li> <li>Database for climate-change-related disasters exists</li> </ul> | <ul style="list-style-type: none"> <li>Easy access to funds</li> <li>Commitment of working personnel</li> </ul> |
| <b>Tasks:</b><br>3.2.1.1 Equip regions and selected districts with communications and outreach equipment.<br>3.2.1.2 Develop and distribute public education materials – pamphlets, leaflets, posters, brochures, jingles, etc. – in both English and the local languages that can easily be understood by those in the high-risk areas.<br>3.2.1.3 Develop a strategy to review and update information on past climate change disasters (for example, newspaper articles may be a useful source of information) and create a comprehensive database.<br>3.2.1.4 Strengthen networks among disaster experts, managers and planners across sectors and between regions and ensure the use of available expertise in climate change adaptation.<br>3.2.1.5 Create a website and provide internet facilities for the dissemination and exchange of data and information on climate change adaptation, disaster risk reduction and environmental sustainability. |   |  |   |

**Outcomes:**

- I. The regions and districts can gather information and data on climate change disasters for public consumption.
- II. The public has confidence in the quality and content of educational materials.
- III. Retrieval, collation and storage of historical information and data; this could enhance research into climate change related disasters.

**Action 3.2.2: Create an enabling environment for the media, build awareness and establish clear working relationships and links to ensure the media are well placed to support the concept and practice of climate change adaptation**

Purpose of action: To work in partnership with the media to ensure dissemination of factual and timely information to the public.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|---|--|---|--|
| <b>Output:</b><br>Partnership with media enhanced and factual information disseminated to the public on a timely basis. | <ul style="list-style-type: none"> <li>Media reportage shows clear understanding of climate change adaptation</li> <li>Improved working relationship between media and key stakeholder institutions, especially NADMO</li> </ul> | <ul style="list-style-type: none"> <li>Key media liaison channels exist</li> <li>Responsibilities, tasks and ways of working clearly defined and documented</li> <li>Reports indicating that training and workshops are in place</li> </ul> | <ul style="list-style-type: none"> <li>Good training materials</li> <li>Media rivalry</li> <li>Motivation packages to foster dedication</li> </ul> |

**Tasks:**

- 3.2.2.1 Review the existing communications strategy with the media to develop a workable plan.
- 3.2.2.2 Establish key media liaison channels to be activated in the event of an emergency. Agree and rehearse defined responsibilities, tasks and ways of working.
- 3.2.2.3 Organize climate change adaptation training and skills development for the media, journalists and the journalists' club.
- 3.2.2.4 Organize field trips for the media to climate change related disaster-prone areas to enhance their understanding and facilitate factual reportage of climate change adaptation issues.

**Outcomes:**

- I. Media understanding of climate change adaptation issues is enhanced and they correctly report issues with facts.
- II. Working relationships between the media and stakeholder institutions, especially NADMO, is healthy and supports concerted efforts in public education campaigns on climate change adaptation.

**Action 3.2.3: Improve public awareness on climate change adaptation and provide skills training to ensure preparedness in the face of climate change and knowledge of adaptation strategies**

Purpose of action: To improve awareness of the communities and develop their skills for climate change adaptation.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|---|---|---|---|
| <b>Output:</b><br>Community awareness improved and skills developed to ensure preparedness on climate change adaptation.  | <ul style="list-style-type: none"> <li>Climate change adaptation alert levels and skills of policy- and decision-makers are high</li> <li>Communities respond well to climate change adaptation issues</li> </ul> | <ul style="list-style-type: none"> <li>Training and workshop reports</li> <li>Media (TV, radio, newspapers) records</li> <li>National strategy for public awareness creation has been developed and is available</li> </ul> | <ul style="list-style-type: none"> <li>Availability of resources (funds, training materials, etc.)</li> <li>Bureaucracy on the part of policy and decision makers.</li> <li>High level of political commitment of the Government</li> </ul> |
| <b>Tasks:</b><br>3.2.3.1 Develop national strategy for public awareness creation on climate change adaptation, including effective use of the media (TV, radio and newspapers).<br>3.2.3.2 Organize adaptation skills training for identifiable groups, such as policymakers, decision-makers, politicians, professional bodies, the judiciary, police, financial institutions, architects, and others.<br>3.2.3.3 Conduct regular public awareness campaigns on climate change adaptation (using, for example, TV, radio, brochures, posters, leaflets, public gatherings organized by chiefs, and strategically on United Nations recognized annual days) on droughts and floods.<br>3.2.3.4 Organize public gatherings and outreach programmes for vulnerable groups, civil society organizations and targeted communities.<br>3.2.3.5 Institutionalize a disaster preparedness week at the beginning of seasonal floods and droughts to sensitize the public. |   |   |   |
| <b>Outcomes:</b><br>I. Government officials at different levels are involved in climate change adaptation issues and facilitate advocacy.<br>II. Communities have the requisite skills to avert impacts of related disasters; coupled with high alert levels, community members have become agents for change.<br>III. People in a vulnerable position respond well to climate change and consequent situations.  |   |   |   |

**Action 3.2.4: Develop appropriate public relations strategies in the key stakeholder institutions to highlight the need for climate change adaptation and their role in that process**

Purpose of action: To make the public aware of the urgent need for and the genuine benefits of climate change adaptation.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Public relations strategy developed in NADMO and other key stakeholder institutions related to climate change adaptation.  | <ul style="list-style-type: none"> <li>Enhanced understanding of and participation in climate change adaptation issues by civil society, the private sector and local communities</li> </ul>  | <ul style="list-style-type: none"> <li>Documents on procedures available</li> <li>Newspaper article available</li> </ul>  | <ul style="list-style-type: none"> <li>Availability of resources (human, material and financial)</li> <li>Effective collaboration among key stakeholder institutions</li> </ul> |
| <b>Tasks:</b><br>3.2.4.1 Develop procedures for effective public relations management and coordination.<br>3.2.4.2 Develop mechanisms for civil society, NGO, private sector and community participation in climate change adaptation issues.<br>3.2.4.3 Ensure constant access to media facilities.   |   |   |   |
| <b>Outcomes:</b><br>I. Civil society, the private sector and the general public are kept constantly aware of conduct and activities that impede climate change adaptation and of the negative impressions made by such conduct.<br>II. The public understands better the roles of the key stakeholder institutions in climate change adaptation.<br>III. There is now a good understanding and working relationship between the stakeholder institutions and the general public. |   |   |   |
| <b>Action 3.2.5: Mainstream climate change adaptation, disaster risk reduction and environmental sustainability in the school curricula at all levels</b>  |   |   |   |
| Purpose of action: To make the school (which is also a key social service) a primary agent for change in climate change adaptation, disaster risk reduction and environmental sustainability.  |   |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Climate change adaptation, disaster risk reduction and environmental sustainability are integrated into the mainstream school curricula.   | <ul style="list-style-type: none"> <li>The students understand the need for mitigation and have become agents of change for climate change adaptation, disaster risk reduction and environmental sustainability</li> <li>Children share the basic principles with their parents and other adults</li> </ul> | <ul style="list-style-type: none"> <li>Syllabuses, and text books, handbooks, and similar tools</li> <li>Disaster preparedness activities in schools</li> </ul> | <ul style="list-style-type: none"> <li>Availability of resources (funds, materials and personnel)</li> <li>Quality teachers</li> </ul>  |

**Tasks:**

- 3.2.5.1 Develop syllabuses at the various levels (primary, secondary and tertiary) for climate change adaptation, disaster risk reduction and environmental sustainability and provide courses.
- 3.2.5.2 Develop and distribute textbooks and handbooks on climate change adaptation, disaster risk reduction and environmental sustainability to educational institutions.
- 3.2.5.3 Ensure that the school curricula and extracurricular activities, especially in primary and secondary schools, include disaster preparedness and climate change adaptation programmes.
- 3.2.5.4 Adapt the policy of greening Ghana schools through tree planting.

**Outcomes:**

- I. The school community becomes resilient to natural disasters including climate-related disasters.
- II. Other members of society (for example, parents of schoolchildren) take a serious interest in mitigation measures, especially with regard to other key public social services.

**Programme 3.3: Rapid response and disaster management****Action 3.3.1: Strengthen the institutional framework for disaster risk response and management**

Purpose of action: To ensure that the institutional structure is effective and that roles and responsibilities are well defined and clear.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>The institutional framework for disaster risk response and management has been strengthened. | <ul style="list-style-type: none"> <li>A functional institutional structure established</li> <li>Increased level of participation of donor and humanitarian agencies, NGOs and the private sector</li> <li>Swift response to emergencies</li> </ul> | <ul style="list-style-type: none"> <li>Updated legislation and documentation defining roles and responsibilities</li> <li>Emergency operations centres</li> <li>Physical presence of cadre of trained personnel at the community level</li> </ul> | <ul style="list-style-type: none"> <li>The CBOs, DVGs and the cadre of trained personnel in the communities are deeply committed</li> </ul> |

**Tasks:**

- 3.3.1.1 Review legislation and define roles and responsibilities of stakeholder institutions.
- 3.3.1.2 Ensure effective coordination and collaboration among stakeholders, including creation of integrated unified standard operating procedures (SOPs), response plans, etc., for managing disasters during emergencies.
- 3.3.1.3 Establish and strengthen emergency operations centres (EOCs) in appropriate locations at all levels (national, regional, district, zonal).

3.3.1.4 Establish a cadre of trained personnel in the communities who will report once a disaster has occurred.

3.3.1.5 Strengthen partnerships with the humanitarian agencies, the private sector, NGOs and the donor agencies.

**Outcomes:**

I. Competencies of stakeholder institutions are enhanced as their roles are well defined and have no overlaps.

II. The institutional framework includes enhanced emergency response through a participatory approach.

III. Humanitarian agencies, the private sector and NGOs show greater commitment to emergency response situations.

**Action 3.3.2: Enhance the institutional capacity of agencies in disaster risk management, especially that of NADMO**

Purpose of action: To enable NADMO and the other agencies to perform effectively in emergency response operations.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Institutional capacity to handle emergency response operations of NADMO and other stakeholder agencies is enhanced.   | <ul style="list-style-type: none"> <li>Roles and responsibilities of NADMO and other institutions defined</li> <li>Funds have been made available to NADMO</li> </ul> | <ul style="list-style-type: none"> <li>Documents on roles and responsibilities</li> <li>Operational needs (vehicles, boats, trucks, etc.) acquired</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds to support emergency response operations</li> </ul> |
| <b>Tasks:</b><br>3.3.2.1 Improve the capacity of NADMO to provide operational leadership and coordination, and train key personnel in emergency response.<br>3.3.2.2 Classify roles and responsibilities within NADMO on coordination and emergency response.<br>3.3.2.3 Assess and strengthen the capacity of NADMO to perform the functions of coordination and implementation in emergency response.<br>3.3.2.4 Provide adequate funds for NADMO to perform efficiently during emergencies by meeting their operational needs (e.g., purchase of boats, trucks, helicopters, and possibly to employ more staff in the field).<br>3.3.2.5 Provide sufficient resources to other stakeholder institutions for them to perform creditably in emergency response situations. |   |   |  |
| <b>Outcome:</b><br>Emergency response operations have been enhanced because NADMO performs its coordination and leadership roles effectively and efficiently and the other stakeholder institutions have built the capacity necessary to also perform well in emergency operations.   |   |   |  |

**Action 3.3.3: Improve the technical capacity of and facilities in communities for rapid response to disasters and disaster management**

Purpose of action: To ensure that the communities have the capacity for emergency response operations.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Improved community rapid response to disasters and disaster management.  | <ul style="list-style-type: none"> <li>There are areas where people can congregate</li> <li>There are relief items and equipment for search, rescue and evacuation</li> <li>Operations are being directed from known and agreed centres</li> </ul> | <ul style="list-style-type: none"> <li>Access routes for evacuation, supply and distribution of relief items</li> <li>Safe havens and emergency operations centres</li> </ul> | <ul style="list-style-type: none"> <li>Community-based organizations and disaster volunteer groups already in place</li> <li>There are places to use as emergency operations centres</li> </ul> |
| <b>Tasks:</b><br>3.3.3.1 Strengthen capacity through training and skills development, of community-based organizations (CBOs) and disaster volunteer groups (DVGs) in emergency response operations.<br>3.3.3.2 Ensure that facilities are available and on time to support emergency operations – e.g., facilities needed for relief supply distribution, search and rescue missions, and evacuation.<br>3.3.3.3 Identify and establish safe havens and clear routes for evacuation, and for supply and distribution of relief items.<br>3.3.3.4 Ensure effective open communications channels are established at all emergency operations centres (EOCs) at all levels (national, regional, district and zonal).<br>3.3.3.5 SADA to build capacity to support emergency response operations in the north. (SADA may provide some facilities for evacuation, supply and distribution of relief items, etc.) |  |   |   |
| <b>Outcomes:</b><br>I. Communities perform better in emergency response operations resulting in fewer casualties and less damage to property.<br>II. Emergency response operations in the north improve markedly as a result of SADA interventions.  |  |   |   |

**Action 3.3.4: Review, update, adopt and disseminate the national disaster management strategies and emergency preparedness and response policy and framework (such as the Emergency Response Plans for Floods)**

Purpose of action: To make the national disaster management strategies and emergency preparedness and response policy and framework as current as possible.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>National disaster management strategies and emergency preparedness and response policy and framework adopted and disseminated.   | <ul style="list-style-type: none"> <li>The reviewed and updated national management strategies and emergency preparedness and response policy and framework are in use and in circulation</li> <li>No fewer than 75 people are trained each year</li> </ul> | <ul style="list-style-type: none"> <li>The adopted National Disaster Management Strategy and Emergency Preparedness and Response Policy and Framework document</li> <li>List of trained personnel according to the districts where they work</li> </ul> | <ul style="list-style-type: none"> <li>The policy and framework are not fully effective</li> </ul> |
| <b>Tasks:</b><br>3.3.4.1 Revise and update the current integrated National Disaster Management Strategy and Emergency Preparedness and Response Policy and Framework.<br>3.3.4.2 Disseminate the strategy and other documents to NADMO staff, possibly in regional, district and community-level workshops.<br>3.3.4.3 Conduct training yearly in selected districts (number of districts depends on availability of resources, but no fewer than three per year, chosen from among the regions most at risk). |   |   |  |
| <b>Outcome:</b><br>The use of the document and especially the training has resulted in efficient emergency preparedness and response.  |   |   |  |



### Programme 3.4: Improved Key Public Social Services

#### Action 3.4.1: Ensure that the key public social services are of a standard that they are able to recover after climate-related disasters

Purpose of action: To avert the impacts of climate-related disasters on key social services.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Impacts of climate-related disasters averted.   | <ul style="list-style-type: none"> <li>The key public services are still in operation or in use after climate-related disasters</li> <li>High commitment shown by social services providers</li> </ul> | <ul style="list-style-type: none"> <li>Register on safety and vulnerability of key public social services</li> <li>Programme to improve safety</li> </ul> | <ul style="list-style-type: none"> <li>Funds are available</li> </ul> |
| <b>Tasks:</b><br>3.4.1.1 Assess the safety of all the existing public social services (including schools, road transport, health (hospitals and clinics), security, utilities (water, electricity, telecommunications, etc.)) and their vulnerability and create a database or register.<br>3.4.1.2 Develop a comprehensive programme to improve the performance of public service facilities, through regular maintenance, repairs, training of staff, integration of climate change adaptation into development planning, etc., and make them safer after climate-related disasters.<br>3.4.1.3 Ensure that resources, including funds, materials and personnel, and community support, are available for improving the safety of key social services.<br>3.4.1.4 Support effective collaboration with stakeholders, for example, the private sector, NGOs, United Nations agencies, and others, and with the service providers to make these facilities safer after climate-related disasters.<br>3.4.1.5. Establish a task force (national, regional, district, zonal) to ensure the safety of these service facilities at all times. |  |   |   |
| <b>Outcomes:</b><br>I. The general public is safer; key public social services are safer after climate-related disasters.<br>II. There is improved commitment on the part of social services providers; this has also contributed to making the communities more resilient to climate-related hazards.  |  |   |   |

**Action 3.4.2: Review and increase investment in existing social services and infrastructure; encourage support of service provision by public–private partnerships and NGOs**

Purpose of action: To ensure greater investment in the provision of social services and infrastructure so as to increase the quantity and quality of the social services provided.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Existing social services and related infrastructure increased and improved.   | <ul style="list-style-type: none"> <li>Greater private sector support</li> <li>Increase in key public social services and infrastructure</li> </ul> | <ul style="list-style-type: none"> <li>Documents on reviewed interventions</li> <li>Document on climate-resilient investment plans</li> </ul> | <ul style="list-style-type: none"> <li>Willingness of the private sector to support social services</li> </ul> |
| <b>Tasks:</b><br>3.4.2.1 Review and build on existing interventions in social services delivery and infrastructure for enhanced economic analysis of needs related to climate change adaptation and estimated costing.<br>3.4.2.2 Support stakeholders in the development of climate-resilient investment plans with a focus on the provision of key public social services and infrastructure.<br>3.4.2.3 Sensitize the private sector to the need to commit funds to provide for key public social services and infrastructure especially in communities vulnerable to climate change.<br>3.4.2.4 Ensure effective partnership with the private sector to provide for, and make safe, key public social services. |   |   |  |
| <b>Outcome:</b><br>The communities benefit from increased private sector support, and community resilience to climate-related disasters is improved.  |   |   |  |

**Programme 3.5: Financial Support and Insurance Schemes****Action 3.5.1: Enhance awareness of the potential of insurance to protect investments and assets in disaster-prone areas**

Purpose of action: To encourage the public to take up insurance policies to cover life and property in the event of a disaster, to protect against loss.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Awareness is enhanced of insurance schemes covering life and property to protect against financial loss. | <ul style="list-style-type: none"> <li>The public and the policymakers are taking up insurance policies against disasters</li> <li>The Government is contemplating making this a requirement at the national level</li> </ul> | <ul style="list-style-type: none"> <li>Reports on workshops, seminars, conferences</li> <li>Insurance schemes are available</li> <li>Risk data and maps covering disaster-prone areas are in place</li> </ul> | <ul style="list-style-type: none"> <li>Risk sharing is not a common practice in Ghana</li> <li>Quality personnel and resources are available to create awareness</li> </ul> |

**Tasks:**

- 3.5.1.1 Educate the public on the need for risk sharing through investment instruments such as insurance (e.g., crop insurance for farmers), use of microcredit and cash transfers for the most vulnerable.
- 3.5.1.2 Sensitize the financial and insurance sector through workshops, seminars and conferences to take an interest in developing disaster risk insurance schemes.
- 3.5.1.3 Develop and distribute risk data and maps of the disaster-prone areas in a format to attract risk sharing by both the general public and the financial and insurance sector.
- 3.5.1.4 Educate the policy- and decision-makers on the need for risk sharing in support of sustainable development, to encourage their support.

**Outcomes:**

- I. The public and the financial and insurance sector understand and accept risk sharing as a means of guarding against financial loss by insuring life and property in the event of disasters.
- II. Suitable maps are available to assist both the public and the insurance and financial sector to take decisions.

**Action 3.5.2: Mobilize adequate financial resources for climate change adaptation, emergency response and disaster management**

Purpose of action: To ensure that adequate funds are available when needed, for disaster management and climate change adaptation activities.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Adequate funds for climate change adaptation, emergency response and disaster management are provided  | <ul style="list-style-type: none"> <li>The legislation concerning the 5 per cent quota of the District Assembly Common Fund is being complied with</li> <li>A disaster response fund is operational</li> <li>Allocation of funds by NGOs to the Northern Region</li> </ul> | <ul style="list-style-type: none"> <li>Legislation concerning the 5 per cent quota of the District Assembly Common Fund</li> <li>Disaster response fund</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> <li>Bill has been prepared</li> </ul> |
| <b>Tasks:</b><br>3.5.2.1 Support the legislation for the judicious use of the 5 per cent quota of the District Assembly Common Fund for disaster risk and climate change adaptation.<br>3.5.2.2 Establish a disaster response fund to ensure that people affected by disasters in the regions receive the minimum they need as soon as possible.<br>3.5.2.3 Encourage the use of voucher systems for providing assistance to people in need (for example, in the Northern Region) as a means of putting decision-making powers in the hands of disaster victims. |  |  |   |

3.5.2.4 Lobby government and NGOs to allocate resources to the Northern Region for appropriate contingency plans which would include a standby "Drought Relief Fund" or "community-based food bank", or both.

3.5.2.5 Advocate an increased allocation from the Government of Ghana Budget for disaster risk management and climate change adaptation.

**Outcomes:**

I. Various funds are available to support climate change adaptation, especially in the Northern Region.

II. Emergency response, climate change adaptation and disaster management activities in the districts have considerably improved to the benefit of the communities.

**Action 3.5.3: Provide supporting social safety nets, especially for vulnerable communities**

Purpose of action: To ensure that the affected communities have the basic needs for survival.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <p><b>Output:</b><br/>Supporting social safety nets are provided, especially to vulnerable communities.</p>   | <ul style="list-style-type: none"> <li>The impact of disasters have been reduced in vulnerable communities</li> <li>Affected victims benefit from facilities such as microcredit, cash transfers and a welfare scheme</li> </ul> | <ul style="list-style-type: none"> <li>Recipients of relief items</li> <li>Community welfare scheme</li> </ul> | <ul style="list-style-type: none"> <li>Availability of resources (funds, materials, personnel)</li> </ul> |
| <p><b>Tasks:</b></p> <p>3.5.3.1 Provide microcredit and cash transfer facilities to vulnerable people in the most-at-risk communities, especially in the North.</p> <p>3.5.3.2 Provide the vulnerable communities with relief items (including food, water, clothing, shelter, etc.) for their immediate use when struck by a disaster.</p> <p>3.5.3.3 Institute welfare schemes in the vulnerable communities, with the support of government, NGOs and the private sector, to serve as community safety nets in times of disasters. (The communities can build community centres, etc., in the less disaster-prone areas in the vicinity.)</p> <p>3.5.3.4 SADA to institute measures to ensure that the people in need in the most affected communities in the Northern Region receive immediate support.</p> |  |  |   |
| <p><b>Outcomes:</b></p> <p>I. The impacts of disasters are reasonably reduced because of the provision of relief items, which are always available on time.</p> <p>II. People who are victims of a disaster benefit from facilities such as microcredit, cash transfers and community welfare schemes.</p>  |  |  |   |

### Programme 3.6: Social Support Systems

#### Action 3.6.1: Improve public climate change adaptation strategies

Purpose of action: To ensure the provision of climate change adaptation needs based on priority social needs.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Public climate change adaptation strategies, including provision of wells, boreholes, road infrastructure, land tenure administrative reforms, etc., improved.   | <ul style="list-style-type: none"> <li>Social needs have been provided based on the priority needs of the affected communities</li> <li>Noticeable change in the communities' attitudes to climate change adaptation</li> </ul> | <ul style="list-style-type: none"> <li>Programme and guidelines for addressing social needs in place</li> <li>Social needs such as wells, boreholes, etc., have been met</li> </ul> | <ul style="list-style-type: none"> <li>The service providers – including the private sector, NGOs, civil society – are willing to participate</li> </ul> |
| <b>Tasks:</b><br>3.6.1.1 Conduct social needs assessments and analyses of the various vulnerable communities and of the available social support systems.<br>3.6.1.2 Prepare a programme and guidelines for the provision of social support based on priority needs and distribute to potential social support providers, civil society and the communities.<br>3.6.1.3 Ensure that social needs such as wells, boreholes, public toilets, earth dams, etc., are provided in compliance with the programme and guidelines.<br>3.6.1.4 Provide communities with technical assistance and subsidized materials to enable them to install, operate and maintain infrastructure and other services within their own areas. |   |   |  |
| <b>Outcomes:</b><br>I. Communities have become more resilient to climate change because their priority needs have been met.<br>II. Communities accept the need for climate change adaptation, irrespective of cultural belief systems.   |   |   |  |
| <b>Action 3.6.2: Create and support livelihood empowerment programmes in rural and urban areas to improve productivity and income of vulnerable communities</b><br>Purpose of action: To improve the living conditions of both the rural and urban poor, and make them resilient to disasters.   |   |   |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
| <b>Output:</b><br>Income and output of the vulnerable communities have been improved due to the support received.  | <ul style="list-style-type: none"> <li>There is a high level of private sector participation in providing livelihood support</li> <li>Living conditions of climate change disaster victims, especially in the</li> </ul>        | <ul style="list-style-type: none"> <li>Reviewed policies and regulatory reforms</li> <li>Documents on capacity-building and skills development</li> </ul>                           | <ul style="list-style-type: none"> <li>High government commitment</li> <li>Sustained private sector support</li> </ul>                                   |

|   | Northern Region, have noticeably improved  |   |  |
|---|--|---|--|
| <b>Tasks:</b><br>3.6.2.1 Review microeconomic policies and regulatory reforms for the private sector, which provides most of the jobs and services, to focus on livelihood initiatives that will make the rural and urban poor more resilient to disasters.<br>3.6.2.2 Support initiatives to protect against disasters, such as providing drought-resistant seeds to farmers in affected areas, so as to make communities more resilient in disaster-prone areas.<br>3.6.2.3 SADA to support a livelihood initiative (for example, by supply of seeds and inputs, financial support, encouraging guineafowl rearing and bread making, etc.) in the Northern Region as a means of increasing community resilience, poverty reduction and wealth creation, with emphasis on the communities affected by the 2007, 2009 and 2011 floods.<br>3.6.2.4 Support capacity-building and skills-development interventions to equip the marginalized urban poor to become productive. |  |   |  |
| <b>Outcomes:</b><br>I. Private sector participation is high due to favourable policies and regulations.<br>II. Climate change disaster victims, especially in the Northern Region, and the urban poor have become productive and more resilient to climate change disasters.  |  |   |  |
| <b>Action 3.6.3: Rationalize a system of incentives, deterrents and alternatives to encourage behavioural change</b><br>Purpose of action: To encourage the communities to be responsive to climate change adaptation issues.   |  |   |  |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
| <b>Output:</b><br>System of incentives, deterrents and alternatives results in behavioural change.  | <ul style="list-style-type: none"> <li>There is law and order in the community as people are aware of implications of failing to comply with agreed adaptation measures</li> <li>The people themselves opt for change</li> </ul> | <ul style="list-style-type: none"> <li>Legislation and regulations that have been put in place, and a document describing the motivation system</li> <li>Alternatives in place to encourage good environmental practices</li> </ul> | <ul style="list-style-type: none"> <li>Availability of funds</li> <li>Access to the communities</li> </ul> |
| <b>Tasks:</b><br>3.6.3.1 Educate the vulnerable communities so they understand and appreciate the benefits of climate change adaptation measures and best environmental practices.<br>3.6.3.2 Develop and implement an effective reward and motivation system (e.g., the provision of tax incentives, soft loans and credit facilities, reduced insurance premiums, etc.) to encourage the general public, including its more vulnerable members, to comply with climate change adaptation measures.  |  |   |  |

3.6.3.3 Support enforcement of legislation and regulations that prescribe stricter measures for people who do not comply with climate change adaptation strategies (for example, indiscriminate dumping of refuse in drains or building in waterways and flood-prone areas need to attract stricter punishment than at present).

3.6.3.4 Prescribe facilities to encourage communities to follow alternative, good practices (such as provision of accessible dumping sites and refuse containers).

**Outcome:**

Communities show a sensible approach to climate change as most people have seriously embraced climate change adaptation measures and they also observe sound environmental practices.

**Action 3.6.4: Strengthen traditional social support systems**

Purpose of action: To ensure efficiency in the traditional social support systems.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <p><b>Output:</b></p> <p>Communities participate in and benefit from strong traditional social support systems.</p>  | <ul style="list-style-type: none"> <li>Community participation is high as a result of the training received</li> <li>The communities are using the facilities such as public toilets</li> </ul> | <ul style="list-style-type: none"> <li>Available training documents</li> <li>Document on or review of traditional systems</li> <li>Available infrastructure, such as public toilets, school classrooms</li> </ul> | <ul style="list-style-type: none"> <li>Willingness of the communities to learn</li> <li>Availability of funds</li> </ul> |
| <p><b>Tasks:</b></p> <p>3.6.4.1 Review belief systems and promote change in those which are inimical to climate change adaptation (e.g., cultural beliefs that make communities refuse to settle in less flood-prone areas). Make use of the various traditional social support systems available in the vulnerable communities.</p> <p>3.6.4.2 Undertake capacity-building of the various artisans, tradesmen, CBOs, DVGs, and other social and cultural groups, such as <i>asafo</i> groups, etc., through organized, participatory, experience-based knowledge and skills-development training.</p> <p>3.6.4.3 Provide, and ensure the judicious use of, resources (financial, material and human) to enable the communities to make available social support to those in need.</p> <p>3.6.4.4 Conduct training and briefing sessions for the chiefs, elders and the community leaders on project leadership roles, accountability and transparency.</p> <p>3.6.4.5 Educate communities to reform those traditional practices that are no longer appropriate in the light of changing conditions.</p> |   |   |  |
| <p><b>Outcome:</b></p> <p>The community is resilient to disasters resulting from climate change through their traditional social support systems.</p>  |   |   |  |

## Summary

### Timeline

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 3: Increase Resilience of Vulnerable Communities to Climate-related Risks |   | Lead Org              | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$ |
|---|---|-----------------------|------|---|------|---|------|---|------|---|------|---|------|---|---------------------|
| Action  |   |                       | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                     |
| <b>Programme Area 3.1: Early warning mechanisms</b>   |   | <b>NADMO and GMet</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>11,500,000</b>   |
| 3.1.1   | Document and disseminate appropriate community-based indigenous early warning systems on climate-related disasters.   |                       | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 3.1.2   | Establish effective hazard monitoring and early warning systems with a sound scientific and technological basis.  |                       | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 3.1.3   | Enhance the technical capacity of GMet and other related institutions such as the Water Resources Commission (WRC) and the Geological Survey Department (GSD).  |                       | x    | x | x    | x | x    | x | x    | x |      |   |      |   |                     |
| <b>Programme Area 3.2: Public education on adaptation skills</b>                            |   | <b>MESTI and EPA</b>  |      |   |      |   |      |   |      |   |      |   |      |   | <b>12,000,000</b>   |
| 3.2.1   | Promote the use of ICT and information systems to enhance access to public information on climate change adaptation.  |                       | x    | x | x    | x | x    | x |      |   |      |   |      |   |                     |
| 3.2.2   | Create an enabling environment for the media, build awareness and establish clear working relationships and links to ensure the media are well placed to support the concept and practice of climate change adaptation. |                       | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 3.2.3   | Increase public awareness on climate change adaption and provide skills training to ensure preparedness in the face of climate change and knowledge of adaptation strategies.   |                       | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 3.2.4   | Develop appropriate public relation strategies in the key stakeholder institutions to highlight the need for climate change adaptation and their role in that process.  |                       | x    | x | x    | x | x    | x |      |   |      |   |      |   |                     |
| 3.2.5   | Mainstream climate change adaptation, disaster risk reduction and environmental sustainability in the school curricula at all levels.   |                       | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |



|  |   |                        |   |   |   |   |   |   |   |   |   |   |   |   |  |                  |
|--|---|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|--|------------------|
| <b>Programme Area 3.3: Rapid response and disaster management</b>  |   | <b>NADMO</b>           |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>8,000,000</b> |
| 3.3.1  | Strengthen the institutional framework for disaster risk response and management.   |                        | x | x | x | x | x | x |   |   |   |   |   |   |  |                  |
| 3.3.2  | Enhance the institutional capacity of agencies in disaster risk management, especially that of NADMO.   |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| 3.3.3  | Improve the technical capacity of and facilities in communities for rapid response to disasters and disaster management.  |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| 3.3.4  | Review, update, adopt and disseminate the national disaster management strategies and emergency preparedness and response policy and framework (such as the Emergency Response Plans for Floods). |                        | x | x | x | x | x | x |   |   |   |   |   |   |  |                  |
| <b>Programme Area 3.4: Improved key public social services</b>     |   | <b>NADMO and MMDAs</b> |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>5,000,000</b> |
| 3.4.1  | Ensure that the key public social services are of a standard that they able to recover after climate-related disasters.   |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| 3.4.2  | Review and increase investments in existing social services and infrastructure; encourage support of service provision by public–private partnerships and NGOs.                                   |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| <b>Programme Area 3.5: Financial support and insurance schemes</b> |   | <b>NADMO</b>           |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>7,500,000</b> |
| 3.5.1  | Enhance awareness of the potential of insurance to protect investments and assets in disaster-prone areas.  |                        | x | x | x | x | x | x |   |   |   |   |   |   |  |                  |
| 3.5.2  | Mobilize adequate financial resources for climate change adaptation, emergency response and disaster management.  |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| 3.5.3  | Provide supporting social safety nets, especially for vulnerable communities.   |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| <b>Programme Area 3.6: Social support systems</b>                  |   | <b>EPA and NADMO</b>   |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>7,500,000</b> |
| 3.6.1  | Improve public climate change adaptation strategies.  |                        | x | x | x | x | x | x |   |   |   |   |   |   |  |                  |
| 3.6.2  | Create and support livelihood empowerment programmes in rural and urban areas to improve productivity and income of vulnerable communities.   |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| 3.6.3  | Rationalize a system of incentives, deterrents and alternatives to encourage behavioural change   |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |
| 3.6.4  | Strengthen traditional social support systems.  |                        | x | x | x | x | x | x | x | x | x | x | x | x |  |                  |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in table below:

| <b>Policy Focus Area 3: Increase Resilience of Vulnerable Communities to Climate-related Risks</b> | <b>Lead Org</b>        | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 3.1: Early warning mechanisms</b>  | <b>NADMO and GMet</b>  | 2,300,000   | 2,300,000   | 2,300,000   | 2,300,000   | 1,150,000   | 1,150,000   | <b>11,500,000</b>          |
| <b>Programme Area 3.2: Public education on adaptation skills</b>                                   | <b>MESTI and EPA</b>   | 2,400,000   | 3,000,000   | 3,000,000   | 1,200,000   | 1,200,000   | 1,200,000   | <b>12,000,000</b>          |
| <b>Programme Area 3.3: Rapid response and disaster management</b>                                  | <b>NADMO</b>           | 2,000,000   | 2,000,000   | 1,600,000   | 800,000     | 800,000     | 800,000     | <b>8,000,000</b>           |
| <b>Programme Area 3.4: Improved key public social services</b>                                     | <b>NADMO and MMDAs</b> | 750,000     | 1,250,000   | 750,000     | 750,000     | 750,000     | 750,000     | <b>5,000,000</b>           |
| <b>Programme Area 3.5: Financial support and insurance schemes</b>                                 | <b>NADMO</b>           | 1,125,000   | 1,875,000   | 1,125,000   | 1,125,000   | 1,125,000   | 1,125,000   | <b>7,500,000</b>           |
| <b>Programme Area 3.6: Social support systems</b>  | <b>EPA and NADMO</b>   | 1,500,000   | 1,500,000   | 1,500,000   | 1,125,000   | 1,125,000   | 750,000     | <b>7,500,000</b>           |



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 4: Increase Carbon Sinks**

## Policy Focus Area 4: Increase Carbon Sinks

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### Introduction

Ghana's natural resources are essential to the provision of important goods and services for social and economic development. The natural resources are currently experiencing a continuous decline at an alarming rate as a result of several factors cutting across various sectors of the Ghanaian economy. The need to mainstream the management of natural resources into national policy planning and the budgeting process has therefore become critical to ensure that the use of the resources is sustainable. The National Development Planning Commission (NDPC) Guidelines for the Preparation of Sector Medium-Term Development Plans for the Ghana Shared Growth and Development Agenda (GSGDA) II, 2014–2017, provide steps to mainstream or integrate cross-cutting issues in development policies, programmes and projects into sectoral strategies in the formulation of sectoral programmes of action to promote sustainable development. The mainstreaming strategy for sectoral natural resources management has been developed in accordance with the NDPC guidelines.

Environmental issues are cross cutting and the sustainable management of natural and renewable resources is essential to deliver the national Medium-Term Development Policy Framework. The MTDPF: GSGDA, 2014–2017 presents ten key focus areas for sustainable natural resources management, of which seven are directly linked to the natural resources management policy area. The remaining three key focus areas have links to the climate change policy area. However, the National Climate Change Policy (NCCP) contains two main focus areas under the natural resources management section of the policy. This mainstreaming document of the NCCP harmonizes the

MTDPF: GSGDA, 2014–2017 documents to ensure sustainable management of natural resources at the national level.

### ***Natural Resources Sector Linkages with MTDPF: GSGDA, 2014–2017***

There is linkage between the Natural Resources Management Policy Area and the MTDPF: GSGDA, 2014–2017. The focus areas and programmes of the Natural Resources Management Policy Area link mainly with the “sustainable natural resources management” and “renewable energy” supply sections of the MTDPF: GSGDA, 2014–2017.

### **Focus Areas of MTDPF: GSGDA, 2014–2017 links with Natural Resource Management Policy Area**

#### **Sustainable Natural Resource Management**

#### **Policy and Strategies/Measures**

##### **I. Protected Areas**

*Maintaining and enhancing the protected areas systems:*

Create a financial framework to ensure adequate motivation of field staff working in protected areas and local communities. Implement national buffer zone policies for rivers and protected areas. Promote local community involvement in management of protected areas.

*Strengthening the legal framework on protected areas:*

Strengthen law enforcement and promote local community education to sustain management of protected areas.

##### **II. Biodiversity**

*Integrating biodiversity issues into development planning:*

Promote public education and awareness of biodiversity and ecosystem services.

### **III. Land degradation and land use**

*Reversing land degradation and natural resources degradation through investments:*

Promote plantation development and management in degraded forests and off-reserve areas.

### **IV. Improved governance and natural resources management**

*Strengthening governance arrangements for sustainable management of natural resources:*

Develop and support training and capacity-building at the district and community levels;

Promote effective participation and consultation at all levels of the decision-making process.

### **V. Community participation and community-based natural resource management**

*Enhancing community participation in natural resource management by awareness-raising:*

Promote information, communication and education strategies to develop community responsibility to manage natural resources sustainably. Enhance community participation in governance and decision-making;

Develop a participatory programme to integrate traditional resource management practices. Integrate gender perspectives in the design and implementation of sustainable resource management mechanisms;

Strengthen and develop local-level capacity to participate in management and governance of natural resources;

Develop a community leadership programme in the sustainable use of natural resources;

Develop training programmes that allow community members to gain skills and knowledge to enable them to engage in natural resource management.

### **VI. Economic incentives**

*Ensuring a balance between sustainable management of natural resources and improvement in the economic well-being of local communities:*

Develop alternative livelihood programmes to improve rural income and reduce pressure on natural resources;

Develop modalities to promote private sector investments in ecotourism and support community-based ecotourism programmes.

### **VII. Ecosystem-based adaptation**

*Protecting and maintaining ecosystems to reduce the vulnerability of local communities to climate change and variability:*

Create an adaptation fund for research, knowledge transfer, capacity-building and local adaptation initiatives;

Promote multi-stakeholder approaches in planning and implementation of adaptation projects and initiatives.

### **VIII. Mineral extraction**

*Restoring degraded mining areas:*

Develop measures to ensure reclamation and plantation development in degraded mined areas.

### **IX. Energy**

#### **A. Renewable energy**

*Increasing the proportion of renewable energy supply:*

Promote the establishment of dedicated woodlots for wood fuel production;

Promote the production and use of improved and more efficient biomass utilization technologies.

## **B. Energy and gender**

*Ensuring that the energy sector is gender sensitive:*

Mainstream gender concerns into the energy sector and align them with proper health, safety and environmental standards;

Support the capacity development of women in the energy sector;

Promote the participation of women in the formulation and implementation of energy interventions.

## **National Climate Change Policy: Mainstreaming Natural Resource Management Focus Areas Linked with MTDPF: GSGDA, 2014–2017**

### **Policy Focus Area Objectives**

#### **I. Increase carbon sinks**

##### **Policy Actions**

*Minimizing loss of carbon sinks:*

- Strengthen institutional and technical capacity in natural resources management;
- Reduce the pressure on forests and mangroves by improving the efficiency of production, harvesting, conversion and use of wood fuels;
- Promote alternative sources of fuel for domestic use, especially in the rural areas, e.g., liquefied petroleum gas (LPG) as an alternative to wood fuel;
- Encourage diversification from natural-resource-based activities into non-farm activities such as trading.

*Enhancing carbon stocks:*

- Improve legislation to effectively address land use rights and land tenure systems;
- 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 initiatives for the enhancement of carbon sinks through afforestation and reforestation measures, including Forest Law Enforcement, Governance and Trade (FLEGT), the non-legally binding instrument on all types of forests, Reducing Emissions from Deforestation and Forest Degradation Plus (REDD+) and the Clean Development Mechanism (CDM);
- Support agroforestry programmes initiated to conserve trees in association with crops;
- Promote the establishment and consolidation of bio-reserves and buffers of forest;
- Reinforce local community involvement in resource management.

#### **II. Improve management and resilience of terrestrial and aquatic ecosystems**

##### **Policy Actions**

*Ensuring effective management and conservation of terrestrial and aquatic ecosystems*

- Improve the management of important ecosystems and hotspots;
- Promote effective spatial planning and land zoning, mapping and production of land resource management plans at all levels;
- Support local, national and international policies that encourage management of terrestrial and aquatic ecosystems;
- Improve mechanisms for fair and equitable sharing of natural resource benefits, including defining tenure rights, minimizing encroachment into forest reserves and reducing conflict over permitted farms and community centres;
- Support scientific research, including into 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;
- Apply technologies to provide information for detection and early warning systems for weather-related hazards;
- Support awareness creation and dissemination programmes;
- Establish ecological networks or biological corridors to link fragmented forests, for example through the establishment of Community Resources Management Areas (CREMAs) or linking up with existing CREMAs for synergy;
- Promote the use of biodiversity and ecosystem services as part of the adaptation strategy to climate change;
- Promote economic and social incentive measures for successful natural resources management;
- Promote afforestation to enhance dry season flows in basins.

#### **Mainstreaming Methodology based on NDPC Guidelines**

The National Development Planning Commission (NDPC) has prepared comprehensive guidelines to direct the development of sectoral medium-term development plans (SMTDPs) for 2014–2017. The guidelines contain detailed activities including relevant steps for the development of SMTDPs, how intra- and inter-sectoral issues would be addressed, and how to integrate cross-cutting issues in development policies, programmes and projects for sustainable development. The strategies for mainstreaming natural resource management issues into the sector policies, planning and estimated costing process based on the NDPC guidelines for the preparation of SMTDPs are listed below:

#### **Stakeholder consultation and development of road map**

- Awareness-raising at all levels among relevant stakeholders on sustainable natural resources management;

- Institutional capacity needs assessment: capacity needs of institutions to be identified, together with building the capacity of relevant stakeholders including local communities to ensure participation in natural resources management, policy planning and decision-making;
- Developing training programmes and capacity-building workshops that are linked to the identified capacity needs;
- In collaboration with key stakeholders, developing strategies to ensure that natural resources management is integrated into the socioeconomic activities and estimated costing process of ministries, departments and agencies, and Metropolitan, Municipal and District Assemblies (MMDAs);
- Integrating monitoring and evaluation of natural resource management measures into the current monitoring and evaluation framework for the Natural Resource and Environmental Governance Programme and other ongoing activities;
- The stakeholder consultation and development of the road map, as well as development of training programmes and capacity-building of all key stakeholders, would ensure effective identification of the mainstreaming process for the natural resources management measures in national policy planning. It would allow for the evaluation of the socioeconomic impact of sustainable natural resources use; and for the development of strategies and mechanisms for mainstreaming in the natural resources management thematic area.



### Programme 4.1: Improving Governance, Capacity and Regulatory Structures

**Objective:** To ensure effective natural resources governance through improved policy, legislation, capacity-building and increased participation of stakeholders in decision-making, including traditional leaders.

**Justification:**

Governance of natural resources, especially the forestry sector, has been a major challenge hindering sustainable resources management. Issues such as weak institutional arrangements, uncertain land use planning and management, tree and land tenure arrangements, weak enforcement of regulations and the challenges of implementation, and the lack of a clear benefit-sharing mechanism have contributed greatly to the decline in particular of off-reserve timber stock. The centrally administered, top-down regulatory approach to resources management has discouraged local communities and other stakeholders from participating fully in the decision-making process of natural resources management. Forest governance reform is, however, currently under way through a range of local and international initiatives such as the Forest Law Enforcement, Governance and Trade (FLEGT) initiative, Voluntary Partnership Agreement (VPA), Reducing Emissions from Deforestation and Forest Degradation (REDD+) and the multi-donor Natural Resources and Environmental Governance Programme. With the growing demand for land, food, timber and other resources coupled with the potential impacts of climate change, building an effective governance process is critical to sustainable natural resources management. The proposed programme therefore seeks to promote a new governance approach which integrates transparency, equity and participation of stakeholders at all levels of natural resources planning and management.

**Action:**

- 4.1.1 Review and strengthen legislation to effectively address land use rights, carbon rights and tenure systems, and equitable benefit-sharing mechanisms.
- 4.1.2 Support existing forest and natural resource governance initiatives and reforms such as the Forest Law Enforcement, Governance and Trade (FLEGT) initiative and the multi-donor Natural Resources and Environmental Governance Programme.
- 4.1.3 Promote effective integration, consultation, education and participation at all levels of the decision-making process to reduce conflicts.
- 4.1.4 Promote access to and increase knowledge of legislation to lowest level actors through translation of legislation into local languages. Integrate indigenous governance into conventional resource governance.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Lands and Natural Resources (MLNR), Environmental Protection Agency (EPA), Forestry Commission (FC), Forestry Research Institute of Ghana of the Council for Scientific and Industrial Research (CSIR-FORIG), Lands Commission, Ministry of Environment, Science, Technology and Innovation (MESTI), Ministry of Local Government and Rural Development (MLGRD), Metropolitan, Municipal and District Assemblies (MMDAs), Ministry of Food and Agriculture (MoFA), National Commission for Civic Education (NCCE), NDPC, research and academic institutions; community-based organizations (CBOs), non-governmental organizations (NGOs), private sector organizations, religious bodies, traditional authorities.

**Estimated Cost:** US\$75,000,000



## Programme 4.2: Securing the Integrity of Forest and other Natural Ecosystems

**Objective:** To improve sustainable management practices to secure continuity of natural ecosystems and their functions.

**Justification:**

Institutional capacities at the national, regional, district and local levels are weak. There is therefore a need to strengthen existing traditional and local systems, emphasizing the role that indigenous knowledge plays in sustainable use and conservation of natural resources. In strengthening natural resources management, the Government would have to monitor and manage issues on illegal logging and the challenges of the acquisition of permits by small-scale timber firms. This will ensure the control of illegal logging and chainsaw lumbering operations within Timber Utilization Contract (TUC) areas. There is also a need to establish functional links upstream and downstream for the efficient tracking of fiscal revenues. A secured forest and other natural ecosystems will improve soil fertility, increase plant and animal biodiversity, and protect watershed systems hence assuring a sustainable supply of potable water.

Climate change poses threats to forest and other natural ecosystems through flood, fire, disease and pest outbreak and modified growing seasons. Targeted research on the impact of climate change on forest and other natural ecosystems is critical for the design of related adaption and mitigation measures meant to improve the resilience of these ecosystems. Resilient natural ecosystems are a guarantee for support of natural ecosystem-related livelihood activities.

**Action:**

4.2.1 Improve and sustain protected area and bio-reserve management and that of traditional protected areas (for example, CREMAs and Sacred Groves) for biodiversity conservation.

4.2.2 Enhance sustainable management and monitoring of forests, within reserves and in off-reserve areas, and other natural ecosystems.

4.2.3 Implement measures to address desertification in Ghana.

4.2.4 Reduce pressure on forest and other natural ecosystems while optimizing fiscal revenue.

4.2.5 Support research on the impact of climate change on biodiversity and natural resources.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Lands and Natural Resources (MLNR), EPA, FC, MESTI, MoFA, MLGRD, MMDAs, NDPC, research and academic institutions; CBOs, NGOs, private sector organizations, traditional authorities.

**Estimated Cost:** US\$250,000,000

## Programme 4.3: Sustainable Wood-based Fuel Production and Development for Domestic Energy Supply

**Objective:** To improve efficiency of wood fuel production and ensure development of alternative biofuels for sustainable energy supply in Ghana.

**Justification:**

Wood fuel consisting of firewood and charcoal is one of the main forest products in Ghana. It accounts for more than 70 per cent of the total primary energy supply, and about 60 per cent of final energy demand. The majority of both rural and urban households use wood fuel for cooking and water heating purposes. Due to the impact of the increasing population, urbanization and relative price changes in alternative energy sources such as LPG, consumption of wood fuel

will remain high and probably grow. This high demand coupled with unsustainable production practices, conversion and end-use inefficiencies and waste will put the country's forest and woodland resources, which supply the bulk of wood fuel, under intense pressure. Besides these, there is a low level of adoption of efficient charcoal production technology coupled with under-developed efficient charcoal and firewood use technologies at the household level. Since the demand for wood fuel will continue to increase, there is a need for policy measures which will ensure efficient production and use of the resources. Moreover, alternative fuel sources could be explored and harnessed to complement the important roles wood fuel is already playing in the socioeconomic development of rural households in particular. There is therefore a need to implement policy initiatives which will focus on promoting sustainable production of wood fuel and development of alternative fuel sources through research and capacity-building activities.

**Action:**

- 4.3.1 Support and promote research into the production and development of alternative biofuels (such as bamboo charcoal; logging, sawmill and agricultural residues; wood pellets; biogas; etc.)
- 4.3.2 Build capacity of fuel-wood-producing communities, NGOs, CBOs, women's groups and other identifiable groups to establish and effectively manage wood fuel plantations (including bamboo).
- 4.3.3 Develop efficient technologies for full utilization of wood residue for energy and technology transfer.
- 4.3.4 Develop efficient technology for the carbonization process.

**Timeline:** 2015–2020

**Responsibility:**

**MLNR and Ministry of Energy and Petroleum (MOEP)**, EPA, FC, Ghana Atomic Energy Commission, Ghana Energy Commission, MESTI, MLGRD, MMDAs, Ministry of Gender, Children, and Social Protection, research institutions and universities; CBOs, NGOs, private sector organizations (e.g. artisanal groups), traditional authorities.

**Estimated Cost:** US\$350,000,000

### **Programme 4.4: Plantation Development (Afforestation, Reforestation and Forest Restoration)**

**Objective:** To harness the potential of planted forests for sustainable timber supply and climate change mitigation, to contribute to low carbon development and green growth.

**Justification:**

Ghana's natural resources, including forests, are declining at a faster rate than ever before. The rapid reduction in these resources has consequences for rural economic development, biological diversity and particularly for climate change. There is the acceptance that plantation development is an effective management tool in restoring degraded areas, and also provides an important mechanism for carbon sequestration. Due to their critical roles, development of plantations has become an important part of the country's national forestry strategies. Although plantation programmes have received national attention, the sector is still underdeveloped and not fully integrated into the national development agenda. There is currently a national plantation development strategy which should be considered. The strategy document should be subjected to local and international social and environmental standards. Present efforts have been designed to reduce the pressure on existing natural forests and woodlands with the intention of providing alternative sources of wood supply. Planted

forests could, however, present enormous opportunities for climate change mitigation and adaptation. The new focus is therefore to harness the potential of plantations in harmonizing the long-term goal of meeting future demands for timber and to sequester carbon to mitigate climate change. This will be achieved through greater support for public, private and community investment in reforestation and afforestation programmes in designated areas.

It is important to ensure that forestry plantations do not take the place of primary forests which is important for ecosystem resilience.

**Action:**

- 4.4.1. Promote, through increased incentive packages (e.g., policy, funding, and carbon credit schemes), opportunities for plantation development and management in off-reserve areas through private and public-private partnerships.
- 4.4.2. Support the rehabilitation of degraded forest landscapes through enrichment planting and reforestation.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Lands and Natural Resources (MLNR)**, FC, MLGRD, MMDAs, Ministry of Finance and Economic Planning (MoFEP), research institutions and universities; CBOs, NGOs, private sector organizations (e.g., private plantation developers), traditional authorities.

**Estimated Cost:** US\$600,000,000

### **Programme 4.5: Conservation of Trees through Agroforestry and On-farm practices, and Greening of Urban Areas**

**Objective:** To conserve and plant trees in farm and fallow lands for carbon stock enhancement and livelihood improvement.

**Justification:**

The contribution of unsustainable agricultural practices to deforestation in the country has been of much concern over the years. To help address this challenge, agroforestry practices and technologies such as alley cropping and windbreaks were introduced and promoted in many parts of the country. These technologies and practices were promoted due to their perceived benefits including improvement in soil fertility, reducing soil erosion, improving biodiversity and diversifying rural livelihood options. The importance of agroforestry systems as carbon sinks has recently been recognized as a sustainable land-use approach for integrating forest carbon sequestration into agricultural production systems.

Agroforestry is seen as a compromise solution for climate change mitigation and adaptation because it increases carbon storage in land and at the same time has the potential to enhance agricultural productivity. The policy strategy therefore is to encourage and support farmers and landowners to conserve trees on their farm and fallow lands to enhance carbon sinks and also provide a good base for income diversification. While farms and fallow areas are reforested, District, Municipal and Metropolitan Assemblies should promote development of urban green areas such as parks and urban forests.

**Action:**

- 4.5.1 Support agroforestry programmes.
- 4.5.2 Provide incentives to and strengthen extension services for farmers and landowners to conserve trees on their farm and

fallow lands for economic benefit and enhancement of carbon stocks.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Lands and Natural Resources (MLNR) and Ministry of Food and Agriculture (MoFA), Department of Parks and Gardens, FC, Ghana Cocoa Board, Lands Commission, MESTI, MLGRD, MMDAs, Ministry of Energy and Petroleum (MOEP), Ministry of Roads and Highways, research institutions and universities; CBOs (such as farmers' groups, women's groups, landowners), civil society groups, NGOs, traditional authorities.

**Estimated Cost:** US\$450,000,000

## FOCUS AREA 4: INCREASE CARBON SINKS

### Programme 4.1: Improving Governance, Capacity and Regulatory Structures

#### Action 4.1.1: Review and strengthen legislation to effectively address land use rights, carbon rights and tenure systems, and equitable benefit-sharing mechanisms

Purpose of action: To clarify land and tree use rights, and provide sustainable benefit-sharing arrangements for forest resources especially of off-reserve stock.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Legislation to address land use rights and tenure systems, and benefit-sharing mechanisms reviewed and strengthened  | <ul style="list-style-type: none"> <li>Legal backing for tree ownership and benefit sharing</li> <li>Percentage of local community members with legally recognized tenure rights</li> </ul> | <ul style="list-style-type: none"> <li>Legal document for ownership and benefit-sharing arrangements</li> <li>National monitoring document</li> </ul> | <ul style="list-style-type: none"> <li>Parliament receives inputs from relevant stakeholders</li> <li>Local communities willing to participate in the process</li> </ul> |
| <b>Tasks:</b><br>4.1.1.1 Discuss and review the existing tenure and benefit-sharing arrangements to identify the current challenges and the potential remedial measures for improvement.<br>4.1.1.2 Formalize and amend the necessary portions of the current legal regime.<br>4.1.1.3 Implement the revised legislation to ensure sustainable management of forest resources particularly in the off-reserve areas. |   |   |  |
| <b>Outcomes:</b><br>I. Tree tenure and benefit-sharing schemes functioning and contributing to the improvement of the livelihood of local communities.<br>II. Sustainable forest resources use and management in off-reserve areas.  |   |   |  |

**Action 4.1.2: Support existing forest and natural resource governance initiatives and reforms such as the Forest Law Enforcement, Governance and Trade (FLEGT) initiative and the multi-donor Natural Resources and Environmental Governance Programme**

Purpose of action: To ensure that existing initiatives to improve governance are supported to achieve sustainability in the forest sector.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Existing forest and natural resource governance initiatives are supported and sustainability is achieved in the forestry sector. | <ul style="list-style-type: none"> <li>Initiatives are integrated into climate change initiatives and programmes</li> <li>Improved tracking system for harvested timber is in place</li> </ul> | <ul style="list-style-type: none"> <li>Forest Investment Programme (FIP) and REDD+ Readiness Preparation Proposal (R-PP). The R-PP aims to assist Ghana to prepare itself for reducing emissions from deforestation and forest degradation (REDD), and become 'ready' for the implementation of an international mechanism for REDD.</li> <li>Ghana's third national communication to the UNFCCC</li> </ul> | <ul style="list-style-type: none"> <li>Funding under these initiatives is sustainable</li> <li>Continued access for legally produced timber into European markets</li> <li>Political will to sustain the commitment to these initiatives</li> </ul> |

**Tasks:**

4.1.2.1 Integrate initiatives into implementation of the Forest Investment Programme (FIP) and other climate change related programmes.

4.1.2.2 Use funds for the implementation of programmes and projects under these initiatives.

**Outcomes:**

I. Predisposing and underlying factors of deforestation and forest degradation are effectively and efficiently addressed.

II. Effective log tracking and legality assurance scheme established and functioning.

III. Governance in the forest sector is improved.

**Action 4.1.3: Promote effective integration, consultation, education and participation at all levels of the decision-making process to reduce conflicts**

Purpose of action: To ensure a comprehensive and effective multi-stakeholder decision-making process in the forest sector.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Well-coordinated and effective multi-stakeholder decision-making process is achieved in the forestry sector. | <ul style="list-style-type: none"> <li>Consolidation of existing initiatives for integrated and participatory decision-making</li> <li>Functional multi-stakeholder decision-making platforms</li> </ul> | <ul style="list-style-type: none"> <li>Multi-stakeholder dialogue and decision-making platforms</li> <li>Proceedings and minutes of multi-stakeholder decision-making meetings</li> </ul> | <ul style="list-style-type: none"> <li>Funding under these initiatives is sustainable</li> <li>Commitment of participating stakeholders</li> <li>Political will to sustain the commitment to these initiatives</li> </ul> |

**Tasks:**

- 4.1.3.1 Consolidate existing initiatives for integrated and participatory decision-making in the forest sector.
- 4.1.3.2 Establish functional multi-stakeholder decision-making platforms at the district, regional and national levels.

**Outcomes:**

- I. Effective participation of key stakeholders in decision-making is ensured.
- II. Avenues for dialogue on important local and national issues in the forest sector are established and functional.
- III. Decision-making in the forest sector is improved.

**Action 4.1.4: Promote access to and increase knowledge of legislation to lowest level actors through translation of legislation into local languages. Integrate indigenous governance into conventional resource governance**

Purpose of action: To increase access to and improve comprehension of forest legislation at the local level while promoting an integrated indigenous and conventional resource governance system.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Improved access to and comprehension of forest laws by all, whilst ensuring the operation of an integrated indigenous and conventional resource governance system. | <ul style="list-style-type: none"> <li>Translation of forest laws into targeted local languages</li> <li>Mechanism for promotion of integrated indigenous and conventional resource governance system</li> </ul> | <ul style="list-style-type: none"> <li>Copies of local language versions of forest laws</li> <li>Established mechanism for integrated indigenous and conventional resource governance system</li> </ul> | <ul style="list-style-type: none"> <li>Funding for engagement of appropriately qualified translators</li> <li>Funds for capacity building in integrated indigenous and conventional resource governance system</li> </ul> |

**Tasks:**

- 4.1.4.1 Identify and engage qualified translators.
- 4.1.4.2 Develop a mechanism for integrated indigenous and conventional resource governance system.

**Outcomes:**

- I. Access to and comprehension of forest laws in local languages is improved.
- II. Integrated indigenous and conventional resource governance system is operationalized.
- III. Natural resource governance is improved.



## Programme 4.2: Securing the Integrity of Forest and other Natural Ecosystems

### Action 4.2.1: Improve and sustain protected area and bio-reserve management and that of traditional protected areas for biodiversity conservation

Purpose of action: To strengthen the legal, administrative and institutional framework for sustainable management of protected areas (PAs) and bio-reserves for biodiversity conservation.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|---|---|--|--|
| <b>Output:</b><br>Management of protected areas and bio-reserves for biodiversity conservation is improved and sustained  | <ul style="list-style-type: none"> <li>• Increase in legally gazetted and recognized protected areas and bio-reserves</li> <li>• Management plans in place</li> </ul>             | <ul style="list-style-type: none"> <li>• Ghana Gazette</li> <li>• Documents developing management plans</li> </ul>   | <ul style="list-style-type: none"> <li>• Sufficient consultation with relevant stakeholders</li> <li>• Funding for implementation of management plans</li> </ul> |
| <b>Tasks:</b><br>4.2.1.1 Discuss and review the existing legal framework to increase and give permanency to gazetted protected areas and bio-reserves.<br>4.2.1.2 Develop and review management plans for protected areas and bio-reserves.<br>4.2.1.3 . Develop training and capacity-building programmes for staff at all levels.<br>4.2.1.4 Develop a communications strategy which allows for effective transboundary cooperation with neighbouring countries.<br>4.2.1.5 Establish more buffer zones to improve livelihood options for fringing communities.<br>4.2.1.6 Set up a monitoring and reporting mechanism. |   |  |  |
| <b>Outcomes:</b><br>I. Improved conservation of biological diversity for climate change mitigation.<br>II. Legal control of bio-reserves and protected areas implemented and functioning.   |   |  |  |
| <b>Action 4.2.2: Enhance sustainable management and monitoring of forests, within reserves and in off-reserve areas, and other natural ecosystems</b><br>Purpose of action: To strengthen forest management practices for climate change mitigation and adaptation.   |   |  |  |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Forests within and outside reserve areas are monitored and sustainably managed.   | <ul style="list-style-type: none"> <li>• Change over time of total biomass</li> <li>• Number of stakeholder groups involved in sustainable forest management processes</li> </ul> | <ul style="list-style-type: none"> <li>• Country Forest Resources Assessment Report to Food and Agriculture Organization of the United Nations (FAO)</li> <li>• Monitoring report</li> </ul> | <ul style="list-style-type: none"> <li>• Funding is sustained</li> <li>• Effective communication strategy is developed</li> </ul>                                |



**Tasks:**

- 4.2.2.1 Revise Forest Management Plans and practices to adapt to impacts of climate change to secure their continuity and function.
- 4.2.2.2 Develop and use a multi-stakeholder approach to planning and management of forest resources.
- 4.2.2.3 Engage local communities, civil society groups, NGOs and the private sector in consultation and training for their effective participation in the planning and management processes.
- 4.2.2.4 Update information and inventories on forest resources within and outside reserves.
- 4.2.2.5 Develop intensive monitoring systems for disturbances such as degradation, wildfire and pest infestation to maintain the integrity of forest ecosystems.

**Outcomes:**

- I. Sustainable forests management integrated into national development planning processes.
- II. Multiple functions of forests are sustained.

**Action 4.2.3: Implement measures to address desertification in Ghana**

Purpose of action: To improve the resilience of savannah ecosystems for the sustainable provision of ecosystem goods and services.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Desertification in northern Ghana is prevented | <ul style="list-style-type: none"> <li>• Change in hectares of woodland cover (percentage change against baseline)</li> <li>• Management plans in place</li> </ul> | <ul style="list-style-type: none"> <li>• Monitoring report</li> <li>• Annual report</li> </ul> | <ul style="list-style-type: none"> <li>• Local people are willing to accept sustainable practices</li> <li>• Funding is sustainable</li> </ul> |

**Tasks:**

- 4.2.3.1 Create awareness of sustainable practices such as mixed farming, agroforestry practices, and improved wood fuel production.
- 4.2.3.2 Develop management plans and operating manuals to guide sustainable management of woodland resources.
- 4.2.3.3 Design incentive packages to promote community-based wildfire prevention and control.
- 4.2.3.4 Develop regrowth of vegetation plan through a participatory process to help maintain vegetation cover especially along riparian areas.

**Outcomes:**

- I. Management plans prepared and implemented.
- II. Savannah ecosystems management integrated into existing development programmes such as the Savannah Accelerated Development programme.

**Action 4.2.4: Reduce pressure on forest and other natural ecosystems while optimizing fiscal revenues**

Purpose of action: To provide a sustainable financial basis and economic incentives for sustainable forest and wildlife management.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Fiscal revenues maximized whilst pressure on ecosystems reduced.  | <ul style="list-style-type: none"> <li>Fiscal reforms in place</li> <li>Contribution of forest sector to Gross Domestic Product (GDP)</li> </ul> | <ul style="list-style-type: none"> <li>Fiscal reform document</li> <li>Estimated cost statement</li> </ul> | <ul style="list-style-type: none"> <li>Private sector is willing to cooperate</li> <li>Efficient monitoring system in place</li> </ul> |
| <b>Tasks:</b><br>4.2.4.1 Discuss and review existing revenue regimes such as taxes, stumpage and rents to streamline collection, and methods leading to improvement in capturing tree data.<br>4.2.4.2 Develop transparent mechanisms for the recovery and redistribution of revenues.<br>4.2.4.3 Set up efficient monitoring systems to track revenue collection, recovery and redistribution. |  |  |  |
| <b>Outcomes:</b><br>I. Fees and taxes rationalized and collection system functional.<br>II. Contribution of forest sector to national economy improved.   |  |  |  |

**Action 4.2.5: Support research on the impact of climate change on biodiversity and natural resources**

Purpose of action: To ensure that the impact of climate change on biodiversity and natural resources is well understood and the information is reliable.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Information on climate change effect on biodiversity and natural resources.  | <ul style="list-style-type: none"> <li>Commissioned research projects on climate change impacts</li> <li>Implemented research activities</li> </ul> | <ul style="list-style-type: none"> <li>Technical reports on climate change impact on biodiversity and natural resources</li> <li>Information sheets on climate change impact</li> </ul> | <ul style="list-style-type: none"> <li>Availability and engagement of qualified researchers.</li> <li>Funds for proposed research studies</li> </ul> |
| <b>Tasks:</b><br>4.2.5.1 Develop research proposals on climate change impact on biodiversity and natural resources.<br>4.2.5.2 Provide information on climate change impact on biodiversity and natural resources to public in format that are comprehensible. |   |   |  |

**Outcomes:**

- I. Targeted research projects on climate impact on biodiversity and natural resources established.
- II. Reliable information climate change effect on biodiversity and natural resources provided.

**Programme 4.3: Sustainable Wood-based Fuel Production and Development for Domestic Energy Supply****Action 4.3.1: Support and promote research into the production and development of alternative biofuels (such as bamboo charcoal; logging, sawmill and agricultural residues; wood pellets; biogas; etc.)**

Purpose of action: To ensure that alternative fuel sources are available for use in order to reduce the rate of deforestation and degradation of the forests through the use of forest-sourced wood fuel.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Alternative biofuel resources and production technologies researched and developed.  | <ul style="list-style-type: none"> <li>Number of households using alternative biofuel increased</li> </ul> | <ul style="list-style-type: none"> <li>Visit to communities and households</li> <li>Reports</li> </ul> | <ul style="list-style-type: none"> <li>Communities are willing to use alternative biofuel and resource developed</li> <li>Community willingness to participate in training</li> <li>Effective communication strategy developed for training</li> </ul> |
| <b>Tasks:</b><br>4.3.1.1 Research different alternatives of biofuel such as bamboo charcoal, wood pellets, biogas, briquettes.<br>4.3.1.2 Develop technology to improve production efficiency of researched and existing biofuel options (for example, cogeneration, briquetting, charcoal production).<br>4.3.1.3 Create awareness and promote dissemination of improved techniques and efficiency in biofuel production and usage.<br>4.3.1.4 Build capacity of local communities, especially of women, in sustainable and efficient harvesting, production, and utilization techniques.<br>4.2.1.5 Support the establishment of institutional framework to coordinate sustainable biofuel production and utilization as an integral part of national development. |  |  |  |
| <b>Outcomes:</b><br>I. Domestic energy security enhanced.<br>II. Sustainable biofuel alternatives and production technologies developed.   |  |  |  |

III. Capacity of local communities built to efficiently produce and utilize alternative sources of fuel.

**Action 4.3.2: Build capacity of fuel-wood-producing communities, NGOs, CBOs, women's groups and other identifiable groups to establish and effectively manage wood fuel plantations (including bamboo)**

Purpose of action: Plantations are effectively managed to reduce pressure on primary forests and also to help address wood fuel challenges.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>Capacity of fuel-wood-production communities, NGOs, CBOs, women's groups and other identifiable groups to establish and effectively manage plantations improved. | <ul style="list-style-type: none"> <li>Field visits to fuel-wood-producing communities</li> <li>Enhanced NGO and CBO activities related to woodlots and plantations in the communities</li> </ul> | <ul style="list-style-type: none"> <li>Yearly reports and photographs</li> <li>Media coverage of meetings</li> </ul> | <ul style="list-style-type: none"> <li>Communities are willing to fully participate in the capacity-building programme</li> <li>Plantations and woodlots have been established in the communities</li> </ul> |

**Tasks:**

4.3.2.1 Organize stakeholder consultative meetings on the capacity gaps relevant to different identifiable groups.

4.3.2.2 Formulate and promote activities to manage private woodlots and plantations as sustainable alternatives to firewood collection.

4.3.2.3 Provide extension services for the establishment and management of family community woodlots.

**Outcomes:**

I. Capacity of fuel-wood-producing communities enhanced.

II. Fuel wood demand by rural and urban communities is met.

III. Domestic energy supply in the country is enhanced.

**Action 4.3.3: Develop efficient technologies for full utilization of wood residue for energy and technology transfer**

Purpose of action: To reduce carbon emissions, deforestation and forest degradation.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Introduction and adoption of efficient technologies for generation of bioenergy. | <ul style="list-style-type: none"> <li>Documented technologies adopted for energy generation</li> <li>Field visits to organizations</li> </ul> | <ul style="list-style-type: none"> <li>Field visit reports</li> </ul> | <ul style="list-style-type: none"> <li>Willingness to adopt the technologies</li> </ul> |

**Tasks:**

4.3.3.1 Identify potential users of the technologies for transfer.

4.3.3.2 Provide capacity-building on how to use the technologies.

4.3.3.3 Provide incentive system and extension services to promote adoption of the new technologies.

**Outcomes:**

I. Potential users of the technologies for transfer are identified.

II. Capacity of users is developed.

III. Efficient technologies for generation of energy from wood residues bioenergy transferred.

**Action 4.3.4: Develop efficient technologies for the carbonization process**

Purpose of action: To reduce carbon emissions, deforestation and forest degradation.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Introduction and adoption of efficient technologies for charcoal production. | <ul style="list-style-type: none"> <li>Field visits to charcoal-producing communities</li> </ul> | <ul style="list-style-type: none"> <li>Yearly reports and photographs</li> <li>Media coverage of meetings</li> </ul> | <ul style="list-style-type: none"> <li>Communities are willing to fully participate in the capacity-building programme</li> <li>Charcoal producers willing to adopt the efficient technologies for production</li> </ul> |

**Tasks:**

4.3.4.1 Identify potential users of the technologies for transfer.

4.3.4.2 Provide capacity-building on how to use the technologies.

4.3.4.3 Provide incentive system and extension services to promote adoption of the new technologies.

**Outcomes:**

I. Potential users of the technologies for transfer identified.

II. Capacity of charcoal producers developed.

III. Efficient technologies for charcoal production.

### Programme 4.4: Plantation Development (Afforestation, Reforestation and Forest Restoration)

#### Action 4.4.1: Promote, through increased incentive packages (e.g., policy, funding, and carbon credit schemes), opportunities for plantation development and management in off-reserve areas through private and public-private partnerships

Purpose of action: Increase commercial plantations in off-reserve areas.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Plantation development and management promoted through increased incentives.  | <ul style="list-style-type: none"> <li>• Increase in financial assistance annually</li> <li>• Increase in commercial plantation</li> </ul>  | <ul style="list-style-type: none"> <li>• Annual reports and audit reports of Forestry Commission (FC) and Ministry of Lands and Natural Resources (MLNR)</li> <li>• Ghana Statistical Service (GSS) Survey Reports.</li> </ul> | <ul style="list-style-type: none"> <li>• Financial mechanism is sustainable</li> <li>• Funding is accessed by private and community plantation developers</li> </ul>  |
| <b>Tasks:</b><br>4.4.1.1 Review the existing Plantation Development Fund to streamline its operations.<br>4.4.1.2 Implement the revised fund through the setting-up of an independent board to manage the fund.<br>4.4.1.3 Develop an effective financial plan to ensure the sustainability of the fund through appropriate investment ventures.<br>4.4.1.4 Develop monitoring systems to ensure appropriate use and management of funds. |   |  |   |
| <b>Outcomes:</b><br>I. New Plantation Development Fund functioning, leading to increased commercial plantations cover.<br>II. Increased investment in commercial plantations which will help to meet the demand for wood and wood products.   |   |  |   |
| <b>Action 4.4.2: Support the rehabilitation of degraded forest landscapes through enrichment planting and reforestation</b><br>Purpose of action: To restore degraded landscapes for enhanced carbon stocks leading to improved rural livelihoods.  |   |  |   |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Rehabilitation of degraded forest landscapes supported.   | <ul style="list-style-type: none"> <li>• Increase in area of forest cover in ha.</li> <li>• Tons of carbon sequestered through rehabilitation activities</li> <li>• Change in area (ha.) of degraded forest lands (percentage change against baseline)</li> </ul> | <ul style="list-style-type: none"> <li>• National Forest Resources Assessment report to FAO</li> <li>• Third National Communication to UNFCCC</li> <li>• Monitoring report</li> </ul>  | <ul style="list-style-type: none"> <li>• Financial mechanism available</li> <li>• Regular monitoring assured</li> <li>• Effective control of bushfires will allow replanted seedlings in degraded forests to survive</li> </ul> |

**Tasks:**

- 4.4.2.1 Identify degraded sites suitable for rehabilitation.
- 4.4.2.2 Develop a National Restoration Plan with realistic targets based on scientific information.
- 4.4.2.3 Integrate the restoration plan into implementation of land-use planning and climate change related programmes.
- 4.4.2.4 Implement the restoration plan through a multi-stakeholder approach to facilitate the participation of all relevant stakeholders.
- 4.4.2.5 Provide training and technical support for developers involved in rehabilitation programmes.
- 4.4.2.6 Develop an efficient monitoring system to regularly assess success of plantations (in terms of area and survival).

**Outcomes:**

- I. Optimum delivery of forest-related goods and services for rural livelihood improvement.
- II. Increase carbon sequestration by forests and trees.

### Programme 4.5: Conservation of Trees through Agroforestry and On-farm practices and Greening of Urban Areas

#### Action 4.5.1: Support agroforestry programmes

Purpose of action: Maximize opportunity to increase carbon sequestration and improve agricultural productivity.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|---|---|---|---|
| <b>Output:</b><br>Agroforestry programmes initiated to conserve trees in association with crops, thus maximizing carbon sequestration and improving agricultural productivity.  | <ul style="list-style-type: none"> <li>• Increase yields (tons per ha.)</li> <li>• Increase percentage cover of trees (in ha.)</li> </ul> | <ul style="list-style-type: none"> <li>• Annual report</li> <li>• Inventory report</li> </ul> | <ul style="list-style-type: none"> <li>• Funding mechanism available</li> <li>• Farmer willingness to adopt technologies</li> </ul> |
| <b>Tasks:</b> <ul style="list-style-type: none"> <li>4.5.1.1 Create awareness of the relevance of agroforestry as a sustainable integrated land-use management tool.</li> <li>4.5.1.2 Disseminate agroforestry technologies through intensive extension services at the district level.</li> <li>4.5.1.3 Train farmers on sustainable tree management practices to maximize potential benefits.</li> <li>4.5.1.4 Develop linkages for market accessibility to enhance income-generating opportunities.</li> </ul> |   |   |   |

**Outcomes:**

- I. Increased productivity of farming systems.
- II. Sustainable income-generating opportunities for rural communities.

**Action 4.5.2: Provide incentives to and strengthen extension services for farmers and landowners to conserve trees on their farm and fallow lands for economic benefit and enhancement of carbon stocks**

Purpose of action: Increase the participation of farmers and local communities in the conservation and management of trees outside forest reserves and promote the equitable distribution of benefits from such resources.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Incentives and extension services for farmers and landowners to conserve trees in their farm and fallow lands provided.   | <ul style="list-style-type: none"> <li>• Increase the area and number of trees under legal control in areas outside forest reserves (farms and fallow areas) by 5%</li> <li>• Increase in off-reserve tree stocks</li> </ul> | <ul style="list-style-type: none"> <li>• Monitoring and evaluation report</li> <li>• Inventory report</li> </ul> | <ul style="list-style-type: none"> <li>• Farmers willingness to grow and maintain trees</li> <li>• Illegal logging operations</li> </ul> |
| <b>Tasks:</b><br>4.5.2.1 Discuss and review the existing land tenure and benefit-sharing arrangements to identify remedial measures for improvement.<br>4.5.2.2 Enact the necessary legislation to empower communities and private individuals to have control over trees on their farm and fallow lands.<br>4.5.2.3 Develop an implementation plan for revised legislation to ensure sustainable management of forest resources particularly in the off-reserve areas. |  |  |  |
| <b>Outcomes:</b><br>I. Conservation of trees in farm and fallow lands.<br>II. Tenure laws known, understood and enforced.   |  |  |  |



## Summary

### Timeline for Actions to be taken on Programme Areas

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 4: Increase Carbon Sinks  |   | Lead Org. | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$ |
|---|---|-----------|------|---|------|---|------|---|------|---|------|---|------|---|---------------------|
| Programme Area and Actions  |   |           | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                     |
| Programme Area 4.1: Improving governance, capacity and regulatory structures      |   | MLNR      |      |   |      |   |      |   |      |   |      |   |      |   | 75,000,000          |
| 4.1.1   | Review and strengthen legislation to effectively address land use rights, carbon rights and tenure systems, and equitable benefit-sharing mechanisms.   |           | x    | x | x    | x |      |   |      |   |      |   |      |   |                     |
| 4.1.2   | Support existing forest and natural resource governance initiatives and reforms such as the Forest Law Enforcement, Governance and Trade (FLEGT) initiative and the multi-donor Natural Resources and Environmental Governance Programme. |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 4.1.3   | Promote effective integration, consultation, education and participation at all levels of the decision-making process to reduce conflicts.  |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 4.1.4   | Promote access to and increase knowledge of legislation to lowest level actors through translation of legislation into local languages. Integrate indigenous governance into conventional resource governance.                            |           |      |   |      |   | x    | x | x    | x | x    | x | x    | x |                     |
| Programme Area 4.2: Securing the integrity of forest and other natural ecosystems |   | MLNR      |      |   |      |   |      |   |      |   |      |   |      |   | 250,000,000         |
| 4.2.1   | Improve and sustain protected area and bio-reserve management and that of traditional protected areas, for example CREMAs and Sacred Groves, for biodiversity conservation.   |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 4.2.2   | Enhance sustainable management and monitoring of forests, within reserves and in off-reserve areas, and other natural ecosystems.   |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 4.2.3   | Implement measures to address desertification in Ghana.   |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 4.2.4   | Reduce pressure on forest and other natural ecosystems while optimizing fiscal revenue.   |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 4.2.5   | Support research on the impact of climate change on biodiversity and natural resources.   |           | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |

| <b>Programme Area 4.3: Sustainable wood-based fuel production and development for domestic energy supply</b>             |   | <b>MLNR and MOEP</b> |   |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>350,000,000</b> |
|--|---|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|
| 4.3.1  | Support and promote research into the production and development of alternative biofuels (such as bamboo charcoal; logging, sawmill and agricultural residues; wood pellets; biogas; etc.).                                     |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 4.3.2  | Build capacity of fuel-wood-producing communities, NGOs, CBOs, women's groups and other identifiable groups to establish and effectively manage wood fuel plantations (including bamboo).                                       |                      |   |   | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 4.3.3  | Develop efficient technologies for full utilization of wood residue for energy and technology transfer.   |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 4.3.4  | Develop efficient technology for the carbonization process.   |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 4.4: Plantation development (afforestation, reforestation and forest restoration)</b>                  |   | <b>MLNR</b>          |   |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>600,000,000</b> |
| 4.4.1  | Promote, through increased incentive packages (e.g., policy, funding, and carbon credit schemes), opportunities for plantation development and management in off-reserve areas through private and public-private partnerships. |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 4.4.2  | Support the rehabilitation of degraded forest landscapes through enrichment planting and reforestation.   |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 4.5: Conservation of trees through agroforestry and on-farm practices, and greening of urban areas</b> |   | <b>MLNR and MoFA</b> |   |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>450,000,000</b> |
| 4.5.1  | Support agroforestry programmes.  |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 4.5.2  | Provide incentives to and strengthen extension services for farmers and landowners to conserve trees on their farm and fallow lands for economic benefit and enhancement of carbon stocks.                                      |                      | x | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 4: Increase Carbon Sinks</b>  | <b>Lead Org</b>      | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 4.1: Improving governance, capacity and regulatory structures</b>                                      | <b>MLNR</b>          | 20,000,000  | 18,000,000  | 11,000,000  | 9,000,000   | 8,000,000   | 9,000,000   | <b>75,000,000</b>          |
| <b>Programme Area 4.2: Securing the integrity of forest and other natural ecosystems</b>                                 | <b>MLNR</b>          | 66,000,000  | 55,400,000  | 38,400,000  | 33,400,000  | 33,400,000  | 23,400,000  | <b>250,000,000</b>         |
| <b>Programme Area 4.3: Sustainable wood-based fuel production and development for domestic energy supply</b>             | <b>MLNR and MOEP</b> | 30,000,000  | 120,000,000 | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | <b>350,000,000</b>         |
| <b>Programme Area 4.4: Plantation development (afforestation, reforestation and forest restoration)</b>                  | <b>MLNR</b>          | 250,000,000 | 70,000,000  | 70,000,000  | 70,000,000  | 70,000,000  | 70,000,000  | <b>600,000,000</b>         |
| <b>Programme Area 4.5: Conservation of trees through agroforestry and on-farm practices, and greening of urban areas</b> | <b>MLNR and MoFA</b> | 125,000,000 | 85,000,000  | 60,000,000  | 60,000,000  | 60,000,000  | 60,000,000  | <b>450,000,000</b>         |



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## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 5: Improve Management and Resilience of Terrestrial and Aquatic Ecosystems (including Marine Ecosystems)**

## Policy Focus Area 5: Improve Management and Resilience of Terrestrial and Aquatic Ecosystems (including Marine Ecosystems)

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### Introduction

Climate change and its impacts are a reality in Ghana. Studies have shown that Ghana's climatic conditions have changed over the past four decades, with a temperature increase of 1°C resulting in immense negative impacts on the terrestrial and aquatic ecosystems, including the marine ecosystem. Within the same period it has been reported that rainfall and runoff declined by about 20 per cent and 30 per cent respectively. Such extreme and unpredictable events have devastating consequences for Ghana's socioeconomic development, food security, water resources, health and livelihoods.

Ghana needs to improve the management and resilience of its terrestrial and aquatic ecosystems in order to minimize the impact of climate change. Resilience is the amount of change a system can undergo (its capacity to absorb disturbance) and retain essentially the same function, structure and feedbacks. Ghana has about 500 km of marine coastline on the west coast of Africa, along the Atlantic Ocean in the Gulf of Guinea, with immense economic benefits such as fishing and transportation. The coastal fisheries and wetlands resources provide a critical source of food security in the country. In recent times the marine waters of Ghana have become important for oil and gas exploration following the discovery of oil deposits in commercial quantities in 2007. The marine territorial waters within the 200 nautical miles of the Economic Exclusion Zone provide tremendous marine fishing opportunities for both local and registered international fishing companies.

Ghana's terrestrial and aquatic ecosystems are essential to the provision of important goods and services for social and economic

development. These ecosystems are currently experiencing continuous decline at an alarming rate as a result of several factors cutting across various sectors of the Ghanaian economy. The need to mainstream the management of the terrestrial and aquatic ecosystems into national policy planning and the budgeting process has therefore become critical to ensure that the use of the resources is sustainable.

Environmental issues are cross cutting and the sustainable management of natural and renewable resources is essential to deliver the national Medium-Term Development Policy Framework (MTDPF). The MTDPF: Ghana Shared Growth and Development Agenda (GSGDA), 2014–2017, presents ten key focus areas for sustainable natural resources management, of which seven are directly linked to the natural resources management policy area. The remaining three key focus areas have links to the climate change policy area. However, the National Climate Change Policy (NCCP) contains two main focus areas as priority areas for climate change mitigation and adaptation under the natural resources management in the country. These priority areas include increased carbon sinks and improved management and resilience of terrestrial and aquatic ecosystems (including marine ecosystems).

## **Focus Areas of MTDPF: GSGDA, 2014–2017 links with Natural Resources Management Policy Area**

### **Sustainable Natural Resource Management**

#### **Policy and Strategies/Measures**

##### **Coastal ecosystems**

*Use of economic incentives and policy and institutional reforms for effective coastal resource management:*

Promote multi-stakeholder practices in planning and management of coastal resources.

##### **Wetlands and water resources**

*Sustainable use of wetlands:*

Promote decentralization and participatory wetlands management. Develop and promote measures to build local capacity to support wetlands management and to promote sustainable livelihood strategies.

*Integrated water resource management:*

Develop capacity for water resource management.

## **National Climate Change Policy: Mainstreaming Natural Resources Management Focus Areas Linked with MTDPF: GSGDA, 2014–2017**

### **Policy Focus Area Objectives**

#### **Policy Actions**

*Ensure effective management and conservation of terrestrial and aquatic ecosystems:*

- Improve the management of important ecosystems and hotspots;
- Promote effective spatial planning and land zoning, mapping and production of land resource management plans at all levels;
- Support local, national and international policies that encourage management of terrestrial and aquatic ecosystems;

- Improve mechanisms for fair and equitable sharing of natural resource benefits, including defining tenure rights, minimizing the encroachment into forest reserves and reducing conflict over permitted farms and community centres;
- Support scientific research, including into 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;
- Apply technologies to provide information for detection and early warning systems for weather-related hazards;
- Support awareness creation and dissemination programmes;
- Establish ecological networks or biological corridors to link fragmented forests, for example, through the establishment of Community Resources Management Areas (CREMAs) or linking up with existing CREMAs for synergy;
- Promote the use of biodiversity and ecosystem services as part of the adaptation strategy to climate change;
- Promote economic and social incentive measures for successful natural resources management;
- Promote afforestation to enhance dry season flows in basins.

#### **Mainstreaming Methodology based on NDPC Guidelines**

The National Development Planning Commission (NDPC) has prepared comprehensive guidelines to direct the development of sectoral medium-term development plans (SMTDPs) for 2015–2020. The guidelines contain detailed activities including relevant steps for the development of SMTDPs, how intra- and inter-sectoral issues would be addressed, and how to integrate cross-cutting issues in development policies, programmes and projects for sustainable development. The strategies for mainstreaming natural resources

management issues into the sector policies, planning and estimated costing process based on the NDPC guidelines for the preparation of SMTDPs are listed below:

**Stakeholder consultation and development of road map**

- Awareness-raising at all levels among relevant stakeholders on sustainable natural resources management;
- Institutional capacity needs assessment: capacity needs of institutions to be identified, together with building the capacity of relevant stakeholders including local communities to ensure participation in natural resources management, policy planning and decision-making;
- Developing training programmes and capacity-building workshops that are linked to the identified capacity needs;
- In collaboration with key stakeholders, developing strategies to ensure that natural resources management is integrated into the socioeconomic activities and estimated costing process of

ministries, departments and agencies, and Metropolitan, Municipal and District Assemblies (MMDAs);

- Integrating monitoring and evaluation of natural resource management measures into the current monitoring and evaluation framework for the Natural Resource and Environmental Governance Programme and other ongoing activities;
- The stakeholder consultation and development of the road map, as well as development of training programmes and capacity- building of all key stakeholders, would ensure effective identification of the mainstreaming process for the natural resources management measures in national policy planning. It would allow for the evaluation of the socioeconomic impact of sustainable natural resources use; and for the development of strategies and mechanisms for mainstreaming in the natural resources management thematic area.



### Programme 5.1: Improved Marine and Coastal Ecosystems Management

**Objective:** To safeguard marine and coastal zone resources for the sustained provision of goods, services and functions.

**Justification:**

Marine and coastal resources play critical roles in maintaining and providing important ecosystem goods and services. The coastal zone represents about 6.5 per cent of Ghana's land area, yet accommodates 25 per cent of the nation's population and hosts about 80 per cent of its industrial establishments. Different sectors of the economy such as tourism, fisheries, agriculture, transportation, salt production, and oil and gas production exploit these resources. These natural resources are threatened by domestic and industrial pollution, fisheries degradation, wetlands and mangrove degradation, coastal erosion, biodiversity loss and aquatic weed encroachment. Under the projected economic growth of 8.0 per cent per annum, 16 out of the 21 coastal districts will have “high” and “extreme” levels of domestic pollution by 2020. Industrial water pollution is a moderate to high priority issue in 6 out of 21 coastal districts. Fisheries exploitation is far above the annual sustainable yield with an excess of 34,000 tons.

In addition to the threat from socioeconomic activities, higher sea levels and decreasing shorelines due to climate change experienced in the coastal areas are a further threat to coastal ecosystems. Safeguarding marine and coastal zone resources calls for a comprehensive ecosystem-based approach. The present programme seeks to use an ecosystem-based approach to promote cross-sectoral collaboration between relevant agencies, and community inclusiveness, and establish marine protected areas for the sustainable management of the marine coastal resources. This will protect and conserve the natural resources.

**Action:**

- 5.1.1 Develop marine and coastal zone sustainable management and development policy.
- 5.1.2 Operationalize existing policies and strategies, for example, the Environmental Protection Agency (EPA) oil spill sensitivity planning, the Wetlands Conservation Strategy, Town and Country Planning, land use plan for the Western Region, and the Spatial Development Framework for the Northern Zone.
- 5.1.3 Establish marine protected areas.
- 5.1.4 Promote and empower communities to utilize marine and coastal resources in a climate responsive manner and within sustainable limits.
- 5.1.5 Strengthen effective monitoring of industrial fishing activities and coastal and marine pollution to ensure compliance with standards aimed at enhancing the quality of marine ecosystems.
- 5.1.6 Protect coastal wetlands and mangroves including Ramsar sites to enhance coastal resilience.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Fisheries and Aquaculture Development (MOFAD) and Ministry of Environment, Science, Technology and Innovation (MESTI), Environmental Protection Agency (EPA), Forestry Commission (FC), Ghana Navy, Ministry of Defence, Ministry of Interior, Ministry of Tourism, Culture and Creative Arts, Ministry of Local Government and Rural Development (MLGRD), Ministry of Lands and Natural Resources (MLNR), Metropolitan, Municipal and District Assemblies (MMDAs), research institutions and universities, civil society groups, non-governmental organizations (NGOs) and community-based organizations (CBOs), traditional authorities.

**Estimated Cost:** US\$250,000,000



### Programme 5.2: Community-based Natural Resources Management

**Objective:** To enhance local-level participation in natural resources management for sustainable development and climate change mitigation and adaptation.

**Justification:**

Many people in the country rely on natural resources for food, fibre, and medicine to support their livelihoods. Although local communities fringing these resources are mostly the primary users, they do not participate in the decision-making process. Natural resources have been managed by a centralized system based on a technical approach to resources management. This intrusive top-down approach has, however, failed to achieve the desired results. The role of local communities and other stakeholders has been reconsidered since they are the direct beneficiaries of policies related to natural resources. The present programme therefore seeks to achieve better resource management outcomes through full participation of local communities and the incorporation of local knowledge systems, norms and cultural practices in the planning and management processes.

**Action:**

- 5.2.1 Improve collaboration between local communities, civil society groups and relevant government organizations for effective participation in planning and management of natural resources and ownership, security and benefit-sharing of these resources.
- 5.2.2 Promote capacity-building activities for local communities to engage fully in sustainable community-based ecosystem management and climate change mitigation and adaptation actions.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Local Government and Rural Development (MLGRD) and Ministry of Lands and Natural Resources (MLNR), EPA, FC, MESTI, MMDAs, Ministry of Energy and Petroleum (MOEP), NDPC, research institutions and universities; civil society groups, CBOs, NGOs, traditional authorities.

**Estimated Cost:** US\$300,000,000

### Programme 5.3: Economic Incentive Measures

**Objective:** To ensure a balance between sustainable natural resources management and improvement of economic well-being of local communities in the context of a green economy.

**Justification:**

The high rate of ecosystem degradation has led to a loss of biodiversity and increased emissions of greenhouse gases into the atmosphere. Conserving ecosystems and natural resources could help to reduce greenhouse gas emissions and biodiversity loss. However, most resource users are involved in activities such as illegal small-scale mining, illegal chainsaw milling, clearing of vegetation for agriculture and sand mining (also known as sand winning) which degrade these resources, because there is often little immediate economic gain from conserving natural resources. Policies in the natural resources sectors mostly pay little attention to immediate economic considerations. Most incentives to protect and conserve natural resources do not provide instantaneous rewards, so alternative land uses are preferred. Sustainable management of natural resources must aim to generate local economic benefits which are sufficient to outweigh the opportunity costs incurred by managing the resources sustainably. The present programme is therefore geared towards achieving a balance between sustainable natural resources management and improvement in the economic situation of local communities.

**Action:**

- 5.3.1 Promote local enterprises and alternative livelihoods, and marketing of enabling environmental programmes or activities, such as bee-keeping, soap making, grasscutter (cane rat) rearing, and petty trading, to improve incomes and reduce the pressure on natural resources.
- 5.3.2 Promote public and private sector investments in ecotourism and support for community-based ecotourism programmes.
- 5.3.3 Ensure natural resources valuation, for example determination of costs of environmental degradation in various sectors, within the national accounting system.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Trade and Industry (MOTI) and Ministry of Lands and Natural Resources (MLNR), FC, Ministry of Finance and Economic Planning (MoFEP), Ministry of Tourism, Ghana Tourism Authority, Ministry of Food and Agriculture (MoFA), MLGRD, MMDAs; civil society groups, CBOs, NGOs, traditional authorities.

**Estimated Cost:** US\$300,000,000

## Programme 5.4: Ecosystem-based Adaptation

**Objective:** To reduce the vulnerability of local communities and ecosystems to climate change and variability.

**Justification:**

Most communities in the country depend largely on natural resources and ecosystem services to support their livelihoods. However, the

capacity of ecosystems to provide such services is threatened by land use and climatic changes. Climate change and variability is inevitable, and therefore requires appropriate measures for vulnerable groups in society to adapt to it. There is also every indication that both rural and urban dwellers in the country will continue to depend directly or indirectly on ecosystems such as forests, mangroves and coastal wetlands for their livelihoods. It is therefore important to integrate adaptation measures into policies and programmes that promote sustainable resource management and land-use planning. The present programme therefore seeks to promote multisectoral and multi-scale approaches to ensure sustainable management of ecosystems to help society to adapt to climate change and variability.

**Action:**

- 5.4.1 Create adaptation fund to support targeted research, knowledge management and transfer, capacity-building and local adaptation projects using the ecosystem-based adaption approach.
- 5.4.2 Promote multi-stakeholder approaches in planning and implementation of adaptation projects.
- 5.4.3 Learn and scale up best practices on ecosystem-based adaptation strategies such as the community-based adaptation model.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Environment, Science, Technology and Innovation (MESTI), EPA, FC, MLGRD, MLNR, MoFEP, MMDAs, research institutions and universities; CBOs, NGOs, traditional authorities.

**Estimated Cost:** US\$360,000,000

## FOCUS AREA 5: IMPROVE MANAGEMENT AND RESILIENCE OF TERRESTRIAL AND AQUATIC ECOSYSTEMS (INCLUDING MARINE)

### Programme 5.1: Improved Marine and Coastal Ecosystems Management

| <b>Action 5.1.1: Develop marine and coastal zone sustainable management and development policy</b><br>Purpose of action: Effective implementation of marine and coastal zone governance training and capacity-building activities, to slow degradation so as to reduce frequency and severity of environmental disasters.  |  |   |   |
|--|--|---|---|
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Marine and coastal zone management policy developed.   | <ul style="list-style-type: none"> <li>Policy document and operational documents developed and made available to stakeholders</li> <li>Eligible stakeholders trained in natural resources governance issues</li> </ul> | <ul style="list-style-type: none"> <li>Monitoring and financial reports</li> <li>Training activities report and certificate of participation</li> </ul> | <ul style="list-style-type: none"> <li>Funding for training and capacity-building available</li> <li>Stakeholders attend training and capacity-building programmes</li> </ul> |
| <b>Tasks:</b><br>5.1.1.1 Develop marine and coastal zone management policy, and categorize and prioritize stakeholder capacity-building initiatives.<br>5.1.1.2 Provide financial and logistical support for implementation of initiatives.  |  |   |   |
| <b>Outcomes:</b><br>I. Marine and coastal zone management policy and governance mechanisms known and understood by stakeholders.<br>II. Improved accountability, transparency and participation in marine and coastal zone management.<br>III. Reduced conflict in the management of marine and coastal zone resources.  |  |   |   |
| <b>Action 5.1.2: Operationalize existing policies and strategies, for example, the EPA oil spill sensitivity planning, the Wetlands Conservation Strategy, Town and Country Planning, land use plan for the Western Region, and the Spatial Development Framework for the Northern Zone</b><br>Purpose of action: To ensure effective management of wetland resources. |  |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Sustainable management of marine and coastal resources.  | <ul style="list-style-type: none"> <li>Policy and operational documents developed on relevant ecosystems</li> </ul>  | <ul style="list-style-type: none"> <li>Ratified policy documents</li> <li>Policy implementation guidelines</li> </ul>                                   | <ul style="list-style-type: none"> <li>Appropriateness of implementation strategies</li> <li>Funding for policy implementation strategies</li> </ul>                          |
| <b>Tasks:</b><br>5.1.2.1 Develop policy implementation and communication strategies.<br>5.1.2.2 Provide financial and logistical support for implementation of initiatives.  |  |   |   |
| <b>Outcomes:</b><br>I. Policy implementation communication and strategies developed.<br>II. Sustainable management of marine and coastal resources enhanced.   |  |   |   |

**Action 5.1.3: Establish marine protected areas**

Purpose of action: To conserve marine hotspots and other fragile marine and coastal area ecosystems.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Marine and Coastal Area Protected Areas established and managed sustainably. | <ul style="list-style-type: none"> <li>Hotspots and fragile marine and coastal areas earmarked for protection documented</li> <li>Management plans developed for the protected areas</li> </ul> | <ul style="list-style-type: none"> <li>Ghana gazette</li> <li>Documents of EPA and Ministry of Fisheries and Aquaculture Development</li> <li>Marine Protected Area Management Plans</li> </ul> | <ul style="list-style-type: none"> <li>Sufficient consultation with relevant stakeholders</li> <li>Funding for implementation of management plans</li> </ul> |

**Tasks:**

5.1.3.1 Discuss and review the existing legal framework for the creation of Marine and Coastal Areas protected areas (PAs).

5.1.3.2 Develop and review management plans for marine and coastal protected areas.

5.1.3.3. Reform institutional and administrative structures for the management of marine and coastal protected areas.

5.1.3.4 Capacity-building for key institutions and stakeholders.

5.1.3.5 Develop monitoring, reporting and verification (MRV) mechanisms.

**Outcomes:**

I. Marine and coastal protected areas are established and functioning.

II. Improved management of marine and coastal areas.

**Action 5.1.4: Promote and empower communities to utilize marine and coastal resources in a climate responsive manner and within sustainable limits**

Purpose of action: to ensure sustainable utilization of marine and coastal resources.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Sustainable utilization of marine and coastal resources by local communities promoted. | <ul style="list-style-type: none"> <li>Field visits and documentation of practical sustainable utilization of marine and coastal resources in local communities</li> <li>Developed capacity building communication strategies for introduction of sustainable approaches to resources utilization</li> </ul> | <ul style="list-style-type: none"> <li>Field visit reports</li> <li>Documentary on sustainable utilization of marine and coastal resources</li> <li>Workshop proceedings</li> </ul> | <ul style="list-style-type: none"> <li>Community willingness to participate in training on sustainable approaches to resources utilization</li> <li>Effective communication strategy developed for training on sustainable approaches to resources utilization</li> <li>Communities' willingness to adopt sustainable approaches to resources utilization</li> </ul> |

**Tasks:**

5.1.4.1 Identify gaps in sustainable utilization of marine and coastal resources in local communities.

5.1.4.2 Organize sensitization workshops on the importance of the sustainability of the utilization of marine and coastal resources.

| 5.1.4.3 Develop communication strategies for the introduction of sustainable approaches to resources utilization.  |   |  |  |
|--|---|--|--|
| 5.1.4.4 Organize training workshops on approaches to sustainable utilization of marine and coastal resources in local communities.   |   |  |  |
| <b>Outcomes:</b><br>I. Communities sensitized on the importance of sustainable approaches to resources utilization.<br>II. Communities trained on the importance of sustainable approaches to resources utilization.<br>III. Sustainable utilization of marine and coastal resources by local communities promoted.                                |   |  |  |
| <b>Action 5.1.5: Strengthen effective monitoring of industrial fishing activities and coastal and marine pollution to ensure compliance with standards aimed at enhancing the quality of marine ecosystems</b><br>Purpose of action: To ensure compliance to sustainable environmental standards for conservation of coastal and marine resources. |   |  |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Robust monitoring of exploitation activities for sustainability of coastal and marine resources ensured.   | <ul style="list-style-type: none"> <li>Capacity need assessment conducted</li> <li>Training programmes on effective monitoring developed</li> </ul>       | <ul style="list-style-type: none"> <li>Capacity needs assessment reports</li> <li>Training workshop proceedings</li> <li>Training manuals</li> </ul> | <ul style="list-style-type: none"> <li>Reliable capacity need assessment</li> <li>Funds availability to procure state-of-the-art monitoring system for monitoring exploitation activities</li> </ul> |
| <b>Tasks:</b><br>5.1.5.1 Conduct technical capacity needs assessment.<br>5.1.5.2 Procure state-of-the-art monitoring system for monitoring exploitation activities.<br>5.1.5.3 Build capacity of monitoring teams for effective monitoring.  |   |  |  |
| <b>Outcomes:</b><br>I. Capacity needs for effective monitoring identified.<br>II. Effective technical monitoring capacity enhanced.  |   |  |  |
| <b>Action 5.1.6: Protect coastal wetlands and mangroves including Ramsar sites to enhance coastal resilience</b><br>Purpose of action: To enhance the resilience of wetlands ecosystems for livelihood enhancement and climate change mitigation.  |   |  |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Laws and regulation developed to protect wetland ecosystems.   | <ul style="list-style-type: none"> <li>Legal text for law and regulation</li> <li>Capacity enhancement programmes for law enforcement agencies</li> </ul> | <ul style="list-style-type: none"> <li>Legal document on wetland ecosystem protection</li> <li>Sensitization workshop proceedings</li> </ul>         | <ul style="list-style-type: none"> <li>Parliament receives inputs from relevant stakeholders</li> <li>Enforcement of laws and regulations for protection of wetland resources</li> </ul>             |

**Tasks:**

- 5.1.6.1 Enact laws and establish regulations to protect and conserve wetland ecosystems.
- 5.1.6.2 Strengthen law enforcement and monitoring systems and agencies for the protection of wetland ecosystems.
- 5.1.6.3 Develop communication strategies for the introduction of sustainable approaches to resources utilization.
- 5.1.6.4 Sensitize stakeholders on the importance of protecting wetland ecosystems.

**Outcomes:**

- I. Laws and regulations established for the protection of wetland ecosystems.
- II. Law enforcement and monitoring systems and agencies for the protection of wetland ecosystems are strengthened.

## Programme 5.2: Community-based Natural Resources Management

### Action 5.2.1: Improve collaboration between local communities, civil society groups and relevant government organizations for effective participation in planning and management of natural resources and ownership, security and benefit-sharing of these resources

Purpose of action: To foster effective participation in planning and management of natural resources through collaboration of all stakeholders, so as to improve management of and reduce conflicts over natural resources.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Collaboration between local communities, civil society groups and relevant government organizations for effective participation in planning and management of natural resources improved.   | <ul style="list-style-type: none"> <li>• Number of multi-stakeholder collaborative meetings organized yearly</li> <li>• Level of different stakeholder representation and participation in natural resources management planning meetings</li> </ul> | <ul style="list-style-type: none"> <li>• Reports from multi-stakeholder collaborative meetings on natural resources management planning</li> <li>• List of different stakeholders participating</li> </ul> | <ul style="list-style-type: none"> <li>• Funding support for stakeholder collaborative meetings available</li> <li>• Willingness of different stakeholders to effectively participate in natural resources management planning programmes</li> </ul> |
| <b>Tasks:</b> <ul style="list-style-type: none"> <li>5.2.1.1 Identify all relevant stakeholders including local community groups, civil society and government institutions concerned with natural resources management.</li> <li>5.2.1.2 Develop effective multi-stakeholder dialogue platforms for effective deliberations on natural resources management planning.</li> <li>5.2.1.3 Provide a platform and design effective communications tools to ensure good representation at all levels of decision-making in the planning process.</li> </ul> |  |  |  |
| <b>Outcomes:</b> <ul style="list-style-type: none"> <li>I. Effective collaboration among all stakeholders in the management of natural resources.</li> </ul>  |  |  |  |



| II. Improved accountability, transparency and participation in natural resources management decisions at all levels.  |  |   |   |
|---|--|---|---|
| III. Reduced conflicts over natural resources management.   |  |   |   |
| <b>Action 5.2.2: Promote capacity-building activities for local communities to engage fully in sustainable community-based ecosystem management and climate change mitigation and adaptation actions</b>  |  |   |   |
| Purpose of action: To improve the capacity of local communities to engage in effective management of ecosystems.  |  |   |   |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>5.2.2. Training and capacity-building activities in ecosystem management at the local community level promoted.   | <ul style="list-style-type: none"> <li>Number of local community training and capacity-building programmes supported and organized</li> <li>Number of community group representatives trained</li> </ul> | <ul style="list-style-type: none"> <li>Training manuals, monitoring and financial reports</li> <li>Training activity reports and certificates of participation</li> </ul> | <ul style="list-style-type: none"> <li>Funding for training and capacity-building available</li> <li>Stakeholders willingness to attend training and participate in capacity-building programmes</li> </ul> |
| <b>Tasks:</b><br>5.2.2.1 Identify all relevant capacity-building initiatives related to ecosystem management.<br>5.2.2.2 Develop criteria for the selection of communities at the district level.<br>5.2.2.3 Categorize and prioritize training activities and initiatives and develop training modules and manuals.<br>5.2.2.4 Provide financial and logistical support for the implementation of training initiatives at the local level. |  |   |   |
| <b>Outcomes:</b><br>I. Ecosystem management mechanisms understood by district- and community-level stakeholders.<br>II. Improved participation in ecosystem governance decision processes.<br>III. Reduced conflict in the management of natural resources.   |  |   |   |

### Programme 5.3: Economic Incentive Measures

| <b>Action 5.3.1: Promote local enterprises and alternative livelihoods, and marketing of enabling environmental programmes or activities, such as bee-keeping, soap making, grasscutter (cane rat) rearing, and petty trading, to improve incomes and reduce the pressure on natural resources</b> |  |   |   |
|--|--|---|---|
| Purpose of action: To ensure sustainable income-generating opportunities for local communities.  |  |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Alternative livelihood programmes promoted to  | <ul style="list-style-type: none"> <li>Number of alternative livelihood programmes initiated and supported</li> <li>Number of community members</li> </ul> | <ul style="list-style-type: none"> <li>Progress reports on alternative livelihood programmes</li> <li>Training manuals and</li> </ul> | <ul style="list-style-type: none"> <li>Funding support for promoting alternative livelihood programmes</li> </ul> |

| improve rural livelihoods and reduce pressure on natural resources   | trained and engaged in alternative livelihood programmes   | certificates of participation   | <ul style="list-style-type: none"> <li>Community member willingness to participate in alternative livelihood programmes</li> </ul>                                       |
|--|--|---|--|
| <b>Tasks:</b><br>5.3.1.1 Identify existing successful alternative livelihood programmes within communities.<br>5.3.1.2 Assess the economic feasibility of introducing new alternative livelihood programmes.<br>5.3.1.3 Assess the adoption potential of the different programmes.<br>5.3.1.4 Prioritize programmes in collaboration with local communities.<br>5.3.1.5 Provide community-based training skills for the different programmes.<br>5.3.1.6 Provide financial and logistical support for implementation.<br>5.3.1.7 Create pilot programmes, ready for scaling up.<br>5.3.1.8 Promote the establishment of cooperative associations to improve access to credit.<br>5.3.1.9 Initiate a community monitoring mechanism to ensure the sustainability of programmes. |  |   |  |
| <b>Outcomes:</b><br>I. Reduced pressure on natural resources.<br>II. Improved rural income through the provision of alternative livelihood activities.   |  |   |  |
| <b>Action 5.3.2: Promote public and private sector investments in ecotourism and support for community-based ecotourism programmes</b><br>Purpose of action: Improve rural economy through sustainable ecotourism programmes.  |  |   |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
| <b>Output:</b><br>Private sector investment and community-based ecotourism programmes promoted.  | <ul style="list-style-type: none"> <li>Number of potential ecotourism initiatives identified</li> <li>Identifiable structures in support of ecotourism, e.g., number of community members trained to serve as tour guides</li> </ul> | <ul style="list-style-type: none"> <li>Ecotourism potential assessment report</li> <li>Ecotourism management plans</li> </ul> | <ul style="list-style-type: none"> <li>Community collaboration and support for ecotourism programmes</li> <li>Investor interest in community-based ecotourism</li> </ul> |
| <b>Tasks:</b><br>5.3.2.1 Identify potential ecotourism sites.<br>5.3.2.2 Assess the economic feasibility and conservation status of the sites identified.<br>5.3.2.3 Develop community sensitization programmes to create awareness of identified tourism sites.<br>5.3.2.4 Develop community-based start-up ecotourism sites.<br>5.3.2.5 Identify potential investors for scaling up and development of ecotourism sites.<br>5.3.2.6 Initiate community collaborative management plans to ensure sustainability of ecotourism programmes.   |  |   |  |



| <b>Outcomes:</b><br>I. Improved revenue through community-based ecotourism programmes.  |  |  |   |
|---|--|--|---|
| <b>Action 5.3.3: Ensure natural resources valuation, for example determination of costs of environmental degradation in various sectors, within the national accounting system</b><br>Purpose of action: To build appreciation for the value of natural resources and the need to avoid environmental degradation.            |  |  |   |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Economic value of natural resources and economic cost of environmental degradation determined.  | <ul style="list-style-type: none"> <li>Number of ecosystem services mapped and valued</li> <li>Framework for incorporation of economic valuation and cost of environmental degradation into national account system</li> </ul> | <ul style="list-style-type: none"> <li>Study report on estimated value of natural resources and cost of environmental degradation</li> <li>Developed framework for incorporation of economic valuation and cost of environmental degradation into national account system</li> </ul> | <ul style="list-style-type: none"> <li>Funds available to conduct mapping of ecosystem services provided by the country's natural resources and determination of environmental degradation</li> <li>Willingness to incorporate economic valuation and cost of environmental degradation into the national account system</li> </ul> |
| <b>Tasks:</b><br>5.3.3.1 Map ecosystem services provided by the country's natural resources.<br>5.3.3.2 Estimate the economic value of the services and the cost of degradation.<br>5.3.3.3 Develop a framework to incorporate economic valuation and the cost of environmental degradation into the national account system. |  |  |   |
| <b>Outcomes:</b><br>Economic value of natural resources and economic cost of degradation determined.  |  |  |   |

#### Programme 5.4: Ecosystem-based Adaptation

| <b>Action 5.4.1: Create adaptation fund to support targeted research, knowledge management and transfer, capacity-building and local adaptation projects using the ecosystem-based adaption approach</b><br>Purpose of action: To provide a source of sustainable funding to support ecosystem-based research and projects. |   |   |  |
|---|---|---|--|
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
| <b>Output:</b><br>Adaptation fund to support research, knowledge transfer, capacity-building and local adaptation projects created.   | <ul style="list-style-type: none"> <li>Legal regime in place</li> <li>Changes in income of local communities over time</li> </ul> | <ul style="list-style-type: none"> <li>Legal document establishing fund</li> <li>Annual report</li> </ul> | <ul style="list-style-type: none"> <li>Inputs are provided by stakeholders</li> <li>Funding is accessed by scientists, private sector and local communities</li> </ul> |

**Tasks:**

- 5.4.1.1 Discuss, through expert group meeting, financing strategies to ensure sustainability.
- 5.4.1.2 Set up adaptation fund to provide financial assistance for research, capacity-building, and adaptation projects.
- 5.4.1.3 Set up a trust board to manage grants and disbursement, and ensure sound financial management of the adaptation fund.
- 5.4.1.4 Discuss and prioritize areas of interest for possible projects to be undertaken with the support of the adaptation fund.
- 5.4.1.5 Implement laws to reduce the vulnerability of ecosystems and communities.
- 5.4.1.6 Develop an intensive monitoring system to ensure sustainability of the funds.

**Outcomes:**

- I. Financing strategies for ecosystem-based adaptation in place and operational.
- II. Local communities and ecosystems are resilient against climate change and variability,

**Action 5.4.2: Promote multi-stakeholder approaches in planning and implementation of adaptation projects**

Purpose of action: To increase participation at all levels in adaptation projects.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|---|---|--|--|
| <b>Output:</b><br>Multi-stakeholder approaches in planning and implementation of adaptation projects and programmes promoted. | <ul style="list-style-type: none"> <li>• Number of stakeholder groups involved in all adaptation processes</li> <li>• Percentage of eligible stakeholders trained in ecosystem-based processes</li> </ul> | <ul style="list-style-type: none"> <li>• Monitoring reports</li> <li>• Training reports</li> </ul> | <ul style="list-style-type: none"> <li>• Stakeholders are willing to participate</li> <li>• Stakeholders take part in training programmes</li> </ul> |

**Tasks:**

- 5.4.2.1 Identify all stakeholders involved in the utilization, management and conservation of ecosystem services and biodiversity.
- 5.4.2.2 Develop a detailed consultation and participation plan outlining how stakeholders would be engaged.
- 5.4.2.3 Create awareness on relevance of ecosystems and ecosystem-based adaptation, and define roles and responsibilities.
- 5.4.2.4 Establish a multi-stakeholder platform for planning and development of adaptation projects and programmes.
- 5.4.2.5 Discuss and develop a communication strategy for sharing information.
- 5.4.2.6 Develop a training and capacity-building plan for stakeholders, especially for local communities and civil society organizations, to ensure their effective participation.
- 5.4.2.7 Develop a conflict resolution mechanism to deal with issues which will emerge during the planning and implementation process.

**Outcomes:**

- I. Participation of all relevant stakeholders guaranteed.
- II. Resilience of ecosystems and local communities to climate change increased.

**Action 5.4.3: Learn and scale up best practices on ecosystem-based adaptation strategies such as the community-based adaptation model**

Purpose of action: To promote ecosystem-based adaptation practices of in coastal areas.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Ecosystem-based adaptation practices promoted.  | <ul style="list-style-type: none"> <li>• Number of potential applicable ecosystem-based adaptation practices identified</li> <li>• Communities identified for piloting ecosystem-based adaptation practices</li> <li>• Training programme on applicable ecosystem-based adaptation practices</li> </ul> | <ul style="list-style-type: none"> <li>• List of applicable ecosystem-based adaptation practices to be introduced to communities</li> <li>• Pilot study reports on ecosystem-based adaptation practices in pilot communities</li> <li>• Training workshop proceedings</li> <li>• Training manuals on applicable ecosystem-based adaptation practices</li> </ul> | <ul style="list-style-type: none"> <li>• Community collaboration and support for ecosystem-based adaptation practices</li> <li>• Funds for piloting practices of ecosystem-based adaptation</li> </ul> |
| <b>Tasks:</b><br>5.4.3.1 Identify ecosystem-based adaptation practices applicable in coastal communities.<br>5.4.3.2 Organize sensitization workshops on the importance of ecosystem-based adaptation practices in coastal areas.<br>5.4.3.3 Organize training workshops on ecosystem-based adaptation practices in coastal areas.<br>5.4.3.4 Identify pilot communities for practice of ecosystem-based adaptation.<br>5.4.3.5 Gradually extend ecosystem-based adaptation practices to other coastal communities. |   |   |  |
| <b>Outcomes:</b><br>I. Communities sensitized on the importance of ecosystem-based adaptation practice.<br>II. Communities trained on the importance of sustainable approaches to resources utilization.<br>III. Pilot communities for practice of ecosystem-based adaptation established.<br>IV. Ecosystem-based adaptation practices scaled up.   |   |   |  |

## Summary

### Timeline for Actions to be taken on Programme Areas

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 5: Improve Management and Resilience of Terrestrial and Aquatic Ecosystems (including Marine) |   | Lead Organization | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$ |
|---|---|-------------------|------|---|------|---|------|---|------|---|------|---|------|---|---------------------|
| Programme Area and Actions  |   |                   | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                     |
| Programme Area 5.1: Improved marine and coastal ecosystems management   |   | MOFAD and MESTI   |      |   |      |   |      |   |      |   |      |   |      |   | 250,000,000         |
| 5.1.1   | Develop marine and coastal zone sustainable management and development policy.  |                   | x    | x | x    | x | x    | x |      |   |      |   |      |   |                     |
| 5.1.2   | Operationalize existing policies and strategies, for example, the EPA oil spill sensitivity planning, the Wetlands Conservation Strategy, Town and Country Planning, land use plan for the Western Region, and the Spatial Development Framework for the Northern Zone. |                   | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 5.1.3   | Establish marine protected areas.   |                   | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 5.1.4   | Promote and empower communities to utilize marine and coastal resources in a climate responsive manner and within sustainable limits.   |                   | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 5.1.5   | Strengthen effective monitoring of industrial fishing activities and coastal and marine pollution to ensure compliance with standards aimed at enhancing the quality of marine ecosystems.  |                   | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 5.1.6   | Protect coastal wetlands and mangroves including Ramsar sites to enhance coastal resilience.  |                   | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |

| <b>Programme Area 5.2: Community-based natural resources management</b> |  | <b>MLGRD and MLNR</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>300,000,000</b> |
|---|--|-----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|
| 5.2.1   | Improve collaboration between local communities, civil society groups and relevant government organizations for effective participation in planning and management of natural resources and ownership, security and benefit-sharing of these resources.                        |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 5.2.2   | Promote capacity-building activities for local communities to engage fully in sustainable community-based ecosystem management and climate change mitigation and adaptation actions.   |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 5.3: Economic incentive measures</b>                  |  | <b>MOTI and MLNR</b>  |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>300,000,000</b> |
| 5.3.1   | Promote local enterprises and alternative livelihoods, and marketing of enabling environmental programmes or activities, such as bee-keeping, soap making, grasscutter (cane rat) rearing, and petty trading, to improve incomes and reduce the pressure on natural resources. |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 5.3.2   | Promote public and private sector investments in ecotourism and support for community-based ecotourism programmes.   |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 5.3.3   | Ensure natural resources valuation, for example determination of costs of environmental degradation in various sectors, within the national accounting system.   |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 5.4: Ecosystem-based adaptation</b>                   |  | <b>MESTI</b>          |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>360,000,000</b> |
| 5.4.1   | Create adaptation fund to support targeted research, knowledge management and transfer, capacity-building and local adaptation projects using the ecosystem-based adaptation approach.   |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 5.4.2   | Promote multi-stakeholder approaches in planning and implementation of adaptation projects.  |                       | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 5.4.3   | Learn and scale up best practices on ecosystem-based adaptation strategies such as the community-based adaptation model.   |                       |   |   |   |   | x | x | x | x | x | x | x | x | x |                    |

### Estimated Cost

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 5: Improve Management and Resilience of Terrestrial and Aquatic Ecosystems (including Marine)</b> | <b>Lead Org</b>        | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 5.1: Improved marine and coastal ecosystems management</b>   | <b>MOFAD and MESTI</b> | 60,000,000  | 90,000,000  | 40,000,000  | 20,000,000  | 20,000,000  | 20,000,000  | <b>250,000,000</b>         |
| <b>Programme Area 5.2: Community-based natural resources management</b>  | <b>MLGRD and MLNR</b>  | 100,000,000 | 40,000,000  | 40,000,000  | 40,000,000  | 40,000,000  | 40,000,000  | <b>300,000,000</b>         |
| <b>Programme Area 5.3: Economic incentive measures</b>   | <b>MOTI and MLNR</b>   | 100,000,000 | 80,000,000  | 40,000,000  | 40,000,000  | 20,000,000  | 20,000,000  | <b>300,000,000</b>         |
| <b>Programme Area 5.4: Ecosystem-based adaptation</b>  | <b>MESTI</b>           | 110,000,000 | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | <b>360,000,000</b>         |





## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 6: Impact of Climate Change on Human Health**

## Policy Focus Area 6: Impact of Climate Change on Human Health

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### Introduction

There is abundant evidence that human activities are altering the earth's climate and that climate change will have a significant impact on health, both domestically and globally. While all of the changes associated with this process are not predetermined, the action we take today will certainly help to shape our environment in the decades to come. Some degree of climate change is unavoidable, however, and we must adapt to its associated effects on health.

The negative effects of climate change on public health include higher levels of certain air pollutants, increased transmission of diseases due to poor water quality, increased incidence of vector-borne diseases, and disruption of health services, mass casualties, and ultimately death. Countries need to build policies and plans to cope with these effects.

The present climate change policies need to be integrated or mainstreamed into national sectoral policies such that the appropriate capacity needs, estimated costs, and monitoring and evaluation plans are identified and implemented. Mainstreaming in this policy area should aim to ensure that systems are put in place such that it becomes the norm to take climate change into consideration in the national development planning processes for the health sector.

The mainstreaming methodology discussed is a combination of the National Development Planning Commission (NDPC) Guidelines for the preparation of strategic medium-term plans, and sectoral monitoring and evaluation plans and best practices from the Environmental Protection Agency (EPA) strategic environmental assessment process. The health sector is guided by the Ghana Global Health Initiative Strategy 2012–2017. The health sector medium-term development plan (SMTDP) reflects the development agenda for the

medium term and aligns succeeding policies with the national objective of attaining middle-income status by 2015. It also coincides with the fourth year of implementation of the sector's third five-year programme of work.

The health SMTDP builds on the general principles of providing affordable primary health care to all people living in Ghana; cost-effective general health-care systems development; bridging of current equity gaps in access to health-care services; and reinforcement of the continuum of care. To ensure consistency and alignment of programmes and investments around a common framework for health-care development, the SMTDP and third five-year programme of work have been fully harmonized.

The general principles reflect the Government's health policy agenda on improving access to health care through the National Health Insurance Scheme, controlling endemic diseases such as malaria, improving the health-care infrastructure and emergency response systems, and creating an enabling environment for health-care delivery in Ghana. They also reflect the need for strengthening the human resources required for effective service delivery with emphasis on equity and improvements in the regulation and management of the service to address issues of efficiency and quality of care at all levels.

The development of the plan went through extensive consultation processes as suggested by the NDPC. The plan focuses on some of the key areas identified for the health-care programme area. With the development of a national policy for climate change, there is a need to further mainstream the policies and strategies identified for climate change and the health sector into the sector's development plans. The mainstreaming ensures that:



- Climate change is taken into consideration and incorporated as a vital component in the whole process of decision-making in the health sector;
- Climate change is comprehensively integrated into and interwoven with other health and socioeconomic themes;
- Climate change deals with the trade-offs in the complete planning processes, including formulation, planning, estimated costing, implementation and monitoring and evaluation.

For mainstreaming to be effective, it should be infused into all levels of the planning frameworks that give effect to the implementation of climate change issues in particular (for example, policies, laws, standards, institutions, technologies, funding mechanisms, programmes, projects, plans, and others). It should also permeate the different stages of the project cycle from beginning to end (that is, conceptualization and identification, design, appraisal, estimated costing, implementation, and monitoring and evaluation).

### **The Mainstreaming Process**

#### **Problem identification**

- Identify the key issues of climate change in the sector
- Assess the trend of the issues
- Identify policy challenges
- Set priorities

#### **Policy options**

- Identify and develop policy(s) that may resolve climate change issues
- List objectives of each policy
- Undertake research on what others have done
- Establish resource requirements
- Undertake quantitative and qualitative analysis of options
- Conduct risk assessment of climate change

#### **Policy option recommendations**

- Develop measures to assess the performance of the proposed climate change policy option
- Describe the impact of the climate change policy option

#### **Communicating policy recommendations**

- Prepare documentation
- Prepare estimated costing
- Prepare briefing materials to enhance decision-making

#### **Policy implementation**

- Translate climate change policy option into detailed implementable programme design
- Set up climate change communication messages
- Involve ministries, departments and agencies in the policy delivery

#### **Monitoring**

- Ensure the correct data is collected on climate change issues
- Analyse the data to assess performance
- Look out for unintended impacts of climate change

#### **Evaluation**

- Conduct quantitative and qualitative evaluation
- Ensure that findings inform revisions to policy and programmes, evaluating the climate change impact on socioeconomic, sectoral and local development strategies and plans
- Evaluate the awareness of and capacity for mainstreaming in the context of the theme
- Evaluate the possible impacts (both negative and positive) of the mainstreaming process

The monitoring and evaluation plan and targets will be developed based on ongoing work in the Ministry of Health (MOH) and Ghana Health Service under a project sponsored by the Global Environment

Facility (GEF) which partly aims at developing indicators and targets for the climate and health process.

**Mainstreaming strategies**

The processes will be implemented through a series of workshops and consultations. These will include:

1. Stakeholder consultation workshop
2. Institutional mapping and capacity needs assessment
3. Capacity-building workshops
4. Wide stakeholder consultations (general public, ministerial, etc.)
5. Research into reviews and findings such as the World Health Organization (WHO) document “Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s”

These strategies are aimed at the development of the capacity-building of stakeholders and institutions, and the integration of climate change in all levels of planning and development. The ongoing GEF project in the health sector will also provide a road map and set the foundation for mainstreaming, but there is a need for alternative funding to complement the existing funds.

## Programme Area

Climate change affects public health through a myriad of environmental consequences, such as sea-level rise, changes in precipitation resulting in flooding and drought, heat waves, changes in intensity of hurricanes and storms, and degraded air quality. These consequences of climate change are anticipated to continue into the foreseeable future. In a tally that included just four diseases (cardiovascular disease, malnutrition, diarrhoea, and malaria) as well as floods, the World Health Organization (WHO) estimated that 166,000 deaths and about 5.5 million disability-adjusted life years (DALYs, a measure of overall disease burden) were attributable to climate change globally in 2000.

### Programme 6.1: Capacity-building of Health Providers and Groups associated with Climate Change

**Objectives:** In the health sector, to improve individual, institutional and systemic capacity to deal with climate change and health. To improve data management, storage and links in the health sector.

**Justification:**

Vulnerability assessment studies done by the Environmental Protection Agency show that climate change and variability affect some selected diseases that were studied. These diseases were malaria, guinea worm, cerebrospinal meningitis, skin disease, diarrhoea and measles. Interviews with health professionals and students in Ghana, in the Ministry of Health and other institutions, have shown that there is limited knowledge of the impacts of climate change on health. Knowledge on how to address these challenges and how to gather the critical data needed to document evidence has also been found to be low. Ideally, climate data relevant for attribution require documented daily or weekly health data over a period of ten years or more. It is

difficult for researchers to find adequate health data, due to inadequate data management and storage of health data in most facilities. There is a need to ensure that the critical mass of people working in the health sector are adequately informed about the key issues on climate change and health including the need for data management. This has to be policy-driven and all health facilities, programmes and departments in the Ministry of Health as well as health-related institutions will have to be involved.

**Action:**

- 6.1.1 Develop and strengthen individual, institutional and systemic capacity in climate-change-related health issues across the health sector.
- 6.1.2 Enhance technical capacity in data collection, management, reporting and storage.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Health (MOH)**, Ghana Health Service (GHS), all teaching hospitals, Centre for Health Information Management, Ghana Public Records and Archives Administration Department; partners, donors and non-governmental organizations (NGOs) supporting the Ministry of Health.

**Estimated Cost:** US\$5,000,000

### Programme 6.2: Climate-related Health Research

**Objectives:** To conduct well-coordinated scientific research on the impacts on health of climate change.

**Justification:**

In September 2011, ministers of health and ministers of the environment agreed to implement the Framework for Public Health Adaptation to Climate Change in the African Region, through

resolution AFR/RC61/R2 of the World Health Organization (WHO) Regional Committee for Africa. Research was one of the priority intervention areas identified in this framework.

Ghana, as a member state, was also a signatory to this resolution and framework and hence this is a priority for the country. Furthermore, the MOH has not yet developed a National Health Strategy for Climate Change in Ghana. Research is a key item on its agenda and is essential to obtain the critical baseline information, including detailed vulnerability assessment, needed to guide policy.

In Ghana there are few studies that have critically examined the associations between climate change and climate-sensitive diseases and even fewer attribution studies. There is an urgent need for health and climate researchers to collaborate to address the current gaps (e.g., on arthropod-borne viruses (arboviruses), heat stroke, etc.).

**Action:**

6.2.1 Development of research programmes to address gaps in health and climate change issues.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Health, GHS, Korle-Bu Teaching Hospital (Public Health Unit), public health institutions and other medical academic institutions, Komfo Anokye Hospital (Kwame Nkrumah University of Science and Technology (KNUST) Community Health Department), Centre for Health Information Management; partners and donors supporting the Ministry of Health, NGOs and civil society working in the area of health.

**Estimated Cost:** US\$50,000,000

### Programme 6.3: Strengthen Climate-sensitive Disease Surveillance and Response Systems

**Objective:** To improve disease surveillance and response systems for the prevention and control of priority climate-sensitive diseases at all levels of national health systems.

**Justification:**

Surveillance is an ongoing systematic collection, analysis and interpretation of outcome-specific data for use in planning, implementing and evaluating public health policies. Surveillance of diseases is considered as the cornerstone of decision-making and practice in public health and is crucial for monitoring the health status of the population, detecting disease and triggering action to prevent further illness and to contain public health issues.

In Ghana, a surveillance system (Integrated Disease Surveillance and Response) already exists. However, limited resources mean that priorities have to be set in various areas, including surveillance and response activities. Additional resources therefore need to be allocated to ensure that there is a robust system in place to adequately respond to the additional challenges posed by climate change. The science of climate change predicts more frequent extremes with possible disease outbreaks and increased incidence of climate-sensitive disease. Surveillance is important to gather information on climate-sensitive diseases.

The need to strengthen the disease surveillance and response system cannot be overemphasized, as this will help to inform early warning systems and allow for a timely response to predicted outbreaks of climate-sensitive disease.

**Action:**

6.3.1 Integrate environment and health surveillance systems.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Health**, GHS – Surveillance Unit, teaching hospitals and medical schools, Ghana Metrological Agency; partners and donors supporting the Ministry of Health, NGOs.

**Estimated Cost:** US\$300,000,000.

#### **Programme 6.4: Improve Public Health Measures (immunization, drainage, sanitation and hygiene), especially in climate-vulnerable communities**

**Objectives:** To improve drainage, sanitation and hygiene services. To increase immunization coverage especially in vulnerable communities.

**Justification:**

Climate change will increase the incidence of diseases of public health importance, such as food-borne and vector-borne diseases, through various mechanisms. These climate-sensitive diseases include diarrhoeal diseases and malaria which are already a significant cause of morbidity and mortality in Ghana, with malaria being ranked first in most health institutions. Diarrhoeal diseases, nutrition-related illnesses and some infections such as malaria, guinea worm, cerebrospinal meningitis, skin disease and measles, have been linked to the climate and have the potential to become worse with increasing climate change and variability.

Poor environmental sanitation at the community level increases the risk and persistence of diseases, especially climate-related diseases such as malaria, diarrhoea and cerebrospinal meningitis. For most disease there are already existing public health interventions. However, according to scientific assessments and publications, including from the Intergovernmental Panel on Climate Change (IPCC) and WHO, adverse health impacts caused by climate change will require further

improvement and scaling-up of existing interventions to manage the associated risks and effects.

Public health interventions need to take account of the added burden of the effects of climate change on health and incorporate these effects in their policies, plans and strategies. The associated environmental challenges, such as poor drainage and hygiene practices, need to be tackled in collaboration with other sectors. Advocacy and raising awareness of these issues is needed urgently to improve the individual and sectoral responses.

**Action:**

6.4.1 Establish collaboration and partnerships for improved drainage, sanitation and hygiene services.

6.4.2 Establish collaboration and partnerships for improved public health-care delivery and immunization coverage.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Health; GHS, Expanded Programme on Immunization**, all teaching hospitals, **Ministry of Local Government and District Assemblies**, **Waste management department and partners**, **Ministry of Roads and Highways**, **Ghana Community-based Health Planning and Services (CHPS) compounds**; partners and donors supporting the Ministry of Health, NGOs working in the health sector, media organizations.

**Estimated Cost:** US\$50,000,000

### Programme 6.5: Emergency Health Preparedness and Climate-proof Health Infrastructure

**Objectives:** To strengthen and operationalize the health-related components of disaster risk reduction plans.

**Justification:**

Climate change will increase the frequency of extreme weather events (with associated injuries) and the incidence of outbreaks of climate-sensitive diseases. These health-related incidents may present as new national emergencies (for example, injuries or displaced people during or injuries caused by floods) or acute exacerbation of existing endemic diseases (such as cholera, cerebrospinal meningitis). In all cases, the importance of timely interventions to save lives and prevent or minimize morbidity and the spread of adverse health effects cannot be over-emphasized. At present, there are inadequate systems and logistics in place in the health sector to implement appropriate emergency preparedness strategies. Strategies to date have not included climate-change-driven emergencies and challenges. Coordination of responses, including the provision of ambulance services, has been disjointed and ad hoc. Standardized tools and adequate legislature are needed to strengthen the response. There is a need to set up collaborative forums to address the logistical and systemic challenges.

**Action:**

6.5.1 Put mechanisms in place to reduce the number of casualties resulting from the health consequences of extreme weather events and to strengthen curative interventions to manage the acute health impacts of climate change.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Health, GHS, Disease Control Unit of the MOH, Disease Surveillance Unit of the MOH, all teaching hospitals, all health facilities including primary healthcare facilities,

Ghana National Fire Service, MESTI, Ministry of Water Resources, Works and Housing (MWRWH), all other ministries, departments and agencies, NADMO; international bodies concerned with climate change and health, food and nutrition, and waste management (for example, WHO, Food and Agriculture Organization of the United Nations (FAO)), partners and donors who support the MOH (for example, WHO, United Nations Children's Fund (UNICEF)), NGOs and civil society groups working in the health sector.

**Estimated Cost:** US\$200,000,000

### Programme 6.6: Collaboration and Partnership for Improved Nutrition, Water and Sanitation

**Objectives:** To establish and strengthen multisectoral, intersectoral and multi-stakeholder processes for policy dialogue, coordination, planning and accountability.

To jointly implement public health adaptation interventions by the Ministry of Health and the Ministry of Environment, Science, Technology and Innovation, engaging other relevant sectors and stakeholders in accordance with the Libreville Declaration on Health and Environment in Africa.

To establish mechanisms for collaboration, partnership and coordination with international bodies working on climate change adaptation and mitigation measures relevant to the health sector.

**Justification:**

According to the WHO, many climatic risks to health are at least partly outside the health sector's normal sphere of action. Chief among these is the fact that climate change can suppress agricultural yields, which would be particularly detrimental in Africa where malnutrition is already the largest single contributor to disease burdens.

In Ghana, infrastructure for waste management has not kept pace with the population growth. Only a third of the waste produced in the urban centres is collected, leaving the rest to pollute the environment.

Access to potable water is also a problem. Less than half of the population in the country has access to potable water, leaving the rest to obtain water from streams and rivers, which are often contaminated with organic and inorganic substances from household and industrial pollutants.

Climate change has implications for the existing poor environmental conditions. As the frequency of natural disasters such as flooding increases, poor waste management and lack of access to water are exacerbated, thus increasing the disease burden of climate-sensitive diarrhoeal diseases. Some of the most effective actions by health professionals may therefore involve supporting the efforts of other sectors to mitigate the effects of and adapt to climate change. Examples include efforts by the food and agriculture sector, of the Accra Metropolitan Assembly in the area of waste management, and those of the MWRWH and the International Water Management Institute (IWMI). There is a need for collaboration and partnership to ensure adequate nutrition, and improved access to potable water and to sanitation.

**Action:**

- 6.6.1 Develop or strengthen platforms for intersectoral collaboration and policy dialogue with relevant ministries and institutions working on the availability of food and the management of water and sanitation.
- 6.6.2 Develop or strengthen platforms for collaboration and coordination with other countries and with international bodies.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Health, Ghana Health Service**, all teaching hospitals; partners and donors supporting the Ministry of Health, NGOs and civil society working in the health sector. Accra Metropolitan Assembly (waste management department) and partners, Environment Protection Agency (EPA), MESTI, Ministry of Food and Agriculture (MoFA), MWRWH; NGOs, international bodies concerned with climate change and health, food and nutrition, and waste management (such as WHO, FAO).

**Estimated Cost:** US\$1,000,000

### Programme 6.7: Social Protection and Improved Access to Health Care

**Objectives:** To improve access to social protection programmes, and improve the quality of health care.

**Justification:**

Accessibility to health care is low in Ghana, the doctor:patient ratio being about 1:14,000 and the nurse:patient ratio being 1: 1,415. This is further compounded by inequities and inequalities in socioeconomic status. The poor state of the road network in the country compounds an already difficult situation. Health-care institutions are distributed unequally, leaving rural communities with very few and in some situations none.

IPCC reviews have concluded that climate change will further increase the incidence of climate-sensitive disease, and will increase the incidence and severity of floods and natural disasters, worsening the road network and further limiting accessibility, and increasing poverty. This will further complicate the existing issues with accessibility to health care in Ghana.

Although Ghana has programmes for social protection, accessibility is still low for the most vulnerable. Ignorance, poverty and lack of



proximity to support systems and groups still create difficulties. Social protection policies and programmes need to take climate change into consideration in order to improve access to health care. Advocacy and awareness-raising are also needed to educate more people on the facilities available to them, such as the National Health Insurance Scheme (NHIS).

**Action:**

6.7.1 Establish and strengthen universal, comprehensive social protection policies and strategies.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Health;** GHS, Disease Control Unit of the MOH, Disease Surveillance Unit of the MOH, Korle-Bu Teaching Hospital, School of Public Health, University of Ghana, Komfo Anokye Hospital, all health facilities including primary health-care facilities, National Health Insurance Authority, Ministry of Gender, Children and Social Protection; partners and donors supporting the MOH, NGOs and civil society working in the health sector, international bodies related to climate change and health, food and nutrition, and waste management (for example, WHO, FAO).

**Estimated Cost:** US\$100,000,000

## **Programme 6.8: Indigenous traditional knowledge and practices in health**

**Objective:** Integrate indigenous traditional knowledge into formal health mitigation and adaptation strategies.

**Justification:**

In its Fourth Assessment Report, IPCC recognized traditional knowledge as ‘an invaluable basis for developing adaptation and natural resource management strategies in response to environmental

and other forms of change’. Currently, in Ghana indigenous and traditional knowledge and practices have not been integrated into policies and strategies for climate change policies.

Effective adaptation policies will need to be formulated on the basis of interdisciplinary research that brings together indigenous knowledge holders and scientists, both natural and social, to build mutual understanding and reinforce dialogue. It is essential that indigenous peoples – who are active resource users and bearers of traditional knowledge – play a central role in this process. Recent partnerships between indigenous peoples and scientists are producing new knowledge in response to the emerging challenges of climate change. This co-produced knowledge that derives from synergies between both systems of knowledge may point the way forward to promising and productive ways to address the complexities of climate change adaptation. This indigenous knowledge base can be useful in managing emerging, re-emerging and other climate-sensitive diseases.

**Action:**

6.8.1 Adopt and integrate indigenous knowledge and practices concerning human health into national health care policies and strategies.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Health,** Ghana Health Service, Centre for Scientific Research into Plant Medicine, MoFA, School of Public Health, University of Ghana, KNUST, other research institutions; partners in traditional medicine practice, NGOs, civil society working in the area of health, bilateral and multilateral organizations in Ghana.

**Estimated Cost:** US\$300,000,000



## FOCUS AREA 6: IMPACT OF CLIMATE CHANGE ON HUMAN HEALTH

### Programme 6.1: Capacity-building of Health Providers and Groups associated with Climate Change

#### Action 6.1.1: Develop and strengthen individual, institutional and systemic capacity in climate-change-related health issues across the health sector

Purpose of action: To improve the knowledge of health professionals of climate change and health issues across the country.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Health professionals trained in climate change and health issues.<br><br>Individual and institutional capacity in climate change and health issues strengthened.  | <ul style="list-style-type: none"> <li>• Structured periodic awareness campaigns in place</li> <li>• Number of training-of-trainers sessions conducted, and number of successful participants</li> <li>• Number of relevant health institutions incorporating climate change issues in their curricula</li> <li>• Number of key messages on climate change and health delivered through the media</li> <li>• Number of relevant institutions with climate change and health issues in their curricula</li> <li>• Number of relevant ministries, departments and agencies with trained focal points on climate change and health issues</li> </ul> | <ul style="list-style-type: none"> <li>• Training reports</li> <li>• Training database</li> <li>• Media house programme schedules</li> <li>• Curricula of relevant training institutions</li> <li>• Human resource management data</li> </ul> | <ul style="list-style-type: none"> <li>• Funding mechanism available</li> <li>• Selected institutions have competence and capacity for training</li> </ul> |
| <b>Tasks:</b><br>6.1.1.1 Conduct situational analysis to determine the level of knowledge and training in the health sector on climate change and health.<br>6.1.1.2 Identify gaps in the knowledge and training of health professionals.<br>6.1.1.3 Prepare capacity-building plans to fill the gaps identified .<br>6.1.1.4 Develop a communications strategy for climate change and health for the health sector.<br>6.1.1.5 Develop specific roles and responsibilities for institutional focal points. |   |   |  |

- 6.1.1.6 Develop guidelines and training manuals in accordance with WHO and IPCC guidelines.  
 6.1.1.7 Determine strategies to identify and prioritize relevant institutions and professionals to be trained.  
 6.1.1.8 Build capacity to develop and implement a formal education programme that focuses on specific target groups.

**Outcomes:**

- I. Increased awareness and knowledge in the health sector of climate change and health issues.  
 II. Behavioural change encouraged among individuals on climate-related health issues.  
 III. Improved technical and institutional capacity on climate change and health issues.  
 IV. Institutional roles and responsibilities of focal points within the health sector clearly defined.  
 V. National core capacities for the sound management of public health risks related to climate change upgraded.  
 VI. Guidance, tools and technical support available to strengthen capacity for public health adaptation to climate change.

**Action 6.1.2: Enhance technical capacity in data collection, management, reporting and storage**

Purpose of action: To improve data management and storage in the health sector so as to build reliable databases from which to conduct research.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Availability of relevant data on climate change and health to inform policy | <ul style="list-style-type: none"> <li>Number of relevant institutions with good quality data</li> </ul> | <ul style="list-style-type: none"> <li>Institutional health databases</li> <li>Centre for Health Information Management</li> </ul> | <ul style="list-style-type: none"> <li>Software for data management available at the district and regional levels</li> </ul> |

**Tasks:**

- 6.1.2.1 Review and identify technical capacity needs and human resources of relevant institutions and organizations.  
 6.1.2.2 Conduct training in the area of data management and dissemination.  
 6.1.2.3 Provide software and equipment to agencies and research facilities to enable them to collect and share information.  
 6.1.2.4 Develop data-sharing protocol between agencies.  
 6.1.2.5 Improve data collection tools for management of data on climate-sensitive diseases for appropriate analysis (e.g., time series, development of scenarios for attribution).  
 6.1.2.6 Explore funding opportunities under various bilateral and multilateral agreements for training programmes and capacity-building for data management (e.g., USAID e-learning system).  
 6.1.2.7 Document sectoral and category-specific reports of the second national communication (SNC) and third national communication (TNC) into national greenhouse gas inventory guidebooks (category-by-category description) to ensure institutional memory and facilitate continuous process of update.

**Outcomes:**

- I. National health sector data management continuously improved.  
 II. Institutions and organizations strengthened with requisite capacity and competence to manage data for climate change.  
 III. Timely delivery of relevant data to inform early warning systems.

## Programme 6.2: Climate-related Health Research

| <b>Action 6.2.1: Development of research programmes to address gaps in health and climate change issues</b>   |  |  |  |
|---|--|--|--|
| Purpose of action: To provide a source of information for the management and monitoring of the impacts on health of climate change.   |  |  |  |
| <b>Output/Tasks/Outcomes</b>  | <b>Objectively Verifiable Indicators</b>   | <b>Sources of Verification</b>   | <b>Assumptions and Risks</b>   |
| <b>Output:</b><br>Establishment of a centre on climate change and health.<br><br>Climate change and health research integrated into key action plans of the Ministry of Health, Ghana Health Service and other relevant institutions and civil society organizations  | <ul style="list-style-type: none"> <li>Functional centre on climate change and health established during the term of the programme</li> <li>Number of research projects and publications on climate change and health</li> </ul> | <ul style="list-style-type: none"> <li>Functional research centre</li> <li>Journals, reports and websites</li> </ul> | <ul style="list-style-type: none"> <li>Funding mechanism available</li> <li>Selected institutions have competence and capacity for research</li> </ul> |
| <b>Tasks:</b><br>6.2.1.1 Collect information on existing research into the effects on health of climate change.<br>6.2.1.2 Develop and implement a research agenda on climate change and health, prioritizing vulnerability assessments of the impact of climate change on health.<br>6.2.1.3 Acquire and maintain technical facilities for research.<br>6.2.1.4 Coordinate research activities, and establish databases on climate change and health information and expertise.<br>6.2.1.5 Establish national climate change knowledge management networks.<br>6.2.1.6 Promote community participation in the acquisition and dissemination of knowledge.<br>6.2.1.7 Strengthen national research institutions.<br>6.2.1.8 Review and update research already performed in relation to public health adaptation to climate change.<br>6.2.1.9 Establish research and policy dialogue.<br>6.2.1.10 Disseminate and use research findings for policymaking.<br>6.2.1.11 Create programmes of simple research methods to facilitate the involvement of NGOs and civil society.<br>6.2.1.12 Develop a forum for the presentation of scientific work. |  |  |  |
| <b>Outcomes:</b><br>I. Increased awareness and knowledge of climate change and health issues in the health sector.<br>II. Improved technical and institutional capacity on climate change and health issues.  |  |  |  |

- III. Institutional roles and responsibilities of focal points within the health sector developed.
- IV. Local knowledge of health risk factors related to climate change and their management documented and disseminated.
- V. Source publications on climate change and health are available.

### Programme 6.3: Strengthen Climate-sensitive Disease Surveillance and Response Systems

#### Action 6.3.1: Integrate environment and health surveillance systems

Purpose of action: To track environmental changes resulting from climate change and their associated effects on public health.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Standardized tools and protocols developed and validated.<br><br>Capacity of relevant national institutions strengthened.<br><br>Early warning system for management of environmental climate-sensitive risk factors established.  | <ul style="list-style-type: none"> <li>• Number of cases of climate-sensitive diseases</li> <li>• Number of people trained in surveillance of climate-sensitive diseases</li> <li>• Functional early warning system</li> </ul> | <ul style="list-style-type: none"> <li>• State of environment and health reports</li> <li>• Training reports</li> <li>• Standardized tools</li> </ul> | <ul style="list-style-type: none"> <li>• Funding mechanism available.</li> </ul> |
| <b>Tasks:</b><br>6.3.1.1 Assess climate-sensitive disease risks to identify which ones can be categorized as major public health threats.<br>6.3.1.2 Assess the gaps and barriers to effective surveillance and response using detection and response data associated with outbreak-prone climate-sensitive diseases.<br>6.3.1.3 Develop, field test and roll out a set of standardized indicators for integrated surveillance of environmental risk factors and associated health effects.<br>6.3.1.4 Develop and validate standardized tools and protocols for data collection, collation, analysis and interpretation.<br>6.3.1.5 Generate state of the environment reports and health reports on a regular basis.<br>6.3.1.6 Establish a coordination mechanism to share information among relevant institutions.<br>6.3.1.7 Establish, strengthen and use early warning systems for the management of climate-sensitive risk factors.<br>6.3.1.8 Undertake additional surveys to supplement integrated disease surveillance and response.<br>6.3.1.9 Monitor and evaluate the disease surveillance systems. |  |   |  |

**Outcomes:**

- I. Timely, evidence-based decisions can be taken for the sound management of public health risks related to climate change.
- II. Integrated surveillance of climate-sensitive diseases is established.
- III. Coordinated regular feedback response system is established.

### Programme 6.4: Improve Public Health Measures (immunization, drainage, sanitation and hygiene), especially in climate-vulnerable communities

#### Action 6.4.1: Establish collaboration and partnerships for improved drainage, sanitation and hygiene services

Purpose of action: To improve drainage, sanitation and hygiene services, so as to reduce the risk of associated diseases.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|---|---|---|---|
| <b>Output:</b><br>Drainage, sanitation and hygiene services improved<br><br>Effective and sustainable waste management system established<br><br>Integrated vector management | <ul style="list-style-type: none"> <li>• Properly constructed and maintained drains in the community</li> <li>• Proportion of households with improved sanitation facilities (e.g., septic tanks, access to latrine pits (Kumasi ventilated improved pits))</li> <li>• Hand-washing facilities available in institutions</li> <li>• Incidence of vector-borne diseases, e.g., malaria.</li> </ul> | <ul style="list-style-type: none"> <li>• District Assemblies project documents</li> <li>• Community survey reports</li> <li>• Institution and civil society inventory reports (e.g., hand-washing facilities)</li> <li>• Institutional morbidity and mortality records</li> </ul> | <ul style="list-style-type: none"> <li>• Funding mechanism available</li> <li>• Adequate human resources available</li> </ul> |

**Tasks:**

- 6.4.1.1 Situational analysis to determine the state of drainage and sanitation systems in the communities in collaboration with relevant institutions.
- 6.4.1.2 Undertake media campaigns to sensitize civil society about the link between climate change, poor drainage, sanitation, hygiene and health.
- 6.4.1.3 Organize community campaigns for on-site household toilets.
- 6.4.1.4 Collaborate with partners for the establishment of effective and sustainable waste management systems.
- 6.4.1.5 Develop and improve hand-washing policies.
- 6.4.1.6 Institute hygiene improvement campaigns in the media.
- 6.4.1.7 Advocate the enforcement of sanitation laws.
- 6.4.1.8 Strengthen and scale up integrated vector management systems.

**Outcomes:**

- I. Increased awareness and knowledge of the relationship between climate change, improved drainage, sanitation and hygiene, and health issues.
- II. Improved drainage, sanitation and hygiene services.
- III. Establishment of effective and sustainable waste management systems.
- IV. Reduced transmission of vector-borne diseases.

**Action 6.4.2: Establish collaboration and partnerships for improved public health-care delivery and immunization coverage**

Purpose of action: Improve access to and coverage of health-care services.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Improved immunization coverage.<br><br>Improved access to health-care services. | <ul style="list-style-type: none"> <li>• Number of individuals immunized against vaccine-preventable, climate-sensitive diseases, e.g., cerebrospinal meningitis, measles</li> <li>• Number of mass immunizations against cerebrospinal meningitis and measles</li> <li>• Proportion of individuals (especially women and children) accessing health care</li> <li>• Number of functional CHPS</li> </ul> | <ul style="list-style-type: none"> <li>• Institutional disease control records</li> <li>• Morbidity and mortality data from the health care facilities</li> <li>• Health care institution attendance records</li> <li>• District health information management systems (DHIMS2)</li> </ul> | <ul style="list-style-type: none"> <li>• Adequate and regular supply of vaccines</li> <li>• Adequate human resources to carry out immunization campaigns</li> </ul> |

**Tasks:**

- 6.4.2.1 Map incidence of disease and identification of vulnerable groups for climate-sensitive diseases.
- 6.4.2.2 Establish collaboration and partnerships for improved immunization coverage.
- 6.4.2.3 Advocate incentives for health professionals willing to serve in rural communities to improve national access to health care.
- 6.4.2.4 Media campaign messages to sensitize individuals about the importance of vaccination in reducing the incidence of some climate-sensitive diseases.
- 6.4.2.5. Increase the number of functional CHPS.

**Outcomes:**

- I. Immunization coverage increased, especially among vulnerable groups.
- II. Reduced incidence of vaccine-preventable climate-sensitive diseases.
- III. Use of health care services improved.

## Programme 6.5: Emergency Health Preparedness and Climate-proof Health Infrastructure

### Action 6.5.1: Put mechanisms in place to reduce the number of casualties resulting from the health consequences of extreme weather events and to strengthen curative interventions to manage the acute health impacts of climate change

Purpose of action: Expected casualties resulting from the health consequences of extreme weather events are minimized or prevented.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <p><b>Output:</b><br/>Mechanisms established to coordinate emergency responses to climate change impacts on health.</p> <p>Guidance, tools and technical assistance available to mitigate identified impacts on public health associated with climate change.</p> <p>Health legislation developed for climate change and emergency preparedness.</p>   | <ul style="list-style-type: none"> <li>• Functional emergency preparedness committee</li> <li>• Tools to mitigate identified impacts on public health associated with climate change</li> <li>• Health legislation for climate change and emergencies prepared</li> </ul> | <ul style="list-style-type: none"> <li>• Minutes of the committee meetings</li> <li>• Tools</li> <li>• Health and climate change legislation</li> </ul> | <ul style="list-style-type: none"> <li>• Funds available</li> <li>• Adequate human resources available</li> </ul> |
| <p><b>Tasks:</b></p> <p>6.5.1.1 Establish mechanisms for effective participation of experts from the Ministry of Health and public health institutions in environmental management activities of other relevant sectors and stakeholders, especially planning, implementation, monitoring and evaluation of environmental management interventions that will result in reducing exposure to environmental risk factors related to climate change.</p> <p>6.5.1.2 Plan, implement, monitor and evaluate integrated vector management (IVM) activities for climate-sensitive vector-borne diseases, including expansion of indoor residual spraying (IRS), distribution of long-lasting, insecticide-treated bednets (LLINs), and environmental management for control of disease vectors.</p> <p>6.5.1.3 Establish and strengthen national poisons centres, emergency hospital centres.</p> <p>6.5.1.4 Provide logistics for emergency centres including ambulances and other emergency drugs and health products.</p> <p>6.5.1.5 Include and implement climate-related disaster risk reduction interventions in national disaster reduction plans; strengthen national disaster management intersectoral coordination committee.</p> <p>6.5.1.6 Strengthen early diagnosis and adequate treatment of climate-sensitive diseases.</p> <p>6.5.1.7 Undertake health promotion to cover climate change issues.</p> |   |   |   |

- 6.5.1.8 Develop legislation and regulations on climate change and health and ensure they are enforced.
- 6.5.1.9 Develop interventions for the management of climate-change-related diseases and injuries.
- 6.5.1.10 Develop and ensure functional early warning systems, in collaboration with relevant sectors, by providing relevant health and meteorological information for seasonal weather predictions.
- 6.5.1.11 Develop and strengthen strategies and tools to mitigate identified impacts on public health associated with climate change.

**Outcomes:**

- I. Reduced impact of climate change on public health.
- II. Reduced numbers of casualties resulting from disasters associated with climate change.
- III. Compliance mechanism in place.

## Programme 6.6: Collaboration and Partnership for Improved Nutrition, Water and Sanitation

### Action 6.6.1: Develop or strengthen platforms for intersectoral collaboration and policy dialogue with relevant ministries and institutions working on the availability of food and the management of water and sanitation

Purpose of action: To establish mechanisms to ensure that the health sector can interact at the policy level with other sectors to ensure appropriate implementation of appropriate adaptation measures.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Functional mechanisms in place for intersectoral collaboration and policy dialogue<br><br>Country task teams set up for the implementation of the Libreville Declaration, and other sectors strengthened to incorporate climate change and health risks and appropriate adaptation measures into action plans | <ul style="list-style-type: none"> <li>Functional national climate change and health inter-ministerial committee</li> <li>Climate change and health risks incorporated into the action plans of the task teams</li> </ul> | <ul style="list-style-type: none"> <li>Terms of reference and minutes for committee meetings</li> <li>Action plans of relevant sectors (food and agriculture, water and sanitation)</li> </ul> | <ul style="list-style-type: none"> <li>A funding mechanism available</li> </ul> |

**Tasks:**

- 6.6.1.1 Undertake situational analysis to establish available platforms and committees in the health sector engaged in advocacy and coordination of climate change issues.
- 6.6.1.2 Establish mechanisms for effective participation of experts from the Ministry of Health and other public health institutions in environmental



- management activities of other relevant sectors, especially planning, implementation, and monitoring and evaluation of environmental management interventions.
- 6.6.1.3 Intensify awareness-raising and community education for point-of-use water conservation and treatment, and implementation of national water safety plans.
- 6.6.1.4 Recruit and deploy additional technical staff who can serve as liaison and technical assistants (e.g., national focal point for climate change and health) for intersectoral collaboration.
- 6.6.1.5 Organize national advisory stakeholders' forums.
- 6.6.1.6 Set up a task force spearheaded by the MOH collaborating with relevant institutions to improve waste management in Ghana. This task force should develop a strategy aimed at improving waste management and clearing drains.
- 6.6.1.7 Intensify awareness-raising and advocacy to encourage climate-resilient agriculture and collaborate with ministries and institutions working in agriculture to choose nutritious crops and livestock for climate-resilient and climate-change-resistant agriculture.
- 6.6.1.8 Develop and strengthen nutritional programmes to incorporate climate change and health issues (e.g., extend vitamin A supplementation activities).
- 6.6.1.9 Deploy social mobilization interventions for safe nutrition; strengthen food safety programmes and promote breastfeeding.

**Outcomes:**

I. Nutrition, waste management, water management and health improved in Ghana.

II. Improved intersectoral collaboration.

**Action 6.6.2: Develop or strengthen platforms for collaboration and coordination with other countries and with international bodies**

Purpose of action: To improve north-south and south-south collaboration, implement international frameworks, and mobilize funds and other resources to improve adaptation to risks and impacts posed by climate change on health.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Strengthened collaboration and partnerships with countries in the sub-region and beyond. | <ul style="list-style-type: none"> <li>Number of sub-regional workshops</li> <li>Number of health professionals supported for international processes (UNFCCC)</li> </ul> | <ul style="list-style-type: none"> <li>Workshop reports</li> <li>Summary reports from health professionals</li> </ul> | <ul style="list-style-type: none"> <li>Available funds</li> </ul> |

**Tasks:**

- 6.6.2.1 Promote inter-country sharing of experience and exchange of information.
- 6.6.2.2 Undertake systematic and comprehensive resource mobilization activities to support the national action plan by preparing and submitting proposals to access climate change funding.
- 6.6.2.3 Organize sub-regional planning workshops on health adaptation to climate change (covering nutrition, water and sanitation).
- 6.6.2.4 Strengthen collaboration between national and international experts in the implementation of national strategies in improved nutrition, water and sanitation as they relate to climate change.

- 6.6.2.5 Establish and strengthen the functioning of a steering committee and a technical advisory committee on climate change and health issues.
- 6.6.2.6 Establish and support the functioning of inter-agency technical support teams for climate change and health issues.
- 6.6.2.7 Support the functioning of the Joint Task Team (JTT) for the health and environment strategic framework to coordinate the implementation of the national health adaptation strategies.
- 6.6.2.8 Undertake required advocacy and communications activities, including supporting delegates concerned with health issues to attend the UNFCCC negotiations.

**Outcome:**

Improved implementation of the international framework on climate change and health matters.

## Programme 6.7: Social Protection and Improved Access to Health Care

### Action 6.7.1: Establish and strengthen universal, comprehensive social protection policies and strategies

Purpose of action: To develop a climate-resilient social environment that addresses inequities and inequalities in health issues.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Universal, comprehensive social protection policies and strategies strengthened | <ul style="list-style-type: none"> <li>Climate change and health issues mainstreamed into the policy document and strategies</li> </ul> | <ul style="list-style-type: none"> <li>Policies and strategies</li> </ul> | <ul style="list-style-type: none"> <li>Funding mechanisms available</li> </ul> |

**Tasks:**

- 6.7.1.1 Improve the availability of human resources for health care, drugs, medical equipment and logistics, including by increasing the doctor: patient ratio, especially in vulnerable areas.
- 6.7.1.2 Increase geographic coverage of access to affordable and good quality health services.
- 6.7.1.3 Promote use of and compliance with disease prevention and care practices at the community and household levels.
- 6.7.1.4 Target services and resources more effectively to priority climate-sensitive diseases and vulnerable groups such as pregnant women and children.
- 6.7.1.5 Strengthen the NHIS to facilitate easier access and timely completion of registration.
- 6.7.1.6 Coordinate and seek greater synergies across the relevant sectors and among appropriate agencies (NADMO, MESTI, EPA, MOH, NHIS and other relevant partners) to address vulnerability stemming from risks associated with climate change.

**Outcome:**

Reduced impact of climate change on public health.

## Programme 6.8: Indigenous traditional knowledge and practices in health

### Action 6.8.1: Adopt and integrate indigenous knowledge and practices concerning human health into national health care policies and strategies

Purpose of action: To create baseline data on indigenous knowledge and practices to inform health adaptation policies and strategies.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Catalogue of indigenous traditional health practices and practitioners developed.<br><br>Indigenous knowledge and practices adopted and integrated into health policies and strategies.  | <ul style="list-style-type: none"> <li>Number of indigenous traditional health practices catalogued</li> <li>Number of indigenous traditional health practitioners catalogued</li> <li>Indigenous knowledge and practices adopted and integrated into health policies and strategies</li> </ul> | <ul style="list-style-type: none"> <li>Databases of indigenous traditional health practices and practitioners</li> <li>Health policies and strategies</li> </ul> | <ul style="list-style-type: none"> <li>Funding mechanism available</li> <li>Existing indigenous health practices and practitioners</li> </ul> |
| <b>Tasks:</b><br>6.8.1.1 Identify past and current coping strategies developed by traditional communities to adapt to and mitigate environmental change based on their own specific cultural backgrounds.<br>6.8.1.2 Collect and analyse information on past and current practical adaptation actions and measures.<br>6.8.1.3 Collect and collate information on indigenous traditional knowledge and practices related to health care.<br>6.8.1.4 Validate and evaluate practices based on scientific, local and the socio-cultural background in which these practices are embedded.<br>6.8.1.5 Formulate policies which actively involve indigenous and traditional communities in the international, regional and local climate change discourse and which secure their entitlement to self-determination, land, natural resources, information, education, health services, and food.<br>6.8.1.6 Recognize and actively promote indigenous adaptation strategies.<br>6.8.1.7 Promote transfer of technology that is culturally appropriate.<br>6.8.1.8 Ensure the conservation of natural resources and biological diversity to facilitate the practice of traditional medicine.<br>6.8.1.9 Combine modern scientific and traditional indigenous knowledge.<br>6.8.1.10 Promote collaborative research and action between indigenous peoples and scientists.<br>6.8.1.11 Monitor the implementation of the integrated adaptation and mitigation policies and strategies. |   |  |   |
| <b>Outcome:</b><br>Improved status of climate-sensitive diseases based on integrated health adaptation policies and strategies.  |   |  |   |

## Summary

### Timeline for Actions to be taken on Programme Areas

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 6: Impact of Climate Change on Human Health  |   | Lead Org   | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$ |
|--|---|------------|------|---|------|---|------|---|------|---|------|---|------|---|---------------------|
| Programme Area and Actions   |   |            | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                     |
| <b>Programme Area 6.1: Capacity-building of health providers and groups associated with climate change</b> |   | <b>MOH</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>5,000,000</b>    |
| 6.1.1  | Develop and strengthen individual, institutional and systemic capacity in climate-change-related health issues across the health sector.                                |            | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 6.1.2  | Enhance technical capacity in data collection, management, reporting and storage.   |            | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 6.2: Climate-related Health Research</b>   |   | <b>MOH</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>50,000,000</b>   |
| 6.2.1  | Development of research programmes to address gaps in health and climate change issues.   |            | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 6.3: Strengthen climate-sensitive disease surveillance and response systems</b>          |   | <b>MOH</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>300,000,000</b>  |
| 6.3.1  | Integrate environment and health surveillance systems.  |            |      | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 6.4: Improve public health measures, especially in climate-vulnerable communities</b>    |   | <b>MOH</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>50,000,000</b>   |
| 6.4.1  | Establish collaboration and partnerships for improved drainage, sanitation and hygiene services.  |            |      |   | x    | x | x    | x | x    | x | x    | x | x    |   |                     |
| 6.4.2  | Establish collaboration and partnerships for improved public health-care delivery and immunization coverage.  |            |      | x | x    | x | x    | x | x    | x | x    | x | x    |   |                     |
| <b>Programme Area 6.5: Emergency health preparedness and climate-proof health infrastructure</b>           |   | <b>MOH</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>200,000,000</b>  |
| 6.5.1  | Put mechanisms in place to reduce the number of casualties resulting from the health consequences of extreme weather events and to strengthen curative interventions to |            |      | x | x    | x | x    | x | x    | x | x    | x | x    |   |                     |

| <b>Policy Focus Area 6: Impact of Climate Change on Human Health</b>                                  |   | <b>Lead Org</b> | <b>2015</b> |          | <b>2016</b> |          | <b>2017</b> |          | <b>2018</b> |          | <b>2019</b> |          | <b>2020</b> |          | <b>Estimated Cost US\$</b> |
|---|---|-----------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|----------------------------|
| <b>Programme Area and Actions</b>   |   |                 | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> |                            |
|   | manage the acute health impacts of climate change.  |                 |             |          |             |          |             |          |             |          |             |          |             |          |                            |
| <b>Programme Area 6.6: Collaboration and partnership for improved nutrition, water and sanitation</b> |   | <b>MOH</b>      |             |          |             |          |             |          |             |          |             |          |             |          | <b>1,000,000</b>           |
| 6.6.1.  | Develop or strengthen platforms for intersectoral collaboration and policy dialogue with relevant ministries and institutions working on the availability of food and the management of water and sanitation. |                 |             |          | x           | x        | x           | x        | x           | x        | x           | x        | x           |          |                            |
| 6.6.2.  | Develop or strengthen platforms for collaboration and coordination with other countries and with international bodies.  |                 | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           |          |                            |
| <b>Programme Area 6.7: Social protection and improved access to health care</b>                       |   | <b>MOH</b>      |             |          |             |          |             |          |             |          |             |          |             |          | <b>100,000,000</b>         |
| 6.7.1   | Establish and strengthen universal, comprehensive social protection policies and strategies.  |                 |             |          | x           | x        | x           | x        | x           | x        | x           | x        | x           |          |                            |
| <b>Programme Area 6.8 Indigenous traditional knowledge and practices in health</b>                    |   | <b>MOH</b>      |             |          |             |          |             |          |             |          |             |          |             |          | <b>300,000,000</b>         |
| 6.8.1   | Adopt and integrate indigenous knowledge and practices concerning human health into national health care policies and strategies  |                 | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           |          |                            |

## Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 6: Impact of Climate Change on Human Health</b>                                       | <b>Lead Organization</b> | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 6.1: Capacity building of health providers and groups associated with climate change</b> | <b>MOH</b>               | 1,500,000   | 1,000,000   | 1,000,000   | 500,000     | 500,000     | 500,000     | <b>5,000,000</b>           |
| <b>Programme Area 6.2: Climate-related Health Research</b>   | <b>MOH</b>               | 15,000,000  | 10,000,000  | 7,000,000   | 7,000,000   | 7,000,000   | 4,000,000   | <b>50,000,000</b>          |
| <b>Programme Area 6.3: Strengthen climate-sensitive disease surveillance and response systems</b>          | <b>MOH</b>               | 30,000,000  | 120,000,000 | 50,000,000  | 40,000,000  | 40,000,000  | 20,000,000  | <b>300,000,000</b>         |
| <b>Programme Area 6.4: Improve public health measures, especially in climate-vulnerable communities</b>    | <b>MOH</b>               | 5,000,000   | 20,000,000  | 10,000,000  | 5,000,000   | 5,000,000   | 5,000,000   | <b>50,000,000</b>          |
| <b>Programme Area 6.5: Emergency health preparedness and climate-proof health infrastructure</b>           | <b>MOH</b>               | 20,000,000  | 80,000,000  | 30,000,000  | 25,000,000  | 25,000,000  | 20,000,000  | <b>200,000,000</b>         |
| <b>Programme Area 6.6: Collaboration and partnership for improved nutrition, water and sanitation</b>      | <b>MOH</b>               | 200,000     | 200,000     | 200,000     | 200,000     | 150,000     | 50,000      | <b>1,000,000</b>           |
| <b>Programme Area 6.7: Social protection and improved access to health care</b>                            | <b>MOH</b>               | 5,000,000   | 25,000,000  | 25,000,000  | 20,000,000  | 20,000,000  | 5,000,000   | <b>100,000,000</b>         |
| <b>Programme Area 6.8: Indigenous traditional knowledge and practices in health</b>                        | <b>MOH</b>               | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | <b>300,000,000</b>         |



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 7: Minimize the Impact of Climate Change on Access to Water and Sanitation**



## Policy Focus Area 7: Minimize the Impact of Climate Change on Access to Water and Sanitation

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### Introduction

The development and management of the water and environmental sanitation sectors are guided by two national strategic documents, the Water Sector Strategic Development Plan (WSSDP) and the National Environmental Sanitation Strategy and Action Plan (NESSAP). The WSSDP articulates the priority actions for the implementation of the National Water Policy (NWP) in the medium to long term (2011–2025), while the NESSAP refocuses attention on environmental sanitation in Ghana and proposes strategies and actions to meet the Environmental Sanitation Policy (ESP) objectives between 2015 and 2020.

Both the WSSDP and NESSAP and other water and sanitation sector strategies and plans mention climate change briefly as an environmental problem, but explicit links of actions to climate change adaptation are not well articulated. The National Climate Change Policy (NCCP) offers the opportunity to strengthen the link between actions and climate change adaptation and risk management. This section of the NCCP thus outlines the strategies that aim to mainstream the actions under the themes of water and sanitation into the national policy planning and budgeting processes.

### Targets for the mainstreaming process

The key targets for the mainstreaming process in the context of access to water and sanitation include the following:

1. **Linking Integrated Water Resources Management (IWRM)** with climate change adaptation:

As water is the primary medium through which climate risks will be experienced, water-related hazards (extreme droughts and floods), water supply and sanitation, and water for agriculture, industry, energy and transport, must all be managed through well-designed national and transboundary water resources management plans. Some priority IWRM-related responses to adaptation proposed in the NCCP include the following:

- Catchment protection and conservation (Programme 7.9) will help to ensure water security during adverse conditions. Such interventions also have wider environmental benefits, such as reduced erosion and soil loss and maintenance of biodiversity and land productivity;
- Increasing water storage capacity through the construction of dams (Programme 7.4) which adds to security in water supply;
- Urban flood mitigation and preparedness through improved drainage system (Programme 7.5).

2. **Improving access to climate information and enhancing early warning systems to support appropriate assistance:**

A strategy of maintaining and strengthening a national climate observation system and strengthening partnerships at all levels, between institutions working on climate-sensitive development programmes (the National Disaster Management Organisation (NADMO), Ministry of Food and Agriculture (MoFA), and others) and the providers of climate information (Ghana Meteorological Agency (GMet), Hydrological Services



Department (HSD), Water Research Institute (WRI), and others) will provide the necessary foundation to support adaptation.

Early warning systems could be strengthened to reduce the scale and magnitude of disasters by improving data collection (Action 7.5.1) processing and archiving. Another important target of disaster preparedness is the dissemination of information. The information collected has to be translated to an easily understandable format and disseminated to as many people as possible using the appropriate means.

**3. Having a water policy, accepted across the water sector, on managing climate risk, with realistic and achievable goals for mainstreaming:**

The policy commits the water sector players to addressing such critical issues as the following:

- Ensuring that the actions set out in the present Focus Area are protected through climate risk reduction elements and managed in a manner that ensures sustainable development; and
- Ensuring that the implementation of the actions will not increase people's vulnerability to disasters or hinder access to the delivery of water and sanitation services.

**4. Having widespread awareness of the need to develop a strategic approach to climate change adaptation and risk reduction across the water and sanitation sector, in response to policy directives:**

A cross-section of water sector decision-makers, managers and practitioners are engaged in a consultative process to ensure that mainstreaming water and sanitation actions on climate change is a component of the sector's strategic framework.

**5. There is ongoing analysis of the extreme events (disaster) environment in any given location (that is, assessment of hazards, disaster impact, vulnerabilities and risks):**

This analysis involves the perspectives of providers of climate information, ministries, departments and agencies, local communities, and other stakeholders. Appropriate strategies are developed on the basis of the above and integrated into new sector plans as appropriate.

**6. Through the sector-wide approach, routinely incorporating climate change adaptation and disaster risk reduction in the planning, implementation and evaluation of the actions:**

This is for the dual purpose of protecting the actions of the programme from the effects of climate change and ensuring that new water programmes, plans and projects do not increase the risk of disasters or enhance vulnerability.

**7. Investing in capacity development for managing climate risk with the collaboration and support of key players and relevant regional or global coordinating or networking bodies.**

**8. Ensuring that institutional capacity is sufficient to support the mainstreaming processes – that is, financial resources, skills and knowledge (by providing staff training and development, materials and appropriate technical support) and strong cross-sectoral commitment and ownership of the actions at all levels.**

**9. Ensuring that the sector monitoring and evaluation framework is revised and used independently and comprehensively to assess the progress made in mainstreaming.**

**The impact of climate change on socioeconomic, sectoral and local development strategies and plans**

Climate change needs to be counted as a risk in building up and implementing strategies and plans for the development of the water sector. Effects of climate change could challenge the goals of access to safe water and adequate sanitation, sustained water resources management and the country's sustainable development. Water resources are at ever-increasing risk as a result of floods and droughts

in some regions and during some seasons. This directly affects the water supply for rural and urban areas, agriculture and power generation.

The potential impact of climate change on socioeconomic and local development strategies and plans is illustrated in the table below.

**Impact of climate change on water and sanitation**

| <b>Climate hazard</b>                                | <b>Immediate impact and consequences</b>  | <b>Vulnerable subsectors and groups</b>   | <b>Impact factor</b> |
|--|---|---|----------------------|
| Rainfall events (becoming more intense and frequent) | Pollution of the environment, including bodies of water<br>Sedimentation of river beds<br>Erosion of river banks  | Water resources, water supply, aquaculture, natural ecology systems and biodiversity<br>Poor farmers, rural and urban communities, children, women  | High                 |
| Floods   | Overtopping of river banks<br>Drainage congestion and waterlogging<br>Loss of homes and agricultural land to rivers<br>Increased river-bank erosion and saline water intrusion in coastal areas | Water resources quality and water supply; agriculture and food security; aquaculture (e.g., fish availability); water transportation, water infrastructure; ecosystems; settlements; health care and human life.<br>Rural and urban communities especially in flood-prone areas, including farmers, fishermen, women and children | High                 |
| Droughts   | Low availability of water for all uses  | Water supply; availability of water resources; agriculture and food security; energy (hydro power); waterways for transportation; health care, ecosystems and biodiversity.<br>Rural and urban communities especially in drought-prone areas, including farmers, fishermen, women and children; industries                        | High                 |
| Temperature increase (Extreme heat)                  | Warmer and more humid weather<br>Likely increase in the incidence of water-   | Community health care; agriculture and food security; aquaculture; natural ecology systems and biodiversity;  | Medium               |

| Climate hazard | Immediate impact and consequences  | Vulnerable subsectors and groups   | Impact factor |
|----------------|--|--|---------------|
|                | borne and air-borne diseases   | availability of water resources<br>The aged, farmers; heat-prone communities; children; women  |               |
| Sea-level rise | Submergence of low-lying coastal areas<br>Saline water intrusion up coastal rivers and into groundwater aquifers<br>Reducing availability of freshwater<br>Loss of biodiversity<br>Damage to the coastal mangroves | Agriculture and food security; aquaculture; sea and coastal wetlands ecological systems; water resources (surface and ground water); tourism; residential settlements; infrastructure and industrial zones<br>Coastal communities, especially poor farmers and fishermen; children and women | High          |

### The awareness and capacity for mainstreaming in the context of water and sanitation

Typically, the awareness and capacity needs for mainstreaming are at the national, district and local levels, including sector-specific aspects, and multiple institutions with mandates relevant to adaptation, from government and non-governmental actors. In essence, the existing sector institutions and platforms are adequate for the mainstreaming process, but should be sufficiently adaptable to integrate planning and take action on climate change impacts. In terms of awareness for mainstreaming, three major sector knowledge-sharing and coordination forums are of the essence:

- **Ghana Water Forum:** established in 2009 out of the then Joint Government of Ghana/Development Partners Annual Review Conference to create a platform for water sector stakeholders and partners to discuss opportunities and challenges of achieving water security, and to formulate concrete policies, strategies and actions to accelerate water resources development and the provision of services.
- **National Environmental Sanitation Conference (NESCON):** Held annually, NESCON offers actors on the front line in this

sector – especially those involved in practical research and implementation of policies, plans, programmes and projects on the ground – a platform for sharing experiences and lessons learned that can be replicated to accelerate adoption of best practices throughout the country.

- **Resource Centre Network (RCN) Ghana:** A network of institutional partners that meets monthly, seeking to promote knowledge management in the water, sanitation and hygiene (WASH) sector in Ghana. The vision is of a dynamic, knowledge-driven sector that provides improved and sustainable pro-poor services.

In addition, there are annual reviews and progress and monitoring platforms at the institutional, regional and district levels, such as the Community Water and Sanitation Agency (CWSA) and Environmental Health and Sanitation Directorate (EHSD) annual reviews, and the review meetings for their various programmes. A new framework for sector monitoring, research and evaluation – of programme audits and mid-term evaluations – is emerging, which would serve as another platform for enhancing awareness in the mainstreaming process.

Based on these networks, a carefully targeted awareness programme could be propagated in ways that recognize that climate change is one of the most important and uncertain challenges faced by water and sanitation professionals working in the public and private sectors.

Listed below are the institutional frameworks and instruments that provide the status, emerging issues and challenges, and the strategies recommended for tackling the capacity needs for mainstreaming the thematic actions into national policy planning:

### **Institutional Frameworks and Instruments for Mainstreaming Climate Change**

#### **Institutions**

##### **Sector leadership**

Ministry of Water Resources, Works and Housing (MWRWH)  
Ministry of Local Government and Rural Development (MLGRD)

##### **Facilitation and/or Regulation**

Community Water and Sanitation Agency (CWSA), Ghana Water Company Limited (GWCL), Water Resources Commission (WRC), Public Utilities Regulatory Commission (PURC), Environmental Health and Sanitation Directorate (EHSD), Metropolitan, Municipal and District Assemblies MMDAs), School Health Education Programme of the Ghana Education Service (GES/SHEP)

##### **Data Management**

Hydrological Services Department (HSD), Water Research Institute (WRI) / Council for Scientific and Industrial Research (CSIR), GMet

##### **Service Delivery**

CWSA, Ghana Urban Water Limited (GUWL), EHSD, GES/SHEP, MMDAs

### **Key instruments**

#### **Sector Policies**

National Water Policy  
Environmental Sanitation Policy  
Riparian Buffer Zone Policy  
School Health Education Policy

#### **Sector strategies and action plans**

Water Sector Strategic Development Plan  
National Integrated Water Resources Management (IWRM) Plan  
National Rainwater Harvesting Strategy  
National Environmental Sanitation Strategy and Action Plan (NESSAP)  
School Health Education Strategy

#### **Sector investment plans (SIP)**

SIP for rural and small town's water supply  
SIP for urban water supply  
Strategic environmental sanitation investment plan.

#### **Capacity issues and challenges**

Considerable progress has been made in institutional reforms and alignment of institutions in the water sector. The MWRWH and MLGRD are in a position to lead the implementation of policies and plans, and undertake resource mobilization and allocation. A Water and Sanitation Working Group made up of ministries, departments and agencies, the private sector, civil society, and development partners also serves as a national coordination link. The overall institutional, technical and human capacity challenges include:

- Ensuring training and retention of an adequate number of sector professionals
- Rationalizing staffing levels based on industry standards

- Ensuring adequate capacity encompassing administrative, financial, technical and logistical provisions
- Maintaining institutional structures responsive to the need for sustainable water use and management
- Ensuring effective coordination and harmonization in the implementation and monitoring approaches to reduce the overall cost of delivery of the plans and programmes.

#### **Strategic actions**

- Targeted capacity-strengthening programmes that are appropriate to water, sanitation and hygiene professionals working in different roles and at different institutional levels need to be developed and implemented;
- the key water agencies and District Assemblies need to be appraised and developed to enable them to perform their functions effectively and efficiently;
- Interactive and training networking activities are needed to support the creation of effective partnerships among sector stakeholders;
- A sector-wide programme approach should be followed to strengthen links between sector programmes and the country-wide planning, budgeting and evaluation processes at all levels – communities, districts and the central agencies.

#### **Evaluate possible impacts (both negative and positive) of the mainstreaming process**

Likely impacts on water governance, and economic, social and environmental impacts, of the mainstreaming process are:

- Creating a better coordinated sector, both intra and inter-sectoral, regarding the development and implementation of policies, plans and strategies;

- Strengthening the capacity of the water sector institutions to take the initiative in adapting to climate change and to preventing possible economic damage caused by the same;
- Providing the water service providers (GWCL, CWSA, EHSD) with the opportunity to improve their technological and economic efficiency in the delivery of services;
- Achieving considerable cost savings by overcoming the consequences of climate change for the water infrastructure, and the productive water-based livelihoods and life of the inhabitants;
- Contributing to improving quality of life through access to safe water and adequate sanitation, and therefore to the security and the safety of the populace;
- Promoting social equality by preferential policies to poor communities and the vulnerable such as women and children;
- Mitigating climate change impacts on water resources such as reducing surface and ground water pollution, protected water sources, and reducing natural disasters.

#### **Strategies and mechanisms for mainstreaming in the thematic area including financial, economic and policy aspects:**

##### **Financial aspects**

- Progressively increase its portion of public sector funding through greater budgetary allocations as will be indicated in the Strategic Investment Plan for the water and sanitation sector;
- Facilitate and ensure that a rural water development levy on payments for urban water is transferred for use in the community water sub-sector;
- Encourage MMDAs to dedicate a portion of their common fund to meet the contribution to the capital cost of water projects by poor and vulnerable communities;

- Leverage more grant or credit financing for the National Community Water and Sanitation Programme (NCWSP);
- Ensure efficient assets management by the Ghana Water Company Limited (GWCL) (e.g., GWCL to set up a depreciation fund (for replacement of fixed assets) and a sinking fund (for expansion development));
- Encourage the private sector to participate in the share-holding of the management of GWCL;
- Access the Multi-donor Budget Support (MDBS) mechanism.

### **Economic aspects**

- Promote incentives for demand management measures in order to ensure the rational allocation and conservation of water resources;
- Institute appropriate water charges, such as water use fees, with the dual purpose of providing a tool for regulating water use and a means of defraying the costs incurred in maintaining an efficient system for integrated water resources management activities.

### **Policy and regulatory aspects**

Develop water governance systems (sub-sector policies, institutions, rules and regulations, etc.) to ensure that cross-sectoral strategies are based on a solid understanding of the impact of climate change on the different components of the water and sanitation services delivery system. These should suit local conditions, be pragmatic and be workable:

- Target areas of improving the national governance system by redefining stakeholder dialogue to look beyond water, targeting decision-making based on evidence, and adapting to change;
- Identify and mobilize donors to the water and sanitation sectors and integrate donor financing into their management platforms in a sector-wide programme approach;

- Provide greater opportunities for public-private partnerships (PPP) - already supported by the Small Towns Water Supply and Sanitation Project;
- MMDAs to establish District Works Departments (DWDs) for greater effectiveness in the delivery of WASH services at the local level;
- Prioritize the setting up of River Basin Boards, targeting river basins in climate-change-prone areas;
- Enhance national institutional capacity to build resilience and adaptation into water resource management and decision-making processes.

### Programme 7.1: Environmental Sanitation Education and Hygiene Education

**Objective:** To increase the climate resilience of vulnerable communities through sustained water, sanitation and hygiene education.

**Justification:**

Adverse effects of climate change, such as floods, are expected to put freshwater resources and water supply and sanitation services at risk and increase the incidence of water-related and waterborne diseases.

Environmental and hygiene education can play a major role in informing people of how to improve local management of water supplies and minimize the risks of infection and disease. Dissemination of information on better hand-washing practices and other practices of good hygienic behaviour could lead to a reduction of water-borne diseases, and ultimately a reduction in health costs to the nation. Educating schoolchildren on basic hygiene and sanitation is very important: most children are eager to learn and can therefore instil and promote positive behavioural change in other children. They also have important roles in household chores related to hygiene, and can therefore instil change within their families and communities.

The approach will be to target schools and local community groups and make use of media such as the Internet, drama, television, and radio. Actions are targeted at building the capacity of private operators and managers of water and sanitation facilities, as well as the provision of education, based on life skills, to artisans to enhance communities' access to affordable sanitation facilities.

The actions are expected to complement the interventions in the WSSDP, the NESSAP, and the GES/SHEP that are being implemented by the MWRWH, MLGRD and the Ministry of Education (MoE)/GES respectively.

**Action:**

- 7.1.1 Promote safe water, sanitation and hygiene practices by strengthening the existing WASH awareness-raising modules for vulnerable communities;
- 7.1.2 Strengthen the education and training of stakeholders in water and environment facilities at all levels.
- 7.1.3 Reinvigorate the schools sanitation and hygiene education (SSHE) programmes as part of the School Health Education Programme (SHEP).

**Timeline:** 2015–2020

**Responsibility:** Ministry of Local Government and Rural Development (MLGRD)/Local Government Service (LGS), MoE/GES, Ministry of Health/Ghana Health Service, Works Departments of MMDAs, CWSA/MWRWH, Ministry of Information and Media Relations/Information Services Department; civil society organizations (CSOs), development partners, universities.

**Estimated Cost:** US\$ 213,070,400

### Programme 7.2: Improved Access to Safe Drinking Water

**Objective:** To ensure adequate delivery of water services through efficient climate-resilient operation and maintenance of water systems.

**Justification:**

One of the ways in which climate change manifests itself is by a rise in temperatures, which results in warmer waters. Warm waters hold less dissolved oxygen which, coupled with nutrient loads, fosters harmful algal blooms, which may result in a significant deterioration of water quality and aquatic ecosystem health in some water supply storage systems. Floods will contaminate water supply infrastructure that has been badly situated, and increase the risk of epidemics of waterborne diseases such as cholera. Prolonged droughts and salt water intrusion

into coastal aquifers due to sea level rise will pose a big challenge to making safe drinking water available in the coastal zone. Water sources – both surface and groundwater – are at real risk. There is a need to ensure good water sources in terms of quantity and quality; conservation and protection of the freshwater resources is essential.

Already, the delivery of water services has become erratic and unreliable, especially in the rural and in low-income and peri-urban communities, which are often situated in climate-vulnerable areas. The gap between supply and demand is due to low investment to rehabilitate or extend services to match the increasing urban expansion, and climate change will exacerbate the problem. Reducing water loss (that is, non-revenue water) in urban water supply systems to acceptable levels (less than 30 per cent) will contribute to water and energy conservation, and energy cost savings. The cost savings will translate into an increase in the income of the poor and vulnerable in the peri-urban communities, and hence into their resilience to climate change. Furthermore, improved or easy access to reliable water supply will translate into increased productivity, higher school attendance and more time available for women to engage in income-earning activities.

**Action:**

- 7.2.1 Strengthen the institutional management capacity of key institutions (GWCL and CWSA) to ensure efficient delivery of water services at all times.
- 7.2.2 Mainstream climate dimensions in the rehabilitation, operation and maintenance of existing water systems and for water conservation.
- 7.2.3 Plan for investment in minor repairs as well as major renewal, replacement, and expansion of water supply services to peri-urban settlements and small towns.

- 7.2.4 Develop and make operational a nationwide potable water quantity and quality monitoring and site surveillance programme to minimize possible sources of pollution.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Water Resources, Works and Housing (MWRWH) and Ghana Water Company Limited (GWCL), CWSA, Environmental Protection Agency (EPA), Ghana Irrigation Development Authority, GMet, MMDAs, Ministry of Gender, Children and Social Protection, MLGRD/Local Government Service, NDPC, Water Resources Commission (WRC); CSOs, development partners, universities and research institutions.

**Estimated Cost:** US\$715,000,000

### Programme 7.3: Climate-related Research

**Objective:** To improve the knowledge base, through research, on climate-sensitive options and practices for the delivery of water and sanitation services.

**Justification:**

Several gaps in information and knowledge exist in terms of observations and the need for research related to climate change and water conservation. Information about the water-related impact of climate change is inadequate – especially with respect to water quality, aquatic ecosystems and groundwater – including their socioeconomic dimensions. There is uncertainty regarding the impact on groundwater recharge and availability for example, and the extent to which over-exploitation in response to scarcity driven by climate change will undermine its sustainability.

Research is needed to generate data and information to support planning for new supplies, the operation and maintenance,



rehabilitation and replacement of existing facilities, and the development of models to support decision-making for water allocation. There is also a need to look into and test new or improved water and sanitation technologies that may be more resilient to climate change.

**Action:**

- 7.3.1 Improve the climate observation and monitoring system and set up a database on water and sanitation schemes, drawing on traditional knowledge and modern information technology to support forecasting and evidence-based decision-making.
- 7.3.2 Investigate opportunities for alternatives to wastewater treatment, processing and uses.
- 7.3.3 Promote scientific investigations and research in water resources assessment, management and development.

**Timeline:** 2015–2020

**Responsibility:** Council for Scientific and Industrial Research (CSIR) and Water Research Institute (WRI); universities and research institutions, CWSA, EPA, Ghana Atomic Energy Commission (GAEC), Ghana Irrigation Development Authority (GIDA), GMet, Hydrological Services Department (HSD), MLGRD, MWRWH, NADMO, WRC; CSOs and NGOs, traditional authorities.

**Estimated Cost:** US\$18,720,000

## Programme 7.4: Construction of Water Storage Systems

**Objective:** To secure adequate water for energy production and food security during all seasons.

**Justification:**

The consequences of climate change and variability include extremes of floods and droughts. The construction of water storage systems is

one of the adaptation options to reduce the vulnerability of communities to climate change.

Future scenarios for Ghana show reduced surface and sub-surface run-off under climate change as a result of predicted lower precipitation, recurring droughts and increased temperatures. Rainfall patterns, particularly in the northern regions, have long dry spells. Water storage facilities across scales – from local rain harvesting systems to large-scale dams – are constructed to satisfy demand for food production, the watering of livestock, and energy from hydropower generation. They are also important factors for regulation of seasonal flows and limiting flooding of downstream communities.

The design and safety of the reservoirs and dams and their operation during extreme events need to be guided, and regulations must be developed as more and more dams are constructed. The Water Resources Commission (WRC) has established a National Dam Safety Unit to regulate and manage large and small hydraulic structures in the country. The National Dam Safety Unit is being assisted to develop a governance framework, which will ensure the safety of dams, safeguard their resulting benefits, and guide operations of those of the future.

The activities under this programme area will involve promoting stakeholders' participation, increasing investment in the construction and rehabilitation of water storage infrastructure, such as dams, canals, irrigation schemes and rainwater harvesting systems. This will facilitate the control of water and make it available in the required quantity and quality to enhance water security and climate resilience.

**Action:**

- 7.4.1 Promote multi-stakeholder participation in the selection and management of water storage systems through participatory tools.

- 7.4.2 Review and establish a framework for the construction, operation and regulation of dams and reservoirs.
- 7.4.3 Promote the development of water storage systems and flood protection measures in the peri-urban settlements and small towns for agriculture and energy production.

**Timeline:** 2014–2020

**Responsibility:** **Water Resources Commission (WRC);** Bui Power Authority, EPA, GIDA, GMeT, GWCL, HSD, MMDAs, MWRWH, MoE, Ministry of Food and Agriculture (MoFA), Volta River Authority (VRA); CSOs and NGOs, universities and research institutions, professional bodies.

**Estimated Cost:** US\$50,000,000

### Programme 7.5: Improved Drainage in Urban Areas

**Objective:** To reduce the risk of flooding and dispersal of pollutants in urban areas by improving the drainage and sanitation systems.

**Justification:**

Climate change will increase the risk of flooding in major cities due to inadequate or poorly planned drainage networks, lack of maintenance of the drainage systems and a poor attitude to waste management.

One of the activities most damaging to water security in the long term is the use of water bodies as a recipient of waste. Surface water in cities and mining areas is being increasingly polluted due to the low capacity for waste management. Rivers and lagoons located near industrial areas are dying as a result of the discharges of untreated industrial and domestic waste leading to nutrient enrichment and odour. Provision of improved and consistently functioning drainage in urban areas has the potential to limit the sanitary nuisances, breeding of disease vectors and the hazards of flooding. Action that has

particular relevance as part of climate change mitigation includes the improvement of drainage design practices through capacity-building, promoting coordination among all of urban planning and development sectors, enforcement of environmental by-laws and regulations, and creation of awareness of the impact of climate change on human health.

**Action:**

- 7.5.1 Improve hydro-meteorological observational networks and provide access to data to facilitate drainage planning and decision-making.
- 7.5.2 Undertake topographic surveys and develop physical plans, incorporating drainage development plans for all regional and district capitals.
- 7.5.3 Build capacity, create awareness and enforce by-laws and regulations in MMDAs on the operation and maintenance of urban drains.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Local Government and Rural Development (MLGRD)/Local Government Service (LGS);** CSIR-WRI, EPA, G-Met, HSD, MMDAs, MWRWH, NADMO, National Commission for Civic Education (NCCE), WRC, Department of Urban Roads, Town and Country Planning; CSOs, private sector, security services.

**Estimated Cost:** US\$156,360,000

### Programme 7.6: Recycling of Solid Waste

**Objective:** To reduce the environmental impact of the disposal of solid waste in landfills through waste reduction, recycling and recovery.

**Justification:**

Climate change will have a substantial impact on solid waste management practices, underlining the need for urgent action on these. The effect of the projected increase in temperatures will be the augmentation of the rate of decay of solid waste that is dumped on land without treatment and safe disposal. This will lead to increased emissions of methane gas, which is several times more powerful than carbon dioxide in terms of its impact on climate change. It is thus critical to step up attempts to ensure timely treatment and disposal of solid wastes, especially in urban areas, which are major generators. In Ghana, most MMDAs resort to the use of landfills and incineration for disposal of waste. But the problems associated with acquisition and management of the landfill sites call for promoting waste minimization rather than waste disposal mechanisms. The provision of appropriate waste management, collection and recycling infrastructure is an essential prerequisite to the diversion of more waste from landfill sites.

The actions under this programme will involve carrying out waste audits or characterization and technology needs assessments. The waste audits will be followed by the formulation of step-by-step implementation plans to help identify strategies that need reviewing, or developed to promote commitment to waste minimization by all MMDAs.

**Action:**

- 7.6.1 Carry out a comprehensive waste audit in selected MMDAs to obtain categories and volume of waste, together with a technology needs assessment.
- 7.6.2 Identify and select, with multi-stakeholder participation, and make available appropriately zoned and serviced land to accommodate waste recovery and recycling infrastructure.

7.6.3 Encourage MMDAs and the private sector to establish waste material recovery, recycling and reduction strategies (including waste separation schemes in communities).

7.6.4 Strengthen human and institutional capacity to implement waste recycling technologies.

7.6.5 Develop and implement programmes in education and awareness-raising on the benefits of alternative uses of waste.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Local Government and Rural Development (MLGRD)/Local Government Service (LGS); CSIR, CWSA, MESTI, Ministry of Energy and Petroleum (MoEP), MMDAs; Association of Ghana Industries (AGI), CSOs, private sector, small and medium-sized enterprises (SMEs), universities and research institutions.

**Estimated Cost:** US\$254,770,000

## Programme 7.7: Wastewater Reduction, Treatment and Reuse

**Objective:** To promote productive end-use of treated waste through the capture of the economic value of wastewater and faecal sludge nutrients.

**Justification:**

One of the activities most damaging to water security in the long term is the use of water sources as a recipient of waste. The freshwater resources of most urban centres are under strain as a result of uncontrolled discharge of industrial and domestic waste into water bodies. Reuse of wastewater in concert with the implementation of other water conservation strategies and enforcing existing environmental regulations can help to lessen the man-made stresses arising from pollution of receiving waters.

The recovery of the nutrients in the wastewater can partially offset the need for fertilizers. This will also produce considerable savings in energy as fewer fertilizers will have to be manufactured, which will contribute to lower greenhouse gas emissions. In addition, the recovery of value from wastewater and faecal sludge has the potential to provide numerous services, including water for irrigation and energy generation through biogas recovery, resulting in job creation. These benefits have not been adequately exploited due to the negative perceptions attached to all types of waste (both liquid and solid), the low visibility of end-use benefits and the lack of appropriate regulation to support waste reduction, reuse, recycling and recovery.

Public education and the provision of incentives to utilize treated wastewater will enhance water conservation and water use efficiency.

The focus of this programme is to promote reuse-oriented sanitation schemes, identify the economic value of wastewater and faecal sludge nutrients, and strengthen capacities in retention, treatment and reuse technologies.

**Action:**

7.7.1 Promote multi-stakeholder participation in the identification and selection waste treatment sites.

7.7.2 Strengthen human and institutional capacity to implement waste reuse technologies.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Local Government and Rural Development (MLGRD), CWSA, EPA, GIDA, MESTI, MWRWH, WRC; CSOs, private sector.

**Estimated Cost:** US\$36,500,000

## Programme 7.8: Improved Access to Sanitation

**Objective:** To improve environmental sanitation through enhanced service delivery.

**Justification:**

Sanitation remains one of the biggest development challenges in Ghana. Poor sanitation and hygiene practices are evident in most communities in the country, such as unsightly littering, foul smells from choked gutters, stagnant pools of water and flooding during rains. Statistics show that the proportion of the Ghanaian population with access to improved sanitation is below 15 per cent (WSMP, 2009).<sup>1</sup> This means Ghana is unlikely to meet the MDG target of 53 per cent coverage by 2015. Sanitation service coverage in the rural areas is extremely low.

The consequences of the poor sanitation practices are immediate (e.g., increasing prevalence of malaria, cholera, diarrhoea and typhoid). Improved sanitation contributes to reducing faecal-oral disease transmission and hence the overall disease burden on the country. Investing in sanitation therefore, brings substantial economic returns and reduces costs in other sectors of which the most obvious one is the curative health sector.

Improving sanitation demands knowledge of the location of facilities, adequate collection, disposal, treatment and reuse of the waste, the provision of toilet facilities, promotion of alternative biodegradable packaging materials instead of plastics, and strengthening institutional, financial and human capacity.

The conventional approaches of providing subsidies for construction of individual toilets have proved to be expensive and unsustainable. An innovative approach for empowering communities to completely eliminate open defecation (community-led total sanitation) is being

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<sup>1</sup> *Water and Sanitation Monitoring Platform summary sheet, 2009* – [www.wsmpp.org](http://www.wsmpp.org)

implemented in selected rural communities by some NGOs. The NGOs will be supported to scale up the community-led total sanitation approach to cover additional rural communities.

The actions under this programme area are designed to complement the interventions under the NESSAP and WSSDP.

**Action:**

- 7.8.1 Improve appropriate sanitation facilities and management practices.
- 7.8.2 Ensure adequate financing of sanitation services.
- 7.8.3 Strengthen the institutional and human capacity of key institutions to ensure coordination and effective and efficient delivery of sanitation services.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Local Government and Rural Development (MLGRD) and Metropolitan, Municipal and District Assemblies (MMDAs); CWSA, MESTI, Ministry of Finance and Economic Planning (MoFEP), Ministry of Health (MOH); CSOs and NGOs (e.g. WaterAid, Plan Ghana, etc.), development partners.

**Estimated Cost:** US\$230,600,000

## Programme 7.9: Water and Land Management

**Objective:** To enhance resilience and adaptation to climate change through protection and conservation of river basins and wetlands.

**Justification:**

Ghana is experiencing damage to watersheds and wetlands through deforestation, illegal mining, urbanization, and inappropriate land use practices, leading to alteration of the ecosystems of river basins. Climate change effects (rising temperatures, flooding and droughts) will exacerbate catchment degradation, declining water levels, the

drying up of sources of water and water pollution, and pose threats to water availability for productive use and the ecosystem services and benefits on which life and the livelihoods of riparian communities depend.

Water is recognized as the crucial link between food, energy and the environment, and is a central element for sustainable development. Thus, the National Water Policy recognizes the need to make the water-related development resilient to climate change and identifies integrated water resources management (IWRM) as one holistic tool which, if applied effectively, can deal with water insecurity and the multiple challenges posed by climate change. In addition, there is little information about wetlands.

Climate change does not respect geographical, administrative or sectoral boundaries, and coordinated responses to strengthen development that is climate resilient and sustainable are essential. This means improved collaboration in the management of shared water and other natural resources across boundaries.

The actions that have particular relevance as part of climate change mitigation include strategies to improve water conservation and aquatic ecosystems, reduce soil erosion and flash floods, provide alternative livelihoods and strengthen access to markets for farm produce.

**Action:**

- 7.9.1 Promote the conservation of water and ecosystem health through effective protection and regulation of land and water resources.
- 7.9.2 Reduce the vulnerability of and economic loss suffered by communities through the provision of alternative non-agriculture livelihood schemes and access to markets.

7.9.3 Strengthen human and institutional capacity to carry out key IWRM mandates including transboundary cooperation in the management of shared river basins.

**Timeline:** 2015–2020

**Responsibility:** **Water Resources Commission (WRC);** CWSA, EPA, GWCL, Forestry Commission of Ghana (FC), MMDAs, Ministry of Interior, Ministry of Lands and Natural Resources (MLNR), NADMO, National Media Commission (NMC); CSOs and NGOs, private sector, traditional authorities.

**Estimated Cost:** US\$5,200,000



## FOCUS AREA 7: ACCESS TO WATER AND SANITATION

### Programme 7.1: Environmental Sanitation Education and Hygiene Education

#### Action 7.1.1: Promote safe water, sanitation and hygiene practices by strengthening the existing WASH awareness-raising modules for vulnerable communities

Purpose of action: To change behaviour towards good hygiene practices and ensure effective coordination among stakeholders at all levels.

| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of verification   | Key assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Awareness on good environmental sanitation practices created, and WASH actions at all levels harmonized.  | <ul style="list-style-type: none"> <li>Number of brochures, documentaries, songs, and videos disseminated every year</li> <li>Guidelines on environmental sanitation updated by 2015</li> <li>Functioning coordination mechanism (e.g. sector-wide programme approach) established in the regions by 2015 and in the districts by 2020</li> <li>Number of focus meetings or learning alliance platform workshops (Mole Conference, Ghana Water Forum, etc.) organized per annum</li> <li>At least 60% of populations in rural areas and small towns are practising hand washing with soap by 2020</li> </ul> | <ul style="list-style-type: none"> <li>Handbooks, flyers, and brochures disseminated (both in print and downloads in electronic versions)</li> <li>TV documentaries and radio discussions on national and local media</li> <li>Workshop and forum reports</li> <li>PPP on hand washing reports</li> </ul> | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Government of Ghana is committed to funding WASH communications campaigns</li> <li>MMDAs willing to commit revenues to cover the costs of awareness campaigns</li> <li>Individuals and households are committed to the success of a hygiene and sanitation programme</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>Uncoordinated inter-sector interventions</li> <li>Apathy of stakeholders to progressive attitudinal and behavioural change</li> </ul> |
| <b>Tasks:</b><br>7.1.1.1 Disseminate the revised environmental sanitation policy (2009) at all levels.<br>7.1.1.2 Update standards and guidelines for all components of WASH services at all levels and segments of the population.<br>7.1.1.3 Develop, produce, and disseminate promotional material (brochures, flyers, leaflets, etc.) on WASH.<br>7.1.1.4 Strengthen the public-private partnership (PPP) on hand washing with soap and WASH outreach campaigns.<br>7.1.1.5 Promote the sector-wide approach to water and sanitation management.<br>7.1.1.6 Extend the learning platforms (Mole, forums, workshops, etc.) to the regions and districts. |  |   |   |

| <b>Outcomes:</b><br>I. Improved knowledge of and skills in water and sanitation.<br>II. Functioning inter-sectoral coordination.<br>III. Significant change in attitude to hygiene attitude and associated behaviour.<br>IV. Improved quality of life through improved WASH.   |  |   |   |
|--|--|---|---|
| <b>Action 7.1.2: Strengthen the education and training of stakeholders in water and environment facilities at all levels</b><br>Purpose of action: Enhance stakeholders' participation in WASH services delivery and create long-term entrepreneurial opportunities.   |  |   |   |
| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of Verification   | Key Assumptions and Risks   |
| <b>Output:</b><br>Stakeholders are empowered to effectively participate and share in the long-term benefits of improved WASH services.   | <ul style="list-style-type: none"> <li>• Training plans for WASH sub-structures prepared by 2013, and implemented in phases by 2015, 2017 and 2022</li> <li>• Number of refresher courses and/or workshops organized per annum</li> <li>• Number of water and sanitation artisans trained by 2020</li> <li>• Number of WASH professionals trained by 2020</li> </ul> | <ul style="list-style-type: none"> <li>• Training plan at all levels</li> <li>• Workshop and training reports</li> <li>• Number of WASH artisans and professionals trained by WASH project</li> </ul> | <b>Assumptions</b> <ul style="list-style-type: none"> <li>• Government of Ghana is committed to fund staff training and workshops;</li> <li>• MMDAs willing to commit revenues to cover the cost of training;</li> <li>• Training institutions are adequately resourced</li> </ul> <b>Risks</b> <ul style="list-style-type: none"> <li>• Delays in releasing budget allocations to training institutions;</li> <li>• Apathy of stakeholders to a progressive attitudinal and behavioral change</li> </ul> |
| <b>Tasks:</b><br>7.1.2.1 Undertake training needs assessment of key WASH organizations (including the coalition of NGOs in the water and sanitation sector (CONIWAS)) and formulate training plans.<br>7.1.2.2 Support universities to carry out postgraduate training courses in water and sanitation.<br>7.1.2.3 Provide adequate logistics and funding to the Schools of Hygiene to train more environmental health officers (EHOs);<br>7.1.2.4 Organize regular workshops to upgrade skills in the management and operation of the water and sanitation systems (Regional Environmental Health and Sanitation Directorates (REHSDs) and Environmental Health and Management Departments (EHMDs) in MMDAs).<br>7.1.2.5 Provide training and support for private-sector artisans and operators of water and sanitation facilities (Water and Sanitation (WATSAN) Committees, Water and Sanitation Development Boards (WSDBs), pump caretakers and area mechanics). |  |   |   |



| <b>Outcomes:</b> <ul style="list-style-type: none"> <li>I. Enhanced community-based participation in hygiene and sanitation.</li> <li>II. Enhanced livelihood assets (health, job opportunities, etc.) of rural and marginalized communities.</li> </ul>  |   |  |   |
|---|---|--|---|
| <b>Action 7.1.3: Reinvigorate the schools sanitation and hygiene education (SSHE) programmes as part of SHEP</b><br>Purpose of action: To support communities, teachers and pupils to develop skills on, necessary attitudes to and knowledge of hygiene and provide a healthy learning environment.  |   |  |   |
| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of verification  | Key assumptions and Risks   |
| <b>Output:</b><br>Knowledge, skills and attitudinal change on good hygiene practices developed.   | <ul style="list-style-type: none"> <li>• At least two teachers in schools trained to develop good hygiene education lesson plans by 2015</li> <li>• Number of latrines constructed in schools by 2020</li> <li>• Ratio of latrines for boys and girls by 2020</li> <li>• SHEP extended to at least 60% of schools by 2015 and 70% by 2025</li> <li>• Open defecation and dumping of refuse into water bodies reduced by at least 70% by 2025</li> </ul> | <ul style="list-style-type: none"> <li>• Hygiene education plans for schools</li> <li>• Posters and teaching aids</li> <li>• Functioning toilets and hand washing facilities in schools</li> <li>• Functioning waste management facilities in schools</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• Funding readily available for the provision of water supply and sanitation facilities in schools</li> <li>• Willingness of MMDAs to contribute financially to school and community programmes</li> <li>• Country-specific hygiene education curricula and appropriate teaching aids available</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>• Weak inter-sectoral collaboration (especially between MoE/Ghana Education Service (GES) and MOH/Ghana Health Service (GHS))</li> <li>• Limited funding of SHEP activities</li> </ul> |
| <b>Tasks:</b> <ul style="list-style-type: none"> <li>7.1.3.1 Conduct training for teachers and school health coordinators to improve facilitation of the SSHE programme.</li> <li>7.1.3.2 Support the preparation of school materials on hygiene promotion (posters, etc.) and teaching aid booklets.</li> <li>7.1.3.3 Provide water and environmental sanitation facilities in schools.</li> <li>7.1.3.4 Scale up SHEP to cover more schools.</li> </ul> |   |  |   |
| <b>Outcomes:</b> <ul style="list-style-type: none"> <li>I. Reduction in open defecation and dumping of refuse into bodies of water.</li> <li>II. Behavioural change as regards good practices in relation to personal, domestic and public hygiene.</li> </ul>  |   |  |   |

## Programme 7.2: Improved Access to Safe Drinking Water

### Action 7.2.1: Strengthen the institutional management capacity of key institutions (GWCL and CWSA) to ensure efficient delivery of water services at all times

Purpose of action: To facilitate the organizational effectiveness and financial sustainability of key service delivery institutions.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of verification   | Key assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Organizational effectiveness and financial sustainability for water service delivery improved.   | <ul style="list-style-type: none"> <li>Phased institutional reforms carried out annually from 2012 to 2016</li> <li>District Water and Sanitation Plans prepared and mainstreamed into the District Medium-Term Development Plans (DMTDPs) in 2015, 2017 and 2022</li> <li>Government of Ghana contribution to investments in the rural water, small towns and water resources sub-sectors will reach 30% by 2015, 50% by 2020 and 100% by 2025.</li> </ul> | <ul style="list-style-type: none"> <li>Well-functioning District Works Departments</li> <li>Annual reports of the Sanitation and Water for All (SWA) Compact</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>The Sanitation and Water for All Compact is well funded</li> <li>MMDAs are committed to build capacity of staff</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Delays in releasing of budget allocations to institutions</li> </ul> |
| <b>Tasks:</b><br>7.2.1.1 Strengthen Works Departments to provide technical advice and leadership for policy formulation to MWRWH, and effectively coordinate sector institutions.<br>7.2.1.2 Implement institutional reforms including capacity-building plans for Works Departments, Public Utilities Regulatory Commission (PURC), Community Water and Sanitation Agency (CWSA), Ghana Water Company Limited (GWCL), and the Water Resources Commission (WRC).<br>Increase government budgetary allocation to improvement of water service delivery. |   |   |   |
| <b>Outcomes:</b> <ol style="list-style-type: none"> <li>Effective coordination between MWRWH and MLGRD to implement the SWA Compact.</li> <li>SWA compact functioning.</li> <li>Significant reduction in the incidence of water-borne and water-related diseases.</li> </ol>   |   |   |   |

**Action 7.2.2: Mainstream climate dimensions in the rehabilitation, operation and maintenance of existing water systems and for water conservation**

Purpose of action: To secure water availability through source conservation and reduction in transmission losses.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification   | Key Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Reliable water supply to urban centres is assured. | <ul style="list-style-type: none"> <li>Database on all water facilities compiled and placed on web by December 2020</li> <li>Phased rehabilitation of urban water facilities between 2013 and 2025</li> <li>Urban water coverage increase to 75% in 2015 and 100% in 2025</li> <li>Water transmission losses (non-revenue water (NRW)) in urban water service delivery reduced from 50% in 2010 to 45% in 2015 and 33% by 2025</li> </ul> | <ul style="list-style-type: none"> <li>Statistics on operation of water facilities</li> <li>Functioning urban facilities</li> </ul> | <i>Assumption</i> <ul style="list-style-type: none"> <li>Government of Ghana commits to fulfil obligations under the SWA Compact</li> <li>Qualified staff available to man the District Water Departments (DWDs)</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Delays in releasing budget allocations to institutions</li> <li>Curtailment of donor support and budgetary allocations due to economic meltdown</li> </ul> |

**Tasks:**

7.2.2.1 Carry out a study to compile database on the functioning of all water facilities to inform planning of major rehabilitation of water facilities.

7.2.2.2 Finance the rehabilitation, upgrading and expansion of all urban systems including distribution system.

7.2.2.3 Develop a strategy and implementation plan to reduce supply transmission losses (non-revenue water).

**Outcomes:**

I. No rationing of water in urban areas.

II. Significant increase in water service points in the informal urban settlements.

III. Water-borne diseases reduce significantly.

**Action 7.2.3: Plan for investment in minor repairs as well as major renewal, replacement, and expansion of water supply services to peri-urban settlements and small towns**

Purpose of action: To secure water supply to meet the demand in the informal and peri-urban settlements and small towns.

| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of Verification   | Key Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Secure water supply to the peri-urban settlements and small towns. | <ul style="list-style-type: none"> <li>Strategic plans to extend water delivery to peri-urban and small town settlements prepared by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Investment plans for extending services to unserved areas</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>Budgetary allocations and donor assistance to the water sector increased</li> </ul> |

|   | <ul style="list-style-type: none"> <li>Percentage of water points with actively functioning water and sanitation committees</li> <li>Rural and small towns water coverage increased from 59% in 2009 to 76% in 2015 and 100% in 2025</li> <li>Well-functioning DWDs established in at least 50% MMDAs by 2015</li> <li>At least 30% of peri-urban settlements have access to alternative or supplementary water sources (rainwater harvesting systems (RWH)) by 2020</li> </ul> | <ul style="list-style-type: none"> <li>Uninterrupted water supply to peri-urban settlements</li> <li>Increased budgetary allocation to DWDs</li> </ul> | <ul style="list-style-type: none"> <li>Government of Ghana and development partners commit to fulfil obligations under the SWA Compact</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>Delays in releasing of budgetary allocation to institutions</li> </ul> |
|---|---|--|---|
| <p><b>Tasks:</b></p> <p>7.2.3.1 Undertake mapping of pro-poor areas and those receiving few services.</p> <p>7.2.3.2 Develop and implement plans to extend services to the small towns and peri-urban settlements.</p> <p>7.2.3.3 Mobilize financial resources to support the expansion of water service delivery.</p> <p>7.2.3.4 Provide adequate logistics and financial support to DWDs in all MMDAs for the operation and maintenance of rural and small-town facilities.</p> <p>7.2.3.5 Provide subsidies on water delivery to the marginalized peri-urban settlements (e.g., tax waivers and other incentives for NGOs and private operators).</p> <p>7.2.3.6 Construct or rehabilitate reservoirs to secure water for small towns.</p> <p>7.2.3.7 Promote river run-off harvesting (rainwater harvesting) and use of dams for water conservation in underserved areas.</p> |   |  |   |
| <p><b>Outcomes:</b></p> <p>I. Significant reduction in the rationing of water supplied to peri-urban and small town settlements.</p> <p>II. Reduction in water-related infections.</p>  |   |  |   |
| <p><b>Action 7.2.4: Develop and make operational a nationwide potable water quantity and quality monitoring and site surveillance programme to minimize possible sources of pollution</b></p> <p>Purpose of action: To improve knowledge on the ambient environment and quality of water sources.</p>   |   |  |   |
| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of Verification  | Key Assumptions and Risks   |
| <p><b>Output:</b></p> <p>The safety of potable water sources is ensured.</p>  | <ul style="list-style-type: none"> <li>Environmental survey of water supply points carried out annually</li> <li>At least 2 people per community (selected from the water and sanitation committees) trained to carry out sanitary surveys by 2015</li> </ul>   | <ul style="list-style-type: none"> <li>Timely remedial actions taken to protect water sources</li> <li>Survey reports</li> </ul>                       | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Health institutions willing to provide data</li> <li>Qualified persons available to receive training</li> </ul>  |

|   |  |  |  |
|---|--|--|--|
|   | <ul style="list-style-type: none"> <li>• Nationwide water quality monitoring carried out at least twice per annum</li> <li>• Response of water users to water quality changes</li> </ul> | <ul style="list-style-type: none"> <li>• Monitoring reports</li> </ul> | <ul style="list-style-type: none"> <li>• Recommendations for water safety by the CWSA are adhered to</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>• Inappropriate practices within the immediate water source environment</li> <li>• Lack of funding for monitoring</li> <li>• Unreliability of sampling and transportation of samples</li> <li>• Lack of reference laboratory</li> </ul> |
| <p><b>Tasks:</b></p> <p>7.2.4.1 Carry out environmental surveys within the immediate environment of the water source to identify possible sources of pollution (e.g., refuse dumps, unprotected toilets, etc., seepage of industrial waste, leaking pipelines, non-functioning equipment or components).</p> <p>7.2.4.2 Train water and sanitation committee members to carry out regular sanitary surveys of water supply points.</p> <p>7.2.4.3 Carry out regular water quality monitoring campaigns of surface and groundwater supply systems.</p> <p>7.2.4.4 Assess the impact of the water supply on public health and the status of public health using data from health institutions.</p> <p><b>Outcomes:</b></p> <p>I. Health problems or epidemics are identified in a timely manner and are documented accurately.</p> <p>II. Knowledge on water quality is improved.</p> <p>III. Reduction in frequency of outbreaks of vector-borne diseases.</p> |  |  |  |

### Programme 7.3: Climate-related Research

#### Action 7.3.1: Improve the climate observation and monitoring system and set up a database on water and sanitation schemes, drawing on traditional knowledge and modern information technology to support forecasting and evidence-based decision-making

Purpose of action: To ensure evidence-based decision-making for improved water and sanitation service delivery through modern information technology

| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of Verification  | Key Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Improved decision-making in water and sanitation services development and management due to the availability of data and information  | <ul style="list-style-type: none"> <li>Guidelines for services renewal and replacements published by 2015</li> <li>At least 3 inventories on water and sanitation services are produced and shared among all sector stakeholders annually</li> <li>Number of institutions reporting on research findings by 2020</li> <li>Waste information system established and upgraded by 2015</li> <li>New information and reports placed on the Water and Sanitation Monitoring Platform (WSMP) website at least once every quarter</li> </ul> | <ul style="list-style-type: none"> <li>Research reports on websites of relevant institutions</li> <li>Number of researchers trained</li> <li>Reports on the WSMP and other websites</li> <li>Number of publications from research</li> </ul> | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Government is committed to funding research</li> <li>Research outputs are readily available to all stakeholders</li> <li>Institutions are ready to provide data</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>Stakeholders are not ready to accept new knowledge, ideas and skills for effective implementation strategies</li> <li>Research institutions do not share information</li> <li>Delays in releasing budgetary allocation for research</li> </ul> |
| <b>Tasks:</b><br>7.3.1.1 Strengthen and support the Schools of Hygiene, Institute of Local Government Studies (ILGS), and university departments to enable them to provide accurate and regular data on environmental sanitation facilities.<br>7.3.1.2 Carry out assessments to determine demand for water and sanitation services of marginalized communities (urban, peri-urban, small towns and rural areas).<br>7.3.1.3 Develop a framework for tracking the volumes and types of waste streams generated by all segments of the economy (especially sources of non-biodegradable organic fractions, and special and hazardous wastes).<br>7.3.1.4 Strengthen existing databases (e.g., DiMES) and websites (e.g., WSMP) to store and disseminate results of research and studies. |   |  |   |
| <b>Outcomes:</b><br>I. Trained personnel who will be involved in the research programme.<br>II. Well-functioning websites (e.g. WSMP) for the dissemination of reports.   |   |  |   |

| III. A network of actors with improved knowledge and skills, in the fields of water and sanitation.<br>IV. An established waste information system.   |   |   |  |
|---|---|---|--|
| <b>Action 7.3.2 Investigate opportunities for alternatives to wastewater treatment, processing and uses</b><br>Purpose of action: To improve appropriate technologies to support improved sanitation service delivery in the face of increasing demand.   |   |   |  |
| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of verification   | Key assumptions and Risks  |
| <b>Output</b><br>Knowledge on affordable sanitation services and end-use of waste improved to enhance the livelihood benefits to communities.   | <ul style="list-style-type: none"> <li>At least 3 research results are produced and shared among all sector stakeholders annually</li> <li>Alternative environment- friendly toilets suggested by 2015</li> <li>Composition of waste streams assessed by 2015</li> <li>Alternative uses of urban waste disseminated to MMDAs by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Research reports</li> <li>Publication of results on websites</li> <li>Recommendations for improved end-use of waste</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>Availability of reliable scientific data</li> <li>Government is committed to funding research</li> <li>Platforms for dissemination of research outputs are locally available</li> <li>Institutions are ready to provide data</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Delays in releasing budgetary allocations to institutions</li> <li>Researchers do not share their knowledge</li> </ul> |
| <b>Tasks:</b><br>7.3.2.1 Carry out studies on alternative technology options for environment-friendly toilets for low-income areas.<br>7.3.2.2 Conduct studies in the handling and alternative uses of existing and changing composition of waste streams.<br>7.3.2.3 Conduct research on the benefits of alternative uses of waste through reduction, reuse and recycling. |   |   |  |
| <b>Outcomes:</b><br>I. Improved knowledge on affordable toilets and on end-use of waste.<br>II. Recommendations for primary waste separation made available to MMDAs.<br>III. Opportunities opened up for jobs in the area of integrated waste management.  |   |   |  |
| <b>Action 7.3.3: Promote scientific investigations and research in water resources assessment, management and development</b><br>Purpose of action: To encourage the use of evidence-based decision-making tools for the sustainable management and development of water resources.   |   |   |  |
| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of verification   | Key assumptions and Risks  |
| <b>Output:</b><br>Scientific investigations and research in the assessment, management and  | <ul style="list-style-type: none"> <li>Water audit reports of at least 10 river basins completed by 2015</li> <li>Decision support models for water allocation in major river basins</li> </ul>   | <ul style="list-style-type: none"> <li>Water audit reports</li> <li>Decision support model(s)</li> <li>Database on water resources on institution websites</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>Reliable hydrogeological data available</li> <li>Research output is readily available to all stakeholders</li> </ul>   |

|  |   |  |   |
|--|---|--|---|
| development of water resources.  | <ul style="list-style-type: none"> <li>prepared by 2015</li> <li>Knowledge base of groundwater in various river basins established by 2020</li> <li>At least 3 research results are produced and shared among all sector stakeholders annually</li> </ul> |  | <ul style="list-style-type: none"> <li>Effective communications network is established for all stakeholders to share their knowledge</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>Delays in releasing budget allocation to institutions</li> </ul> |
| <p><b>Tasks:</b></p> <p>7.3.3.1 Carry out water audits (availability and demand) of major river basins.</p> <p>7.3.3.2 Develop decision support models to facilitate water allocation under various climate scenarios.</p> <p>7.3.3.3 Investigate the impact of land and water uses on the quality and quantity of water resources.</p> <p>7.3.3.4 Support further hydrogeological investigations in the country in partnership with Water Research Institute (WRI) and the Ghana Atomic Energy Commission (GAEC).</p> |   |  |   |
| <p><b>Outcomes:</b></p> <p>I. Water use and demand scenario analyses carried out for priority river basins,</p> <p>II. Improved access to accurate information on groundwater resources.</p> <p>III. Reduced conflict over water use by stakeholders.</p>  |   |  |   |

## Programme 7.4: Construction of Water Storage Systems

| <p><b>Action 7.4.1: Promote multi-stakeholder participation in the selection and management of water storage systems through participatory tools</b></p> <p>Purpose of action: To actively engage society in removing the serious threats caused by potential dam break in terms of deaths, injuries and damage to property and the environment.</p> |   |  |   |
|--|---|--|---|
| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification  | Key Assumptions and Risks   |
| <p><b>Output:</b></p> <p>Stakeholders empowered to participate in decision-making on dams and ensuring safety</p>  | <ul style="list-style-type: none"> <li>Procedures and guidelines for land selection and acquisition for dams prepared through a strategic environmental assessment (SEA) by 2015</li> <li>Guidelines and procedures for valuation, negotiation and payment</li> </ul> | <ul style="list-style-type: none"> <li>SEA reports</li> <li>Procedures for active participation of local stakeholders to avoid conflicts</li> <li>Reports on forums conducted on dam safety</li> </ul> | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Procedures for land acquisition are followed</li> <li>Capacity for the application of the SEA procedures exists</li> <li>Local communities are willing to participate in activities on the safety of dam structures</li> </ul> <p><i>Risks</i></p> |



|   | <ul style="list-style-type: none"> <li>of compensation prepared by 2015</li> <li>At least one forum on dam safety held per annum</li> </ul>  |  | <ul style="list-style-type: none"> <li>Waning public interest in and understanding of dam safety</li> <li>Unavailability of funds for sustained stakeholder involvement</li> </ul>  |
|---|--|--|---|
| <b>Tasks:</b><br>7.4.1.1 Apply the strategic environmental assessment (SEA) principles to ensure consensus in the selection and acquisition of sites for and the impacts resulting from dam operations.<br>7.4.1.2 Implement procedures to facilitate site valuation, negotiation and payment of compensation with the active participation of stakeholders.<br>7.4.1.3 Ensure the participation of traditional authorities, women and youth.<br>7.4.1.4 Institutionalize the forum and platform for national dam safety. |  |  |   |
| <b>Outcomes:</b><br>I. Local and national stakeholders are empowered to influence the decision-making process in the selection of sites.<br>II. A forum and platform on dam safety is institutionalized.<br>III. Any long-term negative impact of dam construction and operation is significantly reduced.  |  |  |   |
| <b>Action 7.4.2: Review and establish a framework for the construction, operation and regulation of dams and reservoirs</b><br>Purpose of action: To ensure that an adequate and uniform level of dam safety is maintained, in respect of the consequences of the possible failure of dams.   |  |  |   |
| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of Verification  | Key Assumptions and Risks   |
| <b>Output:</b><br>Safety of all dams is assured   | <ul style="list-style-type: none"> <li>Functioning National Dams Safety Unit (NDSU) established within the WRC by December 2015</li> <li>Regulations and technical guidelines for dam safety operational by 2015</li> <li>Training manual on dam safety prepared by 2015</li> <li>Functional database on dams, with priority given to registered dams with moderate to high failure incidents, operational by December 2015</li> <li>Communication strategy on dam safety developed by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Approved guidelines and regulations on dams</li> <li>Reports of dams dialogue workshops</li> <li>Training manual and training reports on dam safety</li> <li>Database reports on registered dams</li> <li>Communications strategy document on dam safety</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>Qualified personnel available to staff the NDSU</li> <li>Government of Ghana committed to funding the NDSU</li> <li>Dam operators willing to comply with guidelines and regulations</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Dam operations do not comply with regulations</li> <li>Political interference with siting of dams</li> <li>Lack of funds for implementation of awareness programmes</li> </ul> |

**Tasks:**

- 7.4.2.1 Establish a National Dam Safety Unit.
- 7.4.2.2 Enact regulations for regulating dam operations.
- 7.4.2.3 Conduct training on dam safety for the staff of the Dam Safety Unit and other key stakeholders.
- 7.4.2.4 Develop technical guidelines for dam safety (including operational rules for flood, drought and emergency preparedness and response plans).
- 7.4.2.5 Establish a national database on dams in Ghana.
- 7.4.2.6 Strengthen communications campaigns and education on the operation and impact of dams, to create awareness on dam safety.

**Outcomes:**

- I. New dams constructed and operated according to regulations and guidelines.
- II. Any negative long-term impact of dam construction and operation is significantly reduced, and the safety of dams is assured.

**Action 7.4.3: Promote the development of water storage systems and flood protection measures in the peri-urban settlements and small towns for agriculture and energy production**

Purpose of action: To improve the livelihoods of marginalized communities by ensuring the availability of water for energy production and food security for all seasons.

| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of Verification   | Key Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Construction of small reservoirs to assure the availability of water and energy in rural and informal urban settlements | <ul style="list-style-type: none"> <li>• At least 2 mini-hydro schemes constructed by 2025</li> <li>• A least 50% of existing small reservoirs for irrigation rehabilitated by 2025</li> <li>• At least 30% of peri-urban settlements have access to alternative and/or supplementary water sources (rainwater harvesting systems) by 2025</li> </ul> | <ul style="list-style-type: none"> <li>• Number of mini-hydro schemes constructed</li> <li>• Number of small irrigation reservoirs rehabilitated</li> <li>• River run-off harvesting facilities constructed in underserved settlements</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• Funding available for the construction of small reservoirs</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>• Mini dams are not a priority of the Government of Ghana</li> </ul> |

**Tasks:**

- 7.4.3.1 Construct or rehabilitate reservoirs to secure water for irrigation and aquaculture.
- 7.4.3.2 Construct reservoirs to provide hydropower to rural communities.
- 7.4.3.3 Promote river run-off harvesting (rainwater harvesting) and use of dams for water conservation in underserved areas.

**Outcomes:**

- I. Living standards of peri-urban and small town dwellers are enhanced through improved energy supply and food security.
- II. Water and energy available in marginalized communities.

## Programme 7.5: Improved Drainage in Urban Areas

### Action 7.5.1: Improve hydro-meteorological observational networks and provide access to data to facilitate drainage planning and decision-making

Purpose of action: To improve the knowledge base for drainage planning and development in urban settlements.

| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of Verification  | Key Assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Reliable data and information to facilitate drainage design available.   | <ul style="list-style-type: none"> <li>At least 70% of hydro-meteorological stations functional by 2020</li> <li>At least 2 members of staff from each of the Hydrological Services Department (HSD), Ghana Meteorological Agency (GMet) and WRI are trained by 2015</li> <li>Technology and models for analysis of data are available to relevant institutions by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Data readily available to facilitate drainage designs</li> <li>Models to undertake rainfall run-off analysis</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>HSD and GMet are well funded</li> <li>Data easily accessible</li> <li>Inter-sectoral coordination exists in urban development sectors</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Institutional fragmentation at the national and local government levels</li> <li>Complexity of integrating landscape-scale water management systems</li> </ul> |
| <b>Tasks:</b><br>7.5.1.1 Roll out the rehabilitation of and upgrade the hydro-meteorological monitoring networks.<br>7.5.1.2 Introduce new technologies (including models) for data collection and analysis.<br>7.5.1.3 Strengthen the human and technical capacities of institutions for data analysis and archiving, including Geographic Information System (GIS) driven data and information databases on water-related information. |  |  |   |
| <b>Outcomes:</b><br>I. Well-functioning hydrological and meteorological organizations.<br>II. A functioning database on river flow and rainfall.<br>III. Drainage design based on reliable data.   |  |  |   |

### Action 7.5.2: Undertake topographic surveys and develop physical plans, incorporating drainage development plans for all regional and district capitals

Purpose of action: To ensure that MMDAs adequately deal with flooding in all regional and district capitals.

| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of Verification  | Key Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Improved drainage network in regional and district capitals. | <ul style="list-style-type: none"> <li>Flood vulnerability maps for MMDAs developed and presented in GIS format by 2020</li> <li>Drainage development plans of at least 50% of MMDAs prepared by 2020</li> <li>Number of flood retention ponds constructed on major drainage channels by 2020</li> </ul> | <ul style="list-style-type: none"> <li>Maps of flood susceptibility sites</li> <li>MMDA drainage development plans</li> <li>Flood retention ponds</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>Government of Ghana and development partners commit to fulfil obligations under the SWA Compact</li> <li>Sites for construction of retention ponds readily available</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Institutional fragmentation at local government level</li> <li>Lack of qualified staff at MMDAs</li> </ul> |

#### Tasks:

7.5.2.1 Prepare maps of flood susceptibility areas.

7.5.2.2 Construct flood retention ponds on major drainage channels.

7.5.2.3 Prepare MMDA drainage development plans.

#### Outcomes:

I. Improved knowledge of needs of MMDAs for drainage networks.

II. I. Significant reduction in flooding in urban areas.

### Action 7.5.3: Build capacity, create awareness and enforce by-laws and regulations in MMDAs on the operation and maintenance of urban drains

Purpose of action: To promote the culture of maintenance for efficient functioning of urban drains as well as behavioural change of the populace towards waste disposal

| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of Verification   | Key Assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Knowledge and skills of staff of District Works Departments (DWDs) upgraded to enable them to | <ul style="list-style-type: none"> <li>Functioning DWDs established in at least 50% of MMDAs by 2015</li> <li>Inter-departmental technical committees for MMDAs established by 2015</li> </ul> | <ul style="list-style-type: none"> <li>DWDs implementing efficient drainage networks</li> <li>Reports of inter-departmental technical committees for MMDAs</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>Qualified personnel available to staff the works departments of MMDAs</li> <li>MMDAs committed to building capacity of their staff</li> </ul> |

|  |  |   |  |
|--|--|---|--|
| deal with urban drainage issues.   | <ul style="list-style-type: none"> <li>• Programmes for awareness-raising carried out annually by MMDAs, at least twice a year</li> <li>• Programmes for maintenance of wetlands and watercourses to receive storm drains and prevent flooding carried out annually</li> </ul> | <ul style="list-style-type: none"> <li>• Reports of awareness-raising programmes</li> <li>• Reduction in the number of choked drains</li> </ul> | <ul style="list-style-type: none"> <li>• Decentralized departments at MMDAs coordinate activities</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>• Public resistance to and failure to comply with waste regulations and prevention of littering</li> </ul> |
| <p><b>Tasks:</b></p> <p>7.5.3.1 Strengthen the capacity of Environmental Health Officers to effectively facilitate programmes of MMDAs, including the appointment of qualified professional staff.</p> <p>7.5.3.2 Establish an inter-departmental committee in all MMDAs to address issues related to environmental sanitation and the operation and maintenance of drainage networks.</p> <p>7.5.3.3 Enforce regulations and by-laws to prevent dumping of waste in drains and wetlands.</p> <p>7.5.3.4 Support the MMDAs to provide facilities (waste bins) to promote waste-separation at the household, community and public levels.</p> <p>7.5.3.5 Develop and implement programmes for the sustained education of the public on the economic value of wetlands.</p> <p>7.5.3.6 Support advocacy on interventions aimed at restoring and improving wetlands and watercourses.</p> |  |   |  |
| <p><b>Outcomes:</b></p> <p>I. Watercourses de-silted and protected, facilitating the perennial flow of storm water downstream.</p> <p>II. Clean wetlands and watercourses in urban settlements.</p> <p>III. Reduced flooding and environmental degradation through safe disposal of waste and reuse practices.</p> <p>IV. Reduced health-related hazards from wastes.</p>  |  |   |  |

## Programme 7.6: Recycling of Solid Waste

| <p><b>Action 7.6.1: Carry out a comprehensive waste audit in selected MMDAs to obtain categories and volume of waste, together with a technology needs assessment</b></p> <p>Purpose of action: To establish baseline information on waste so as to enhance waste management planning.</p> |  |   |  |
|--|--|---|--|
| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of Verification   | Key Assumptions and Risks  |
| <p><b>Output:</b></p> <p>Waste management planning enhanced through improved information</p>   | <ul style="list-style-type: none"> <li>• Comprehensive waste audit completed and disseminated by 2015</li> <li>• Waste reduction plan completed by 2015</li> </ul> | <ul style="list-style-type: none"> <li>• Waste reduction plans of MMDAs</li> <li>• Majority of MMDAs have initiated separation-at-source</li> </ul> | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>• Qualified experts available to carry out audit and value-chain analysis</li> <li>• Government of Ghana and development</li> </ul> |

|   | <ul style="list-style-type: none"> <li>Economic value of wastes identified by 2015</li> <li>Standards for assessment and disposal and treatment of waste disseminated to MMDAs by 2015</li> </ul>   | programmes  | <p>partners are committed to fulfilling their obligations under the SWA Compact</p> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>Lack of funds for development of the waste audit</li> </ul>   |
|---|---|---|--|
| <p><b>Tasks:</b></p> <p>7.6.1.1 Conduct a waste audit of the waste disposal and treatment sites of selected MMDAs for classification of wastes (organic materials, discarded electronic and electrical equipment, packaging waste, etc.)</p> <p>7.6.1.2 Develop standards for assessment and disposal of waste for landfill.</p> <p>7.6.1.3 Develop strategies for the gradual reduction of urban waste (including waste separation at the household, community and public levels) to facilitate recycling.</p> <p>7.6.1.4 Conduct value-chain analysis of environmental sanitation to identify job creation opportunities.</p> |   |   |  |
| <p><b>Outcomes:</b></p> <p>I. Prominence given to the recycling and reuse of waste in all MMDAs.</p> <p>II. At least 25% of waste is diverted from landfill sites to recycling and reuse by 2017.</p>   |   |   |  |
| <p><b>Action 7.6.2: Identify and select, with multi-stakeholder participation, and make available appropriately zoned and serviced land to accommodate waste recovery and recycling infrastructure</b></p> <p>Purpose of action: Remove bottlenecks to the acquisition of land to be used for the treatment and disposal of waste.</p>  |   |   |  |
| Output/Tasks/Outcomes   | Verifiable Indicators   | Means of verification   | Key assumptions and Risks  |
| <p><b>Output:</b></p> <p>Stakeholders empowered to effectively participate and share in the long-term benefits of improved WASH services.</p>   | <ul style="list-style-type: none"> <li>Appropriate treatment and disposal sites identified and acquired by MMDAs by 2015</li> <li>All waste disposal and treatment sites issued with environmental impact assessment (EIA) permits by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Number of EIA permits issued by EPA</li> <li>Guidelines for land acquisition for waste disposal and treatment</li> </ul> | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Government of Ghana and development partners committed to fulfilling their obligations under the SWA Compact</li> <li>Service providers comply with permit conditions</li> <li>Communities willing to comply with waste regulations, prevent littering, and help to monitor compliance</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>Resistance to waste regulations and prevention of littering by the public</li> </ul> |

**Tasks:**

- 7.6.2.1 Apply the strategic environmental assessment (SEA) principles to ensure consensus in selection of waste disposal and treatment sites.
- 7.6.2.2 Develop guidelines and enforce legislation on the acquisition of land for waste treatment and disposal sites.
- 7.6.2.3 Implement procedures to facilitate site valuation, negotiation and payment of compensation, with the active participation of stakeholders.
- 7.6.2.4 Ensure the participation of traditional authorities, women and youth.

**Outcomes:**

- I. Disposal and treatment sites made available for use by the MMDAs.
- II. Health-related hazards from waste management reduced, thus improving the quality of life for the residents in environs of waste treatment plants.

**Action 7.6.3: Encourage MMDAs and the private sector to establish waste material recovery, recycling and reduction strategies (including waste separation schemes in communities)**

Purpose of action: To help prevent pollution of the environment and contamination of groundwater from industrial waste.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification   | Key Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>Safety of the environment and groundwater resources assured through integrated management of industrial waste. | <ul style="list-style-type: none"> <li>Waste management plan (WMP) for the paper and packaging industry ready for implementation by 2015</li> <li>WMP for the pesticides industry ready for implementation by 2015</li> <li>WMP for the e-waste industry ready for implementation by 2015</li> <li>WMP for the plastics industry ready for implementation by 2015</li> <li>WMP for the metals industry ready for implementation by 2015</li> <li>Standards for disposal of industrial waste to landfills finalized by 2015</li> </ul> | <ul style="list-style-type: none"> <li>WMPs available</li> <li>Dissemination of standards for industrial waste disposal to MMDAs</li> </ul> | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Government of Ghana commits funds to the preparation of industrial WMPs</li> <li>EPA has the capacity to support MMDAs to develop WMPs</li> </ul> <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>MMDAs not committed to the implementation of WMPs</li> </ul> |

**Tasks:**

- 7.6.3.1 Support the private sector to prepare waste management plans (WMPs) for industrial and hazardous wastes (i.e., pesticides, e-waste, paper and packaging, metals, etc.).
- 7.6.3.2 Review or develop and implement waste management plans (WMPs) for the following industries: (i) paper and packaging, (ii) pesticides, (iii) electronic and electrical (e-waste streams), (iv) plastics, and (v) metals (ferrous and aluminium).
- 7.6.3.3 Develop standards for disposal of industrial waste to landfills.



| <b>Outcomes:</b> <ul style="list-style-type: none"> <li>I. Enhanced integrated management of hazardous and industrial waste.</li> <li>II. Groundwater contamination prevented through improved landfill management.</li> </ul>  |  |   |  |
|---|--|---|--|
| <b>Action 7.6.4: Strengthen human and institutional capacity to implement waste recycling technologies</b><br>Purpose of action: To empower the MMDAs and other service providers (NGOs) to manage waste through reuse and recycling.   |  |   |  |
| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of verification   | Key Assumptions and Risks  |
| <b>Output:</b><br>Knowledge of waste reuse technologies of MMDAs and other service providers improved.  | <ul style="list-style-type: none"> <li>• Qualified staff available in the MMDAs to provide technical advice and support services by 2015</li> <li>• Legislation, regulations and by-laws to support waste reduction, reuse, recycling and recovery developed by 2015</li> <li>• Initiate promotion of primary waste separation at MMDAs by 2015</li> </ul> | <ul style="list-style-type: none"> <li>• Number of MMDA staff members trained</li> <li>• Number of offenders prosecuted for non-compliance with legislation supporting waste reduction, reuse, recycling and recovery</li> <li>• Household waste separation facilities distributed</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• Government of Ghana commits funds for training and institutional strengthening</li> <li>• MMDAs have the capacity to develop and enforce legislation</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>• Reluctance of households to cooperate in the use of technologies for waste reuse and recycling, such as waste separation facilities</li> </ul> |
| <b>Tasks:</b> <ul style="list-style-type: none"> <li>7.6.4.1 Recruit appropriate experts (sanitary engineers, planners, etc.) for the MMDAs participating in the pilot project.</li> <li>7.6.4.2 Organize workshops for the training of trainers on waste reuse technologies for the staff of MMDAs and NGOs.</li> <li>7.6.4.3 Develop and enforce legislation, regulations and by-laws to support waste reduction, reuse, recycling and recovery.</li> <li>7.6.4.4 Ensure adequate financing of sanitation services to complement financing of reuse interventions.</li> </ul> |  |   |  |
| <b>Outcomes:</b> <ul style="list-style-type: none"> <li>I. Qualified staff are available in the WASH sector, providing easy access to technical advice and support services.</li> <li>II. A significant number of waste reuse and recycling technologies are accepted and used.</li> </ul>  |  |   |  |
| <b>Action 7.6.5: Develop and implement programmes in education and awareness-raising on the benefits of alternative uses of waste</b><br>Purpose of action: To ensure that people are aware of the impact of waste on their health, well-being and the environment, and to create employment opportunities.   |  |   |  |
| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of Verification   | Key Assumptions and Risks  |
| <b>Output:</b><br>Stakeholders empowered to effectively participate and share in the long-term  | <ul style="list-style-type: none"> <li>• Marketing plan for end-use of waste completed by 2015</li> <li>• Lessons learned from field pilot</li> </ul>  | <ul style="list-style-type: none"> <li>• Marketing plan on end-use of waste</li> <li>• Dissemination of lessons</li> </ul>  | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• Government of Ghana and development partners committed to fulfilling obligations under the SWA Compact</li> </ul>  |



|   |   |   |  |
|---|---|---|--|
| benefits of improved end products of treated waste.   | <p>projects of compost and biogas applications published by 2020</p> <ul style="list-style-type: none"> <li>• Scaling-up of pilot project experience to all MMDAs initiated by 2022</li> <li>• Communications materials on the reduction, reuse, recycling and recovery of solid waste management developed by mid-2015</li> <li>• Outreach campaigns carried out at least twice per year</li> <li>• “Greening” events organized at least twice per year</li> </ul> | <p>learned from pilot interventions</p> <ul style="list-style-type: none"> <li>• Number of end users using organic fertilizers</li> <li>• Communication materials on the waste reduction, reuse, recycling and recovery</li> <li>• Reports on outreach programmes and events</li> </ul> | <p><i>Risks</i></p> <ul style="list-style-type: none"> <li>• Reluctance of the public to accept and use end products of treated waste</li> </ul> |
| <p><b>Tasks:</b></p> <p>7.6.5.1 Develop marketing plan to enhance the end use of treated waste.</p> <p>7.6.5.2 Rehabilitate and equip disused treatment plants for pilot demonstration of technologies on reuse of waste (e.g., waste-to-energy, compost from waste)</p> <p>7.6.5.3 Scale-up pilot project experience in waste reuse applications in all MMDAs.</p> <p>7.6.5.4 Develop information, education, and communications materials on the reduction, reuse, recycling and recovery of solid waste management for use by selected MMDAs.</p> <p>7.6.5.5 Provide information to communities, schools and businesses about recycling opportunities.</p> <p>7.6.5.6 Promote the organization of “greening” events in educational institutions and for the general public on public holidays.</p> |   |   |  |
| <p><b>Outcomes:</b></p> <p>I. By 2025, at least 30% of solid waste is diverted from landfill sites for reuse.</p> <p>II. A significant number of small and medium-sized enterprises participate in waste service delivery and recycling.</p> <p>III. Significant application of end use of treated waste in cities and rural communities.</p>   |   |   |  |

## Programme 7.7: Wastewater Reduction, Treatment and Reuse

### Action 7.7.1: Promote multi-stakeholder participation in the identification and selection waste treatment sites

Purpose of action: To remove bottlenecks to the acquisition of land to be used for the treatment and disposal of waste.

| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of Verification   | Key assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Stakeholders empowered to effectively participate and share in the long-term benefits of improved WASH services   | <ul style="list-style-type: none"> <li>• Appropriate treatment and disposal sites identified and acquired by MMDAs by 2015</li> <li>• At least 70% of sites for wastewater treatment plants (WWTPs) issued with EIA permits by 2015</li> </ul> | <ul style="list-style-type: none"> <li>• Number of EIA permits issued by EPA</li> <li>• Guidelines for land acquisition for waste treatment and disposal</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• Government of Ghana and development partners committed to fulfilling their obligations under the SWA Compact</li> <li>• Service providers comply with permit conditions</li> <li>• Communities willing to comply with waste regulations, and help to monitor compliance</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>• Resistance to regulations and prevention of littering by the public</li> </ul> |
| <b>Tasks:</b><br>7.7.1.1 Apply the strategic environmental assessment (SEA) principles to ensure consensus in selection of sites.<br>7.7.1.2 Enforce legislation on the acquisition of land for treatment sites.<br>7.7.1.3 Implement procedures to facilitate site valuation, negotiation and payment of compensation, with active participation of stakeholders.<br>7.7.1.4 Ensure the participation of traditional authorities, women and youth. |  |   |   |
| <b>Outcomes:</b> <ol style="list-style-type: none"> <li>Sites for wastewater treatment plants made available for use by the MMDAs.</li> <li>Health-related hazards from wastewater management reduced, thus improving the quality of life for the residents in environs of wastewater treatment plants.</li> </ol>  |  |   |   |

**Action 7.7.2: Strengthen human and institutional capacity to implement waste reuse technologies**

Purpose of action: To empower the MMDAs and other service providers (NGOs) to manage waste through reuse and recycling.

| Output/Tasks/Outcomes   | Verifiable Indicators  | Means of Verification  | Key Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b><br>Knowledge of waste reuse technologies of MMDAs and other service providers improved.  | <ul style="list-style-type: none"> <li>• Qualified staff available in the MMDAs to provide technical advice and support services by 2015</li> <li>• Legislation, regulations and by-laws to support waste reduction, reuse, recycling and recovery developed by 2015</li> <li>• Initiate promotion of primary waste separation at MMDAs by 2015</li> </ul> | <ul style="list-style-type: none"> <li>• Number of MMDA staff members trained</li> <li>• Number of offenders prosecuted for non-compliance with legislation, on the basis of the polluter pays principle</li> <li>• Household waste separation facilities distributed</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• MMDA staff remain on post</li> <li>• Households separate waste</li> </ul> |
| <b>Tasks:</b><br>7.7.2.1 Recruit appropriate experts (sanitary engineers, planners, etc.) for the MMDAs participating in the pilot project.<br>7.7.2.2 Organize workshops for the training of trainers on waste reuse technologies for the staff of MMDAs and NGOs.<br>7.7.2.3 Develop and enforce legislation, regulations and by-laws to support waste reduction, reuse, recycling and recovery.<br>7.7.2.4 Ensure adequate financing of sanitation service to complement financing of reuse interventions. |  |  |   |
| <b>Outcomes:</b><br>Qualified staff are available in the WASH sector providing easy access to technical advice and support services.  |  |  |   |

**Programme 7.8: Improved Access to Sanitation****Action 7.8.1: Improve appropriate sanitation facilities and management practices**

Purpose of action: To improve management practices of sanitation facilities.

| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of Verification   | Key Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Availability of sanitation facilities per household increased. | <ul style="list-style-type: none"> <li>• 54% sanitation coverage is achieved by 2017; and 100% achieved by 2020;</li> <li>• 95% of urban households and 75% of rural households have access to adequate levels of waste collection services</li> </ul> | <ul style="list-style-type: none"> <li>• Data from CWSA</li> <li>• Annual reports of MMDAs</li> </ul> | <ul style="list-style-type: none"> <li>• Government of Ghana is committed to provide subsidies for the installation of households latrines</li> </ul> |

**Tasks:**

- 7.8.1.1 Implement the national rural sanitation model and scaling-up strategy for the Ghana Community-led Total Sanitation (CLTS) project.
- 7.8.1.2 Rehabilitate disused treatment plants in MMDAs.
- 7.8.1.3 Improve urban drainage systems to reduce the risk of flooding and dispersal of pollutants in urban areas.
- 7.8.1.4 Provide adequate and modern sanitation services for the transitory and floating population (in markets, shopping areas, transport terminals, etc.).

**Outcomes:**

- I. Effective coordination between MWRWH and MLGRD to implement the Sanitation and Water for All (SWA) Compact.
- II. Sanitation and Water for All (SWA) Compact functioning.
- III. Significant reduction in the incidence of water-borne and water-related diseases.

**Action 7.8.2: Ensure adequate financing of sanitation services**

Purpose of action: To help improve sanitation services coverage with adequate and sustained funding mechanisms.

| Output/Tasks/Outcomes  | Verifiable Indicators  | Means of verification  | Key assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Well-funded MMDAs provide improved environmental sanitation services | <ul style="list-style-type: none"> <li>At least 30% of households in MMDAs pay for environmental sanitation services</li> <li>At least 60% of residents in MMDAs pay property rates</li> <li>Strategic Environmental Sanitation Investment Plan (SESIP) of majority of MMDAs prepared by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Number of households paying bills</li> <li>Strategic Environmental Sanitation Investment Plan report</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>MMDAs have dedicated budget lines for environmental sanitation services</li> <li>Residents are committed to paying property rates and bills for services</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Residents of MMDAs do not pay bills and property rates</li> </ul> |

**Tasks:**

- 7.8.2.1 Enforce billing of households for waste collection services.
- 7.8.2.2 Implement mechanisms for efficient collection of property rate by MMDAs.
- 7.8.2.3 Enforce the polluter pays principle for industries (including mining companies).
- 7.8.2.4 Develop a Strategic Environmental Sanitation Investment Plan.

**Outcomes:**

- I. Well-maintained sanitation facilities.
- II. A significant number of households accept and pay for environmental sanitation services.

**Action 7.8.3: Strengthen the institutional and human capacity of key institutions to ensure coordination and effective and efficient delivery of sanitation services**

Purpose of action: To facilitate the organizational effectiveness of key environmental sanitation service delivery institutions.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification  | Key Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>Knowledge and skills of staff of MMDAs are upgraded to adequately deal with issues related to urban waste, drainage and waste reuse technologies.  | <ul style="list-style-type: none"> <li>• 50% increase in the number of enforcement actions by 2015</li> <li>• Percentage of MMDAs trained</li> <li>• 95% of urban households and 75% of rural households have access to adequate levels of waste collection services</li> <li>• 54% sanitation coverage is achieved by 2015, and 100% achieved by 2025</li> </ul> | <ul style="list-style-type: none"> <li>• Number of EIA permits issued</li> <li>• Number of accused convicted for non-compliance</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• Government of Ghana and development partners are committed to the implementation of the SWA compact;</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>• Lack of coordination between the MWRWH and the MLGRD to implement the SWA Compact</li> </ul> |
| <b>Tasks:</b><br>7.8.3.1 Strengthen the Environmental Health and Sanitation Directorate (EHSD) so as to provide technical advice and leadership for policy formulation to the MLGRD, and effectively coordinate sector institutions (reinforce tasks under Action 7.2.1).<br>7.8.3.2 Build capacity and awareness of MMDAs on operation and maintenance of urban drains (included in tasks under Action 7.5.3).<br>7.8.3.3 Strengthen human and institutional capacities to implement waste reuse technologies (included in tasks under Action 7.6.4).<br>7.8.3.4 Enforce legislation, regulations and by-laws prohibiting the dumping of waste in wetlands and water courses. |   |  |  |
| <b>Outcomes:</b><br>I. Sanitation and Water for All (SWA) Compact is functioning.<br>II. Significant reduction in incidence of water-borne and water-related diseases.   |   |  |  |

## Programme 7.9: Water and Land Management

### Action 7.9.1: Promote the conservation of water and ecosystem health through effective protection and regulation of land and water resources

Purpose of action: To create the enabling environment necessary for the implementation of technical interventions for the protection of land and water resources.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification  | Key Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>Protected water sources and quality  | <ul style="list-style-type: none"> <li>• Implementation of the Riparian Buffer Zone Policy commenced by 2015</li> <li>• By-laws of at least 60% of MMDAs functioning by 2015</li> <li>• At least 100 prosecutors trained on water and sanitation regulations by 2020</li> <li>• Water audit of all river basins conducted by 2015</li> <li>• Dedicated programmes for water resources monitoring ready by 2015</li> <li>• Indicators for ambient water quality developed by 2015</li> </ul> | <ul style="list-style-type: none"> <li>• Legislative instruments and guidelines on buffer zone implementation</li> <li>• By-Laws of MMDAs</li> <li>• Training reports</li> <li>• Water audit report</li> <li>• Monitoring reports</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>• HSD, WRI and GMet are well funded</li> <li>• Controller and Accountant General's Department and EPA have adequate capacity to monitor and enforce regulations</li> <li>• Qualified candidates for training courses are available and motivated</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>• Conflicting interests between polluters and regulators and /or prosecutors create barriers to the implementation of regulations</li> </ul> |
| <b>Tasks:</b><br>7.9.1.1 Create and sustain awareness of the value of water as a scarce resource, and threats to water and land resources.<br>7.9.1.2 Implement the Riparian Buffer Zone Policy so as to retard silting of streams and pollution of bodies of water.<br>7.9.1.3 Enforce legislation, regulations and by-laws prohibiting the dumping of waste in wetlands and watercourses (including drains).<br>7.9.1.4 Support advocacy on interventions aimed at restoring and improving wetlands and watercourses.<br>7.9.1.5 Set up effective monitoring and assessment of water resource availability, use and quality. |   |  |  |
| <b>Outcomes:</b><br>I. River banks are well demarcated and reforested.<br>II. Downstream availability of water, quality of water, preventing contamination, etc.   |   |  |  |

**Action 7.9.2: Reduce the vulnerability of and economic loss suffered by communities through the provision of alternative non-agriculture livelihood schemes and access to markets**

Purpose of action: To introduce integrated water resources management into climate change adaptation so as to reduce livelihood vulnerability in communities.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification   | Key Assumptions and Risks  |
|--|---|---|--|
| <b>Output:</b><br>To mitigate the vulnerability of and economic loss suffered by communities through adaptation to climate variability and change. | <ul style="list-style-type: none"> <li>Contingency management plans prepared by 2015</li> <li>Implementation of Riparian Buffer Zone Policy commence by 2015</li> <li>Communications strategy for climate change adaptation formulated by 2015</li> <li>The irrigation and water conservation strategy implemented by 2020</li> </ul> | <ul style="list-style-type: none"> <li>Disaster preparedness and contingency management plans</li> <li>Communications strategy</li> <li>Legislative instruments for buffer zone policy</li> <li>Number of functional water conservation structures</li> </ul> | <i>Assumptions</i> <ul style="list-style-type: none"> <li>The local communities already have some knowledge in adapting to climate change which must be built upon</li> <li>Funding requirements for activities are met</li> </ul> <i>Risks</i> <ul style="list-style-type: none"> <li>Local capacity not strong enough to support climate change interventions</li> </ul> |

**Tasks:**

7.9.2.1 Create public awareness on the impact of climate change (including the dangers of settling in flood-prone areas).

7.9.2.2 Improve flood management through catchment conservation and protection so as to retard surface run-off.

7.9.2.3 Support the development of participatory disaster preparedness and management programmes.

7.9.2.4 Strengthen the dissemination of information to facilitate adaptation (e.g., early warning systems).

7.9.2.5 Implement the developed of an irrigation and water conservation strategy.

**Outcomes:**

I. Most communities are aware of and coping with the impacts of climate change.

II. Adaptive and coping strategies on climate change, with particular emphasis on the use and management of water resources, are implemented.

**Action 7.9.3: Strengthen human and institutional capacity to carry out key IWRM mandates including transboundary cooperation in the management of shared river basins**

Purpose of action: To strengthen human and institutional capacity to carry out key integrated water resources management mandates at all levels to protect water resources and the ecosystem services they provide.

| Output/Tasks/Outcomes  | Verifiable Indicators   | Means of Verification  | Key Assumptions and Risks                                  |
|--|---|--|--|
| <b>Output:</b><br>Strengthened human and institutional capacity to carry | <ul style="list-style-type: none"> <li>At least 10 river basin boards are set up by 2020</li> </ul> | <ul style="list-style-type: none"> <li>Functioning River Basin Boards</li> </ul> | <i>Assumptions</i><br>Institutional fragmentation at local |

|  |   |   |   |
|--|---|---|---|
| out key IWRM mandates.   | <ul style="list-style-type: none"> <li>• At least 2 IWRM educational workshops are organized annually for MMDAs and other relevant bodies in river basins</li> <li>• At least 2 members of each MMDA receive training in IWRM by 2015</li> <li>• Monitoring and evaluation plans prepared for the River Basin Boards by 2015</li> </ul> | <ul style="list-style-type: none"> <li>• Workshops reports</li> <li>• Monitoring and evaluation Plans</li> <li>• Annual progress reports</li> </ul> | government levels<br><i>Risks</i> <ul style="list-style-type: none"> <li>• Political consensus and stakeholder opinions cannot be harmonized</li> </ul> |
| <b>Tasks:</b><br>7.9.3.1 Set up or strengthen river basin institutions (e.g., river basin boards, water users associations, etc.) to serve as collaboration mechanisms and forums for local actors.<br>7.9.3.2 Provide logistics for the efficient running of the river basins' institutions and enforcement of regulations.<br>7.9.3.3 Support education and training in integrated water resources management (IWRM) at all levels.<br>7.9.3.4 Coordinate the development of a detailed basin-level data and information management system.<br>7.9.3.5 Monitor and evaluate annual work programmes for river basins. |   |   |   |
| <b>Outcomes:</b><br>I. An enabling environment created and institutional roles functioning to protect water resources and ecosystem services.<br>II. Decision-making is well established at the lowest appropriate local level for carrying out water resources management and development actions.  |   |   |   |



## Summary

### Timeline

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| <b>Policy Focus Area 7: Minimize the Impact of Climate Change on Access to Water and Sanitation</b> |  | <b>Lead Org</b>       | <b>2015</b> |          | <b>2016</b> |          | <b>2017</b> |          | <b>2018</b> |          | <b>2019</b> |          | <b>2020</b> |          | <b>Estimated Cost US\$</b> |
|---|--|-----------------------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|-------------|----------|----------------------------|
| <b>Action</b>   |  |                       | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> | <b>1</b>    | <b>2</b> |                            |
| <b>Programme Area 7.1: Environmental sanitation education and hygiene education</b>                 |  | <b>MLGRD and LGS</b>  |             |          |             |          |             |          |             |          |             |          |             |          | <b>213,090,400</b>         |
| 7.1.1   | Promote safe water, sanitation and hygiene practices by strengthening the existing WASH awareness-raising modules for vulnerable communities                       |                       | x           | x        | x           | x        |             |          |             | x        | x           | x        | x           |          |                            |
| 7.1.2   | Strengthen the education and training of stakeholders in water and environment facilities at all levels  |                       |             | x        | x           | x        | x           |          |             |          |             |          |             |          |                            |
| 7.1.3   | Reinvigorate the schools sanitation and hygiene education (SSHE) programmes as part of SHEP  |                       |             | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        |                            |
| <b>Programme Area 7.2: Improved access to safe drinking water</b>                                   |  | <b>MWRWH and GWCL</b> |             |          |             |          |             |          |             |          |             |          |             |          | <b>715,000,000</b>         |
| 7.2.1   | Strengthen the institutional management capacity of key institutions (GWCL and CWSA) to ensure efficient delivery of water services at all times                   |                       |             | x        | x           | x        | x           |          |             |          |             |          |             |          |                            |
| 7.2.2   | Mainstream climate dimensions in the rehabilitation, operation and maintenance of existing water systems and for water conservation.                               |                       |             | x        | x           | x        | x           | x        | x           | x        |             |          |             |          |                            |
| 7.2.3   | Plan for investment in minor repairs as well as major renewal, replacement, and expansion of water supply services to peri-urban settlements and small towns.      |                       | x           | x        | x           |          |             |          |             |          |             |          |             |          |                            |
| 7.2.4   | Develop and make operational a nationwide potable water quantity and quality monitoring and site surveillance programme to minimize possible sources of pollution. |                       | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        | x           | x        |                            |

| <b>Programme Area 7.3: Climate-related research</b>              |  | <b>CSIR-WRI</b>      |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>18,720,000</b>  |
|--|--|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|
| 7.3.1  | Improve the climate observation and monitoring system and set up a database on water and sanitation schemes, drawing on traditional knowledge and modern information technology to support forecasting and evidence-based decision-making. |                      |   | x | x | x | x |   |   |   |   |   |   |   |   |                    |
| 7.3.2  | Investigate opportunities for alternatives to wastewater treatment, processing and uses.   |                      |   |   |   | x | x | x | x | x | x | x |   |   |   |                    |
| 7.3.3  | Promote scientific investigations and research in water resources assessment, management and development.  |                      |   | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 7.4: Construction of water storage systems</b> |  | <b>WRC</b>           |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>50,000,000</b>  |
| 7.4.1  | Promote multi-stakeholder participation in the selection and management of water storage systems through participatory tools.  |                      | x | x | x |   |   |   |   |   |   |   |   |   |   |                    |
| 7.4.2  | Review and establish a framework for the construction, operation and regulation of dams and reservoirs.  |                      |   |   | x | x | x | x | x |   |   |   |   |   |   |                    |
| 7.4.3  | Promote the development of water storage systems and flood protection measures in the peri-urban settlements and small towns for agriculture and energy production.  |                      |   |   |   | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 7.5: Improved drainage in urban areas</b>      |  | <b>MLGRD and LGS</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>156,360,000</b> |
| 7.5.1  | Improve hydro-meteorological observational networks and provide access to data to facilitate drainage planning and decision-making   |                      | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 7.5.2.   | Undertake topographic surveys and develop physical plans, incorporating drainage development plans for all regional and district capitals.   |                      |   |   | x | x | x | x |   |   |   |   |   |   |   |                    |
| 7.5.3.   | Build capacity, create awareness and enforce by-laws and regulations in MMDAs on the operation and maintenance of urban drains.  |                      |   | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 7.6: Recycling of solid waste</b>              |  | <b>MLGRD and LGS</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>254,770,000</b> |
| 7.6.1  | Carry out a comprehensive waste audit in selected MMDAs to obtain categories and volume of waste, together with a technology   |                      | x | x | x |   |   |   |   |   |   |   |   |   |   |                    |

|  |   |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |                    |
|--|---|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|
|  | needs assessment.   |                        |   |   |   |   |   |   |   |   |   |   |   |   |   |                    |
| 7.6.2  | Identify and select, with multi-stakeholder participation, and make available appropriately zoned and serviced land to accommodate waste recovery and recycling infrastructure. |                        |   | X | X | X | X |   |   |   |   |   |   |   |   |                    |
| 7.6.3  | Encourage MMDAs and the private sector to establish waste material recovery, recycling and reduction strategies (including waste separation schemes in communities).            |                        |   |   |   | X | X | X | X | X | X | X | X | X | X |                    |
| 7.6.4  | Strengthen human and institutional capacity to implement waste recycling technologies.  |                        |   |   |   | X | X | X | X | X |   |   |   |   |   |                    |
| 7.6.5  | Develop and implement programmes in education and awareness-raising on the benefits of alternative uses of waste.   |                        |   | X | X | X | X | X | X | X | X | X | X | X | X |                    |
| <b>Programme Area 7.7: Wastewater reduction, treatment and reuse</b> |   | <b>MLGRD</b>           |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>36,500,000</b>  |
| 7.7.1  | Promote multi-stakeholder participation in the identification and selection waste treatment sites   |                        |   | X | X | X | X | X | X | X | X | X | X | X | X |                    |
| 7.7.2  | Strengthen human and institutional capacity to implement waste reuse technologies.  |                        | X | X | X | X | X | X | X | X | X | X | X | X |   |                    |
| <b>Programme Area: 7.8: Improved access to sanitation</b>            |   | <b>MLGRD and MMDAs</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>230,600,000</b> |
| 7.8.1  | Improve appropriate sanitation facilities and management practices  |                        |   | X | X | X | X | X | X | X | X | X | X | X | X |                    |
| 7.8.2  | Ensure adequate financing of sanitation services;   |                        | X | X | X | X |   |   |   |   |   |   |   |   |   |                    |
| 7.8.3  | Strengthen the institutional and human capacity of key institutions to ensure coordination and effective and efficient delivery of sanitation services.                         |                        | X | X | X | X | X | X | X | X | X | X | X | X | X |                    |
| <b>Programme Area 7.9: Water and land management</b>                 |   | <b>WRC</b>             |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>5,200,000</b>   |
| 7.9.1  | Promote the conservation of water and ecosystem health through effective protection and regulation of land and water resources  |                        | X | X | X | X | X | X | X | X | X | X | X | X | X |                    |
| 7.9.2  | Reduce the vulnerability of and economic loss suffered by communities through the provision of alternative non-agriculture livelihood schemes and access to markets             |                        |   |   |   | X | X | X | X | X |   |   |   |   |   |                    |
| 7.9.3  | Strengthen human and institutional capacity to carry out key IWRM mandates including transboundary cooperation in the management of shared river basins                         |                        | X | X | X | X | X | X | X | X | X | X | X | X | X |                    |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 7: Minimize Impacts of Climate Change on Access to Water and Sanitation</b> | <b>Lead Org</b>        | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 7.1: Environmental sanitation education and hygiene education</b>              | <b>MLGRD and LGS</b>   | 50,606,000  | 66,800,000  | 30,049,000  | 35,000,000  | 30,600,000  | 35,400      | 213,090,400                |
| <b>Programme Area 7.2: Improved access to safe drinking water</b>                                | <b>MWRWH and GWCL</b>  | 100,000,000 | 300,000,000 | 20,000,000  | 100,000,000 | 95,000,000  | 100,000,000 | 715,000,000                |
| <b>Programme Area: 7.3 Climate related research</b>  | <b>CSIR-WRI</b>        | 2,000,000   | 4,240,000   | 4,000,000   | 2,240,000   | 3,240,000   | 3,000,000   | 18,720,000                 |
| <b>Programme Area 7.4: Construction of water storage systems</b>                                 | <b>WRC</b>             | 10,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | 5,000,000   | 5,000,000   | 50,000,000                 |
| <b>Programme Area 7.5: Improved drainage in urban areas</b>                                      | <b>MLGRD and LGS</b>   | 15,060,000  | 45,060,000  | 35,060,000  | 26,060,000  | 25,060,000  | 10,060,000  | 156,360,000                |
| <b>Programme Area 7.6: Recycling of solid waste</b>  | <b>MLGRD and LGS</b>   | 50,640,000  | 60,480,000  | 42,460,000  | 40,960,000  | 30,460,000  | 29,770,000  | 254,770,000                |
| <b>Programme Area 7.7: Wastewater reduction, treatment and reuse</b>                             | <b>MLGRD</b>           | 3,080,000   | 6,080,000   | 8,080,000   | 9,080,000   | 6,080,000   | 4,100,000   | 36,500,000                 |
| <b>Programme Area 7.8: Improved access to sanitation</b>   | <b>MLGRD and MMDAs</b> | 20,430,000  | 78,430,000  | 38,430,000  | 36,430,000  | 38,430,000  | 18,450,000  | 230,600,000                |
| <b>Programme Area 7.9: Water and land management</b>   | <b>WRC</b>             | 800,000     | 1,300,000   | 1,100,000   | 900,000     | 700,000     | 400,000     | 5,200,000                  |



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 8: Gender Issues in Climate Change**

## Policy Focus Area 8: Gender Issues in Climate Change

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### Introduction

The link between gender and climate change is increasingly being acknowledged as critical for adaptation and mitigation, which will enable countries such as Ghana to promote development on an equitable basis. Climate change causes variability, danger and risk to life and property and contributes to the increasing gap between the rich and the poor. At the same time, the impact of climate change is different for women and men, the former being the most adversely affected in all spheres of life. Since women suffer from all kinds of discriminatory practices and also tend to belong to the poorer sections of society, they are often among those who have the least capacity and opportunities to cope with the impacts of climate change, or to participate in critical decisions relating to how climate change can be addressed.

Given the existing gaps and challenges in all spheres of life in Ghana in the promotion of gender equality, there is a need to highlight the specific ways in which gender can be mainstreamed with reference to climate change.

### Identifying Targets of the Mainstreaming Process

As a country, Ghana has institutionalized its development planning processes to facilitate coherence, effectiveness and accountability in their implementation, monitoring and evaluation. Through the National Development Planning Commission (NDPC) guidelines for the preparation of the Sectoral Medium-Term Development Plan for the latest development plan of the country, the Ghana Shared Growth and Development Agenda (GSGDA), 2010–2013, was produced. The guidelines provide the steps needed to mainstream cross-cutting issues in sector strategies and programmes of action, as well as

sectoral action plans under the Medium-Term Expenditure Framework strategic planning and estimated costing process. The sectoral monitoring and evaluation guidelines also set out procedures for the collection, verification and reporting of data, in order to assess policy impacts on economic development.

There are guidelines on cross-cutting issues, which include gender and climate change. This means that a mandated framework is already available at the national and district levels to justify the call to mainstream climate change into gender equality issues and vice versa. The guidelines call for a number of specific measures, including the integration of cross-cutting issues (such as population, gender, strategic environmental assessments, climate change, vulnerability, etc.) in programmes and projects for sustainable development. This is followed by gender sensitivity (p.1, NDPC, 2011). There is also a specific section on gender equity (Section 4.3.7, p. 34) where the following statement is made:

“Gender auditing should be carried out by the Regional Planning Coordinating Units (RPCUs) with respect to ensuring gender equity. The profile, programmes, Estimated Cost, Report of the Public Hearing/District Communication Programmes of the District should be checked to ascertain whether issues relating to women in particular, including participation have been considered.”

In terms of institutional development and strengthening, since 2012 the Ministry of Gender, Children and Social Protection (MOGCSP) has replaced the former Ministry of Women and Children’s Affairs



(MOWAC) which was established in 2001.<sup>2</sup> Notwithstanding this name change, all the structures of MOWAC are still in place, with its ten regional directorates taking responsibility for gender issues at the regional level. But there is no representation of these structures at the district level. Gender desk officers have been made responsible for assisting line ministries to mainstream gender into their priority areas of work, but this has largely been unsuccessful as there has been lack of clarity about the mandate that they are expected to undertake which would be in addition to their existing core responsibilities within their organizations.<sup>3</sup>

The Medium-Term National Development Policy Framework (2010–2013) has been used by MOWAC, and now MOGCSP, to develop its own sectoral medium-term development plan in which a number of interventions have been outlined to address gender issues as they manifest themselves in the various sectors of the economy, from the household level to those of the community and wider society. They are:

- Enhancing the human resource capacity of MOWAC (MOGCSP) to carry out its mandate
- Enhancing the economic empowerment of women
- Considering gender sensitivity in the development of sectoral policies, plans, cost estimates, resource allocation, business promotion, programmes and projects
- Formulating policy, and coordinating, executing and monitoring programmes and activities related to the well-being of women and children
- Embarking on outreach and awareness-raising programmes to ensure that gender equality is mainstreamed in all sectors of the economy
- Providing the requisite platform and mechanism to implement undertakings given by the government at international forums to improve the status of women
- Collaborating with development partners, civil society organizations and stakeholders to facilitate the integration of women's issues into national development
- Ensuring compliance with Ghana's international obligations that relate to women.

The above strategies can therefore form the basis for ensuring that gender is mainstreamed in climate change initiatives.

A multi-stakeholder approach is adopted by MOGCSP in the planning process, with growing collaboration between the Ministry, women's rights organizations, civil society and other ministries, departments and agencies, along with Metropolitan, Municipal and District Assemblies (MMDAs). This approach is facilitating the mainstreaming of gender and other cross-cutting issues within the sustainable development context. For example, the implementation of the Africa Adaptation Programme (AAP) has actively involved MOGCSP as a target institution to ensure links between gender and

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<sup>2</sup>The previous institutions handling issues concerning women and children, namely, the National Council on Women and Development and the Ghana National Commission on Children have become the Department of Women and the Department of Children, respectively.

<sup>3</sup>Other institutions whose work impinges on the promotion of women's rights include: the policy planning, monitoring and evaluation offices in ministries, departments and agencies and in the Metropolitan, Municipal and District Assemblies (MMDAs); inter-ministerial sectoral gender policy committees; the Commission on Human Rights and Administrative Justice (CHRAJ); gender desk officers in ministries, departments and agencies and in MMDAs; parliamentary sub-committees on gender and legal issues; the Women's Caucus in Parliament; non-governmental organizations (NGOs) across the country; Queen Mothers' associations; the women's wings of political parties; and the Domestic Violence and Victim Support Units (DOVVSU) at national, regional and district levels.

climate change. MOGCSP and other civil society groups, such as Abantu for Development and the Gender Action on Climate Change for Equality and Sustainability (GACCES), are also represented on the Ghana National Climate Change Committee (NCCC) and the steering committee of the AAP. Such representation seeks to ensure that the interests and concerns of different categories or target groups of women (such as women with disabilities, widows, single women, and girls) are taken into account in designing interventions to address climate change.

### **Evaluating the Impacts of Climate Change on Socioeconomic, Sectoral and Local Development Strategies and Plans**

MOGCSP has already developed a process of mainstreaming gender in ministries, departments and agencies and in MMDAs. Job descriptions of the gender desk officers of all the above, together with accountability frameworks and memorandums of understanding with stakeholders, have also been finalized to enable relevant institutions and experts to carry out the mainstreaming process. This process should enable MOGCSP to ensure that ministries, departments and agencies, and MMDAs, are able to monitor climate change impacts from a gender perspective in their respective plans and strategies.

### **Awareness and Capacity-building for Mainstreaming in the context of gender**

MOGCSP has institutionalized monthly meetings as a basis for information-sharing in the quest to promote gender equality. The monthly meetings are held at the national level and replicated at the regional levels as quarterly meetings. Resource persons from critical institutions are invited to share their work and experiences with women. It is important that organizations specifically working on climate change, such as the Environmental Protection Agency (EPA) and the Ministry of Environment, Science, Technology and Innovation (MESTI), are regularly invited to share information on

this issue. Civil society groups – especially those working directly on gender and climate change – should also be actively involved. Other mechanisms that can be used are awareness creation and capacity-building programmes on gender and climate change, for all levels.

### **Evaluate Possible Impacts (Negative and Positive) of the Mainstreaming Process**

It is critical that there is ongoing consultation and the involvement of both women's and men's groups in order to ascertain results and progress. The MOGCSP monitoring and evaluation framework, and in particular its use of participatory techniques that provide opportunities for women, should be used. Public hearings should be conducted to allow women to explain how their experience of climate change has been affected by their gender. Monitoring and review committees at all levels should include women experts on climate change.

### **Develop Strategies and Mechanisms for Mainstreaming Gender including policy, financial and economic aspects**

#### **Policy aspects**

MOGCSP has undertaken nationwide consultations to draft a national gender policy. When completed, it is expected to serve as a guide for stakeholders to contribute to the national development process through gender-responsive programmes and projects. It will also enhance women's active participation in decision-making at all levels and in all sectors, including climate change, given the current efforts that have been made to set up an expert group to develop an affirmative action bill.

#### **Financial aspects**

Regarding financial aspects, MOGCSP has continued to suffer from limited budgetary allocations. To this end, a process of gender-related estimated costing was initiated by MOGCSP to inform relevant



agencies and committees about the need for equity in the allocation of financial resources. Climate change initiatives can also benefit from such processes through their promotion of responsiveness to gender issues. Lessons from the AAP will also serve as useful entry points for ensuring separate and integrated estimated costing components for the process of mainstreaming gender and climate change. A minimum of 30 per cent of all estimated costing allocations for climate change should be set aside for the promotion of gender equity and equality.

### **Economic aspects**

The different experiences of women and men in the area of climate change must be dealt with to promote economic well-being. This should take into account the needs and concerns of different groups of women. Integrated and specific gender and climate change initiatives should be promoted to enhance the livelihood of women experiencing adverse impacts of climate change.

### **Programme Areas**

There is a causal relationship between climate change and gender relations. Climate change tends to exacerbate existing gender inequalities. At the same time gender inequalities lead women to be exposed to greater negative impacts. Such negative impacts include gender-based vulnerabilities, which reflect specific historical and cultural patterns of relations in social institutions, culture and personal lives. Because climate change affects women and men differently, a perspective based on gender equality is critical when discussing policy development, decision-making and strategies for adaptation and mitigation, finance, capacity-building and technology issues. Women are not just victims but they are powerful agents of change and their leadership is critical in all initiatives for achieving equitable sustainable development.

### **Programme 8.1: Gender-responsive Climate Change Research**

**Objectives:** To study and provide information on the impact of climate change on gender relations (in different socioeconomic sectors) in Ghana.

#### **Justification:**

To date, the impacts of climate change and its variability on gender relations have not been widely studied in Ghana. They therefore remain largely invisible. Despite the difficulties of prediction, it is clear that the impacts of climate change will be gender-dependent, and that these require further research. Vulnerability to natural and human-induced hazards and long-term climate change means that those most at risk of, and least able to cope with the effects of, disasters and environmental change, are the poorest, including poor women.

Responses to the impact of climate change in different sectors of the economy will therefore need to take account of problems related to gender, otherwise government policies and development programmes could further exacerbate gender inequalities. There are also possibilities for positive changes to occur, when women take on new roles, challenging gender stereotypes as a result of the impacts of climate change. Public policies need to be more responsive to the decisions faced by local communities regarding their livelihoods, and the potential impacts of those on power and gender relations. For that reason, research is required to explore how climate changes will manifest themselves in different regions and sectors of the country, and how social and natural systems will evolve over time and have an impact on gender relations. Data collected from such research must be disaggregated for different categories of women, men, boys and girls, to reflect the roles, real situations and general conditions of these groups in all aspects of the society.

**Action:**

- 8.1.1 Identify key gender- and climate change-related themes for research, and design research methodology through participatory approaches (e.g., vulnerability to hazards and long-term climate change).
- 8.1.2 Build capacity in gender and climate change research.
- 8.1.3 Undertake research, including fieldwork and sex-disaggregated data analysis.
- 8.1.4 Develop strategies for the dissemination and implementation of gender-sensitive data by organizing validation workshops.
- 8.1.5 Disseminate research results.

**Timeline:** 2015–2020

**Responsibility:** Ministry of Gender, Children and Social Protection (MOGCSP) and Environmental Protection Agency (EPA); Forestry Commission (FC), Forestry Research Institute of Ghana (FORIG), Ghana Meteorological Agency (GMet), Ghana Statistical Service (GSS), Ministry of Energy and Petroleum (MoEP), Ministry of Environment, Science, Technology and Innovations (MESTI), Ministry of Food and Agriculture (MoFA), National Disaster Management Organisation (NADMO), National Development Planning Commission (NDPC), universities and other research institutions; civil society organizations (CSOs), the media, NGOs.

**Estimated Cost:** US\$18,000,000

## **Programme 8.2: Livelihood Protection, Alternative and Sustainable Livelihoods and Poverty Reduction**

**Objectives:** To empower vulnerable groups through gender-sensitive livelihoods that enhance the capacity to adapt to the impacts of climate change.

**Justification:**

While acknowledging the gender-dependent impacts of climate change, it is clear that poor and landless households are the most vulnerable. Children, women, the elderly and households with large family sizes are generally most affected. In cases of crop failure or deaths of farm animals, men experience particular vulnerabilities as traditional household providers. Men therefore often resort to off-farm and non-farm activities as sources of income. Women, however, experience vulnerability due to their lack of access to property and their being largely confined to the home because of their primary responsibility for household maintenance. Major factors exacerbating their vulnerability include the lack of accessibility to and affordability of agricultural inputs, and also insufficient access to water, and lack of transportation, lighting and communication, in particular in the communities of the urban and rural poor.

There are, however, local coping mechanisms which could be used to reduce vulnerability and build resilience to the impacts of climate change, such as savings, diversification, woodlots, social networks and borrowing. Institutional coping strategies include emergency aid, credit services, safety nets, water distribution, and campaigns to raise awareness of efficient and economical energy technologies. There is a need to build on existing livelihood initiatives, keeping gender and power relations in proper perspective, so that appropriate strategies can be used to tackle climate-specific vulnerabilities.

**Action:**

- 8.2.1 Develop criteria to identify and map gender-specific vulnerable groups and individuals who are likely to be worst affected by climate change.
- 8.2.2 Identify and register nature of vulnerability, and livelihood needs, gaps and interventions, according to gender.

8.2.3 Develop new interventions and improve and scale up existing ones, through gender-responsive consultations and approaches to address identified needs to build resilience and sustainability.

8.2.4 Implement interventions, including continuous monitoring and evaluation and also the impact assessment of climate change from a gender perspective.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Gender, Children and Social Protection (MOGCSP) and Ghana Statistical Service (GSS);** FC, GMet, MESTI, Ministry of Information and Media Relations (MIMR), MoEP, MoFA, Ministry of Finance and Economic Planning (MoFEP), MMDAs, NADMO, universities and research institutions; CSOs, NGOs.

**Estimated Cost:** US\$1,800,000,000

### Programme 8.3: Gender Responsiveness in Natural Resource Management

**Objective:** To promote gender responsiveness in the management of natural resources under changing climate conditions.

**Justification:**

In understanding the relationship between gender and sustainable development, an analysis of the patterns of use, knowledge and skills that are related to the use, management and conservation of natural resources is critical. The use of gender approaches provides a clearer and more holistic picture of the relations of women and men from different backgrounds with ecosystems. Women's access to concessions to manage and use natural resources is limited despite their knowledge being critical.

Current initiatives in Ghana involving women have demonstrated clear benefits for the environment, and also for women's social and economic status. In different ways, forests provide fuel, water, food and traditional medicine. The issue of deforestation must therefore also be addressed from a gender perspective given the different ways in which women and men are dependent on forest resources.

Socially just and effective forest policy must also acknowledge gender differences in the sustainable management of natural resources. Interventions around forest conservation that are gender-aware can strengthen women's capacity to adapt, promote their resilience, enhance their income-generating potential and have long-term environmental benefits. Public policies must shift from defining natural resources in monetary terms and focus community knowledge in an equitable manner. Gender-sensitive approaches should also be used to strengthen initiatives to conserve natural resources.

**Action:**

8.3.1 Create a sex-disaggregated database on access to and control over natural resources.

8.3.2 Scale up existing initiatives that promote women's access to and control over natural resources.

8.3.3 Harness and use the knowledge of both women and men, including traditional knowledge on the management of natural resources.

8.3.4 Initiate and build new programmes to enhance and safeguard women's interest in, access to and control over natural resources.

**Timeline:** 2015–2020

**Responsibility:**

**Ministry of Lands and Natural Resources (MLNR) and Ghana Statistical Service (GSS);** EPA, FC, GMet, MESTI, MoEP,

MOGCSP, Water Resources Commission (WRC), the judiciary, MMDAs, security services, universities and research institutions; CSOs, faith-based organizations, NGOs, organized labour.

**Estimated Cost:** US\$50,000,000

### **Programme 8.4: Gender-sensitive Education, Training and Capacity-building on Gender and Climate Change**

**Objective:** To promote gender-responsive climate change education, training and capacity-building interventions to benefit women, men, girls and boys across the country.

**Justification:**

A large part of the funds for climate change adaptation and mitigation go to supporting the development of infrastructure and technology. However, interventions such as gender-responsive education, training and capacity-building at all levels are also important in changing behaviour and attitudes. Public education, training and capacity-building that prioritize women's needs in relation to climate change are likely to address gender inequalities. Accordingly, women's capacities must be built into educational programmes in both household-related activities and in skills that can facilitate their access to better jobs, financial services, information and technology. Knowledge and skills can enable women and girls to play an effective role in the various decisions and interventions designed to respond to climate change such as early warning systems and the effective management of resources. Moreover, opportunities to address the challenges of climate change that target women can also empower and increase productive capacities. Education and capacity-building initiatives can involve women as educators, trainers, and participants within target groups. The equal access and participation of women, girls, boys and men in such programmes can help empower a new

generation of advocates. Investments in gender-sensitive climate change education, training and capacity-building will strengthen the existing initiatives being implemented in the country.

**Action:**

8.4.1 Conduct gender-sensitive education, training and capacity-building for women, men, girls and boys on climate change adaptation, finance, mitigation, technology, and regulatory frameworks, and for institutions that deal directly with women and their groups.

8.4.2 Educate the general public and train and build the capacities of institutions in the area of gender and climate change.

**Timeline:** 2015–2020

**Responsibility:**

**Training and capacity-building:** Ministry of Gender, Children and Social Protection (MOGCSP); MESTI, MoEP, universities; CSOs.

**Public education:** Ministry of Information and Media Relations (MIMR); MESTI, MOGCSP, National Commission for Civic Education (NCCE), universities; CSOs.

**Estimated cost:** US\$17,000,000

### **Programme 8.5: Gender-responsive Disaster Risk Reduction and Management**

**Objective:** To strengthen gender responsiveness in the reduction and management of climate-related disaster risks.

**Justification:**

Under the Hyogo Framework for Action (HFA), the United Nations International Strategy for Disaster Reduction (UNISDR) has developed, with the inclusion of gender considerations, disaster risk reduction plans of action. In these action plans, gender considerations

are incorporated by ensuring equal access to educational opportunities for vulnerable women, developing early warning systems which take gender and livelihoods into account, and ensuring that a gender perspective is adopted in decision-making processes when implementing risk management policies. Gender-sensitive data, the incorporation of women's perspectives and knowledge, and the need to reduce the negative impacts of natural disasters on women, particularly in relation to the provision of water, food and energy, have also been acknowledged.

As a country that is signatory to the HFA, Ghana is expected to implement disaster risk reduction in national plans in readiness for natural disasters. NADMO is already modifying the country's disaster risk reduction plans to promote more gender-sensitive approaches. Training materials on gender and disaster risk reduction have been developed and used in building the capacity of disaster risk service providers in selected regions and districts. Such existing programmes need to be scaled up to ensure the equal participation of women and men in all levels of disaster preparedness and response.

**Action:**

- 8.5.1 Review existing policies, programmes and projects on gender and climate-related disaster risks.
- 8.5.2 Implement interventions that address gender-specific resource use patterns that can degrade the environment.
- 8.5.3 Invest in training and capacity-building programmes on gender and disaster risk management and reduction at all levels.
- 8.5.4 Implement a gender-sensitive community education initiative on early warning systems and hazard management.
- 8.5.5 Address social, legal, cultural and economic inequalities that increase the risks and impacts of disasters.

**Timeline:** 2015–2020

**Responsibility:**

**National Disaster Management Organisation (NADMO), Ministry of Gender, Children and Social Protection (MOGCSP), Ministry of Information and Media Relations (MIMR);** Attorney General's Department, FC, MESTI, MoEP, MoFA, NCCE, Parliament, universities; CSOs, the media.

**Estimated cost:** US\$13,000,000

## FOCUS AREA 8: GENDER AND CLIMATE CHANGE

### Programme 8.1: Gender-responsive Climate Change Research

#### Action 8.1.1: Identify key gender- and climate change-related themes for research, and design research methodology through participatory approaches

Purpose of action: To agree with all stakeholders on key research themes and methodology.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|---|---|--|--|
| <b>Output:</b><br>Ten consultations on research themes and methodology conducted across the country.  | <ul style="list-style-type: none"> <li>Final report on consultations</li> </ul> | <ul style="list-style-type: none"> <li>Programme consultants</li> <li>MOGCSP, Ghana Statistical Service (lead institution)</li> <li>Stakeholders, media reports</li> </ul> | <ul style="list-style-type: none"> <li>Stakeholder interest and participation; availability of funds; democratic governance system in place</li> </ul> |
| <b>Tasks:</b><br>8.1.1.1 Prepare draft research themes and methodology and circulate to key stakeholders.<br>8.1.1.2 Organize 10 consultations with stakeholders on draft research themes and methodology.<br>8.1.1.3 Produce, circulate and validate draft report.<br>8.1.1.4 Produce and disseminate final report on consultations. |   |  |  |
| <b>Outcome:</b><br>Research themes and methodology developed.   |   |  |  |

#### Action 8.1.2: Build capacity in gender and climate change research

Purpose of action: To ensure that researchers understand and become familiar with climate change and gender analytical tools to be adopted for the research.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Ten training-of-trainers workshops organized.   | <ul style="list-style-type: none"> <li>Final report on training-of-trainers workshops</li> </ul> | <ul style="list-style-type: none"> <li>Programme consultants, and MOGCSP and Ghana Statistical Service (lead institution)</li> </ul> | <ul style="list-style-type: none"> <li>Stakeholder interest and participation</li> </ul> |
| <b>Tasks:</b><br>8.1.2.1 Select researchers in all 10 regions.<br>8.1.2.2 Organize 10 regional training-of-trainers workshops.<br>8.1.2.3 Produce and circulate final report of training-of-trainers workshops. |  |  |  |

| <b>Outcome:</b><br>Researchers trained on climate change and gender analytical tools and ready for fieldwork.  |  |  |  |
|--|--|--|--|
| <b>Action 8.1.3: Undertake research, including fieldwork and sex-disaggregated data analysis</b><br>Purpose of action: To collect sex-disaggregated data on climate change issues from the field.                          |  |  |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>Sex-disaggregated data collection in all 10 regions completed.   | <ul style="list-style-type: none"> <li>Data from fieldwork</li> </ul>                  | <ul style="list-style-type: none"> <li>Ghana Statistical Service (lead institution) and other research institutes</li> </ul>             | <ul style="list-style-type: none"> <li>Safe political environment for fieldwork</li> <li>Public cooperation with researchers</li> <li>Availability of funds</li> <li>Willingness of researchers to undertake fieldwork on gender and climate change</li> </ul> |
| <b>Tasks:</b><br>8.1.3.1 Commission fieldwork.<br>8.1.3.2 Researchers undertake fieldwork with supervision from consultants.<br>8.1.3.3 Collate and analyse data from fieldwork.   |  |  |  |
| <b>Outcomes:</b><br>Climate change sex-disaggregated data available for validation.  |  |  |  |
| <b>Action 8.1.4: Develop strategies for the dissemination and implementation of gender-sensitive data by organizing validation workshops</b><br>Purpose of action: To discuss and validate research data with stakeholders |  |  |  |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
| <b>Output:</b><br>10 regional validation workshops organized.  | <ul style="list-style-type: none"> <li>Final report on validation workshops</li> </ul> | <ul style="list-style-type: none"> <li>Programme consultants</li> <li>MOGCSP and Ghana Statistical Service (lead institution)</li> </ul> | <ul style="list-style-type: none"> <li>Stakeholder interest and participation</li> <li>Availability of funds</li> <li>Democratic governance in place</li> </ul>  |
| <b>Tasks:</b><br>8.1.4.1 Organize 10 regional validation workshops.<br>8.1.4.2 Produce final report on validation workshops.   |  |  |  |



## 8.1.4.3 Produce final research report.

**Outcome:**

Climate change sex-disaggregated data validated and ready for dissemination.

**Action 8.1.5: Disseminate research results**

Purpose of action: To make gender-based research report and other knowledge products emanating from the report widely available to all stakeholders and worldwide.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Gender-specific research information on climate change produced and disseminated. | <ul style="list-style-type: none"> <li>Research report easily available and accessible</li> </ul> | <ul style="list-style-type: none"> <li>Internet, all MMDAs, Ghana Statistical Service, MIMR (lead institution)</li> </ul> | <ul style="list-style-type: none"> <li>Stakeholder interest</li> <li>Financing secured</li> <li>Civil society and women's groups are involved</li> </ul> |

**Tasks:**

8.1.5.1 Produce hard copies of research report for distribution.

8.1.5.2 Produce soft copies of research report for online distribution.

8.1.5.3 Distribute hard and soft copies of research report to all stakeholders and worldwide.

**Outcome:**

Evidence-based research report on the nature of climate change and gender-specific impacts produced and used as reference for climate change interventions.

**Programme 8.2: Livelihood Protection, Alternative and Sustainable Livelihoods and Poverty Reduction****Action 8.2.1: Develop criteria to identify and map gender-specific vulnerable groups and individuals who are likely to be worst affected by climate change**

Purpose of action: To ensure standardized and gender-responsive criteria are deployed at all times.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Set of gender-sensitive and standard criteria developed. | <ul style="list-style-type: none"> <li>Gender-sensitive selection criteria document</li> </ul> | <ul style="list-style-type: none"> <li>Ghana Statistical Service</li> <li>MOGCSP</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> <li>Commitment to gender and vulnerability issues</li> </ul> |

**Tasks:**

8.2.1.1 Engage resource persons to develop gender-sensitive criteria.

8.2.1.2 Review and approve final report through validation workshops that involve women and their groups.



| <b>Outcome:</b><br>Gender-sensitive selection criteria that can be deployed fairly across the country.  |   |   |   |
|---|---|---|---|
| <b>Action 8.2.2: Identify and register nature of vulnerability, and livelihood needs, gaps and interventions, according to gender</b><br>Purpose of action: To develop a database of groups and individuals who require support.  |   |   |   |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators                                       | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Sex-disaggregated database captured.  | <ul style="list-style-type: none"> <li>Database</li> </ul>              | <ul style="list-style-type: none"> <li>Ghana Statistical Service</li> <li>MOGCSP</li> </ul>   | <ul style="list-style-type: none"> <li>Commitment to gender and vulnerability issues</li> <li>Funding available</li> <li>Commitment of field staff</li> </ul> |
| <b>Tasks:</b><br>8.2.2.1 Source equipment and software for data capture.<br>8.2.2.2 Train registration and data capture personnel in the application of a gender perspective.<br>8.2.2.3 Undertake registration exercise with women's active participation.<br>8.2.2.4 Complete sex-disaggregated database and establish mechanism for ongoing registration.                                |   |   |   |
| <b>Outcome:</b><br>Available sex-disaggregated database for design and execution of interventions to support vulnerable groups negatively affected by climate.  |   |   |   |
| <b>Action 8.2.3: Develop new interventions and improve and scale up existing ones, through gender-responsive consultations and approaches to address identified needs to build resilience and sustainability</b><br>Purpose of action: To develop gender-sensitive interventions that address the needs and gaps of vulnerable groups that have been negatively affected by climate change. |   |   |   |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators                                       | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Report produced that outlines the interventions to be implemented.  | <ul style="list-style-type: none"> <li>List of interventions</li> </ul> | <ul style="list-style-type: none"> <li>MOGCSP and Ghana Statistical Service</li> <li>CSOs, MMDAs</li> <li>MESTI and MoEP</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> </ul>   |
| <b>Tasks:</b><br>8.2.3.1 Develop interventions based on research conducted.<br>8.2.3.2 Organize consultative workshops to validate interventions.<br>8.2.3.3 Produce final report on interventions to be implemented.<br>8.2.3.4 Build capacity of women to adapt to sustainable alternative livelihoods.   |   |   |   |
| <b>Outcomes:</b><br>Clearly defined and proper interventions.   |   |   |   |

**Action 8.2.4: Implement interventions, including continuous monitoring and evaluation and also the impact assessment of climate change from a gender perspective**

Purpose of action: To implement gender-sensitive interventions aimed at supporting those negatively affected by climate change.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b><br>Disbursement of funds and provision of other components of various interventions.   | <ul style="list-style-type: none"> <li>• Reports on interventions implemented</li> <li>• Recorded changes in livelihoods of beneficiaries</li> </ul> | <ul style="list-style-type: none"> <li>• MOGCSP and Ghana Statistical Service</li> <li>• CSOs, MMDAs</li> <li>• MESTI, MoEP</li> </ul> | <ul style="list-style-type: none"> <li>• Funding available</li> </ul> |
| <b>Tasks:</b><br>8.2.4.1 Disbursement of funds and other components of various interventions.<br>8.2.4.2 Monitoring and evaluation of various interventions as well as impact assessment from a gender perspective. |  |  |   |
| <b>Outcome:</b><br>Gender-sensitive sustainable livelihoods provided for vulnerable groups that have been negatively affected by climate change.  |  |  |   |

**Programme 8.3: Gender Responsiveness in Natural Resource Management****Action 8.3.1: Create a sex-disaggregated database on access to and control over natural resources**

Purpose of action: To support advocacy efforts and the implementation of programmes to enhance women's access to and control over natural resources.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Sex-disaggregated data collected and analysed | <ul style="list-style-type: none"> <li>• Data from fieldwork</li> <li>• List of researchers</li> <li>• Methodology for data collection</li> </ul> | <ul style="list-style-type: none"> <li>• MOGCSP</li> <li>• Ghana Statistical Service</li> <li>• CSOs</li> <li>• MESTI and MoEP</li> <li>• MMDAs</li> <li>• Universities and research institutions</li> </ul> | <ul style="list-style-type: none"> <li>• Safe political environment for fieldwork</li> <li>• Public cooperation with researchers</li> <li>• Public policies that favour sustainable use of natural resources</li> <li>• Cooperation from security agencies</li> <li>• Respondents' confidentiality</li> </ul> |

**Tasks:**

- 8.3.1.1 Commission fieldwork.
- 8.3.1.2 Collate and analyse data from fieldwork according to gender.
- 8.3.1.3 Use sex-disaggregated data for advocacy and project design and implementation.

**Outcome:**

Advocacy and projects on natural resources management benefit from sex-disaggregated data.

**Action 8.3.2: Scale up existing initiatives that promote women's access to and control over natural resources**

Purpose of action: To enable many more women to take advantage and benefit from existing and proven initiatives that enhance their access to and control over natural resources.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Number of proven gender-sensitive initiatives scaled up. | <ul style="list-style-type: none"> <li>• Documentation on the number of women supported and number and types of scaled up initiatives</li> </ul> | <ul style="list-style-type: none"> <li>• MOGCSP</li> <li>• Ministry of Lands and Natural Resources</li> <li>• CSOs</li> <li>• MESTI</li> <li>• MoEP</li> <li>• Universities and research institutions</li> </ul> | <ul style="list-style-type: none"> <li>• Public policies favouring sustainable use of natural resources by women</li> <li>• Funding available</li> <li>• Stakeholder cooperation and collaboration</li> </ul> |

**Tasks:**

- 8.3.2.1 Identify innovative and proven gender-responsive initiatives.
- 8.3.2.2 Work with relevant agencies and institutions to link additional women and their groups to scale up the innovations.
- 8.3.2.3 Provide legal and financial support to strengthen women's access to and control over natural resources in their communities.

**Outcomes:**

- I. Gender-sensitive innovations on sustainable management of natural resources scaled up.
- II. Increased benefits for women in terms of capacity, and access to and control over, and knowledge and management of natural resources.
- III. Availability of financial and legal support systems for women on natural resources management.

**Action 8.3.3: Harness and use the knowledge of both women and men, including traditional knowledge on the management of natural resources**

Purpose of action: To empower women to participate equitably in natural resource management and decision-making over natural resources.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Enhanced participation of women in decision-making on natural resources management. | <ul style="list-style-type: none"> <li>Number of women holding leadership and decision-making positions on natural resources management committees</li> </ul> | <ul style="list-style-type: none"> <li>MOGCSP</li> <li>Ministry of Lands and Natural Resources</li> <li>MIMR</li> <li>CSOs</li> <li>MESTI</li> <li>MoEP</li> <li>Universities and research institutions</li> </ul> | <ul style="list-style-type: none"> <li>Policy supports women's effective participation</li> <li>Active women's participation</li> <li>Structures can be identified</li> <li>Funding available</li> <li>Stakeholder cooperation and collaboration</li> </ul> |

**Tasks:**

8.3.3.1 Identify decision-making structures on natural resources management.

8.3.3.2 Set quotas for representation and participation of women on the identified structures.

8.3.3.3 Monitor compliance with the quotas set.

**Outcome:**

Increased women's visibility and voices in decision-making in natural resource management structures.

**Action 8.3.4: Initiate and build new programmes to enhance and safeguard women's interest in, access to and control over natural resources**

Purpose of action: To remove barriers and ensure women have the needed safeguards and mechanisms to access and control natural resources.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Financial, social, environmental and legal safeguards provided. | <ul style="list-style-type: none"> <li>Gender-responsive natural resources legal frameworks</li> <li>Gender-balanced estimated cost lines in the sector</li> <li>Regulatory reports</li> </ul> | <ul style="list-style-type: none"> <li>MOGCSP</li> <li>Ministry of Lands and Natural Resources</li> <li>CSOs</li> <li>MESTI</li> <li>MoEP</li> <li>EPA</li> <li>Universities</li> <li>The media</li> <li>Ministry of Finance and Economic Planning</li> </ul> | <ul style="list-style-type: none"> <li>Favourable policy climate</li> <li>Effective enforcement mechanism</li> <li>Substantive budgetary allocations</li> <li>Active women's participation</li> <li>Funding available</li> <li>Stakeholder cooperation and collaboration</li> </ul> |

**Tasks:**

- 8.3.4.1 Promote gender-sensitive legal frameworks and safeguards on natural resources management.
- 8.3.4.2 Initiate new programmes to increase women's ability to benefit from sustainable and gender-responsive natural resources management.
- 8.3.4.3 Establish gender-responsive enforcement mechanism and monitor their operation.

**Outcomes:**

Increased gender-sensitive safeguards and new initiatives that enhance benefits for women in natural resources management.

### Programme 8.4: Gender-sensitive Education, Training and Capacity-building on Gender and Climate Change

#### Action 8.4.1: Conduct gender-sensitive education, training and capacity-building for women, men, girls and boys on climate change adaptation, finance, mitigation, technology, and regulatory frameworks, and for institutions that deal directly with women and their groups

Purpose of action: To educate, train and build the capacities of institutions on gender and climate change.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|--|--|---|---|
| <b>Output:</b><br>Ten training-of-trainers and capacity-building workshops conducted across the country. | <ul style="list-style-type: none"> <li>• Workshop reports</li> <li>• List of trained trainers</li> <li>• Training manuals</li> </ul> | <ul style="list-style-type: none"> <li>• MOGCSP</li> <li>• CSOs</li> <li>• The media and media reports</li> </ul> | <ul style="list-style-type: none"> <li>• Funding available</li> <li>• Stakeholder commitment</li> <li>• Public interest</li> <li>• Expertise in developing gender-sensitive materials for the training</li> </ul> |

**Tasks:**

- 8.4.1.1 Select trainees in all 10 regions using gender-sensitive criteria.
- 8.4.1.2 Organize 10 regional training-of-trainers workshops on adaptation, finance, mitigation, technology, regulatory frameworks and gender mainstreaming.
- 8.4.1.3 Produce and circulate final report of training-of-trainers workshops.

**Outcomes:**

- I. Trained trainers available to support public education on gender and climate change.
- II. Relevant gender-sensitive training materials on climate change produced.

**Action 8.4.2: Educate the general public and train and build the capacities of institutions in the area of gender and climate change**

Purpose of action: To educate the public on the gender implications of climate change in order to elicit public support for proposed interventions.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Gender-sensitive climate change public education, training and capacity-building conducted across the country, benefiting women and men on an equal basis.   | <ul style="list-style-type: none"> <li>Gender-sensitive education materials</li> <li>Impact assessment report</li> </ul> | <ul style="list-style-type: none"> <li>MOGCSP</li> <li>MIMR</li> <li>CSOs</li> <li>MESTI</li> <li>EPA</li> <li>The media</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> <li>Relevant and gender sensitive training materials</li> <li>Stakeholder commitment</li> <li>Public interest</li> </ul> |
| <b>Tasks:</b><br>8.4.2.1 Publish hard and soft gender-sensitive climate change education and training materials.<br>8.4.2.2 Select target groups across the country using gender-sensitive criteria.<br>8.4.2.3 Engage women, girls, men and boys as field educators, trainers and resource persons to deliver the programme.<br>8.4.2.4 Conduct gender-sensitive public education, training and capacity-building in collaboration with both electronic and print media.<br>8.4.2.5 Monitor and evaluate the impact of the gender-sensitive public education, training and capacity-building. |  |   |  |
| <b>Outcomes:</b><br>I. Public knowledge on the gender implications of climate change enhanced.<br>II. Enhanced media and public support for gender-related interventions on climate change.<br>III. Critical mass of women, men, girls and boys have enhanced knowledge and skills on gender and climate change issues.  |  |   |  |

**Programme 8.5: Gender-responsive Disaster Risk Reduction and Management****Action 8.5.1: Review existing policies, programmes and projects on gender and climate-related disaster risks**

Purpose of action: To update and strengthen existing systems and structures.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Existing gender-responsive disaster risk reduction and management framework at NADMO reviewed. | <ul style="list-style-type: none"> <li>Gender-responsive disaster risk reduction and management review report</li> </ul> | <ul style="list-style-type: none"> <li>NADMO, MOGCSP</li> <li>MIMR</li> <li>CSOs, the media</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> <li>Stakeholder commitment</li> <li>Public interest</li> </ul> |

| <b>Tasks:</b><br>8.5.1.1 Review existing gender-responsive disaster risk reduction and management framework at NADMO.<br>8.5.1.2 Validate the framework among all stakeholders.<br>8.5.1.3 Implement, monitor and evaluate the gender-responsive disaster risk reduction and management framework.   |  |  |   |
|--|--|--|---|
| <b>Outcome:</b><br>Reviewed gender-responsive disaster risk reduction implemented.   |  |  |   |
| <b>Action 8.5.2: Implement interventions that address gender-specific resource use patterns that can degrade the environment</b><br>Purpose of action: To strengthen women's and men's sustainable use of natural resources so as to reverse degradation trends and to serve as safeguards against natural disasters.  |  |  |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Enhanced and effective natural resource use and management on an equal basis by men and women.   | <ul style="list-style-type: none"> <li>Types, numbers and locations of interventions</li> </ul>  | <ul style="list-style-type: none"> <li>NADMO</li> <li>MOGCSP</li> <li>MIMR</li> <li>Forestry Commission</li> <li>Field visits</li> <li>CSOs and the media</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> <li>Stakeholder commitment</li> <li>Public interest</li> <li>Support systems such as national policies and legislation</li> </ul> |
| <b>Tasks:</b><br>8.5.2.1 Identify adaptive and natural resources management interventions.<br>8.5.2.2 Implement interventions to benefit interested women and men in disaster-prone locations.<br>8.5.2.3 Monitor and evaluate adaptive and natural resources management interventions.  |  |  |   |
| <b>Outcome:</b><br>Gender-sensitive sustainable practices implemented as part of reducing the impact of disasters.   |  |  |   |
| <b>Action 8.5.3: Invest in training and capacity-building programmes on gender and disaster risk management and reduction at all levels</b><br>Purpose of action: To create a critical mass of women and men with capacities and expertise in gender-responsive disaster risk management and offer opportunities to respond to women's needs and priorities at all levels of disaster risk management. |  |  |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b> <ul style="list-style-type: none"> <li>Training and capacity-building in gender -responsive disaster risk reduction scaled up.</li> <li>A number of women and men</li> </ul>  | <ul style="list-style-type: none"> <li>Training manuals</li> <li>Evaluation reports</li> <li>Workshop reports</li> <li>Audio-visual and other training aids</li> <li>Impact assessment report</li> </ul> | <ul style="list-style-type: none"> <li>NADMO</li> <li>MOGCSP</li> <li>MIMR</li> <li>CSOs</li> <li>The media</li> </ul>   | <ul style="list-style-type: none"> <li>Funding available</li> <li>Stakeholder commitment</li> <li>Public interest</li> </ul>  |

| benefit from the training and are also able to replicate the training.  |  | <ul style="list-style-type: none"> <li>Workshop participants</li> </ul>   |  |
|---|--|---|--|
| <b>Tasks:</b><br>8.5.3.1 Identify training needs of women and men.<br>8.5.3.2 Develop relevant training materials.<br>8.5.3.3 Publish hard and soft audio-visual materials.<br>8.5.3.4 Hold training-of-trainers workshops to benefit women and men based on selection criteria.<br>8.5.3.5 Organize replication workshops across the country.  |  |   |  |
| <b>Outcomes:</b><br>I. Gender-sensitive training materials on disaster risk management produced.<br>II. Capacity of gender-sensitive disaster risk management trainers strengthened.  |  |   |  |
| <b>Action 8.5.4: Implement a gender-sensitive community education initiative on early warning systems and hazard management</b><br>Purpose of action: To ensure that the knowledge of both women and men is taken into account in the development of early warning systems and hazard management and that public education programmes use them to enhance gender responsiveness.                    |  |   |  |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
| <b>Output:</b> <ul style="list-style-type: none"> <li>Gender sensitive information and communications technology (ICT) tools and methods are used to develop early warning systems and hazard management interventions.</li> <li>Women's knowledge is factored into the development of early warning systems and hazard management.</li> <li>Public education and awareness is enhanced.</li> </ul> | <ul style="list-style-type: none"> <li>Number and types of gender-sensitive ICT materials developed</li> <li>Ideas and images reflecting women's knowledge</li> <li>List of beneficiary groups and institutions of the programme</li> <li>Reports of actual participation of both women and men</li> </ul> | <ul style="list-style-type: none"> <li>NADMO</li> <li>MOGCSP</li> <li>MIMR</li> <li>CSOs</li> <li>The media</li> <li>Meteorological services</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> <li>Stakeholder commitment</li> <li>Public interest</li> <li>Willingness to involve women and use their knowledge</li> </ul> |



**Tasks:**

- 8.5.4.1 Hold consultations with women and men on their current methods of gauging forthcoming dangers and of dealing with hazards management.
- 8.5.4.2 Develop gender-sensitive early warning and hazard management systems using ICT tools.
- 8.5.4.3 Mount public education campaigns at all levels in the country on gender-sensitive early warning systems.

**Outcomes:**

- I. Public awareness of the gender-dependent nature of disaster risk reduction is created throughout the country.
- II. Women's knowledge is validated and used.
- III. Gender-sensitive early warning and hazard management systems are in place.

**Action 8.5.5: Address social, legal, cultural and economic inequalities that increase the risks and impacts of disasters**

Purpose of action: To support the implementation of existing laws and regulations on discriminatory practices against women that can exacerbate the impact of disasters.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|--|---|---|--|
| <b>Outputs:</b> <ul style="list-style-type: none"> <li>Inter-agency consultations organized</li> <li>Action plan developed to facilitate the implementation of existing laws and regulations on discrimination against women</li> <li>Laws and regulations on discriminatory practices against women enforced</li> </ul> | <ul style="list-style-type: none"> <li>Reports of consultations</li> <li>Action plan document</li> <li>Court cases</li> </ul> | <ul style="list-style-type: none"> <li>NADMO</li> <li>MOGCSP</li> <li>MIMR</li> <li>CSOs</li> <li>The media</li> <li>NCCE</li> <li>Parliament</li> <li>Attorney General's Department</li> <li>Courts</li> </ul> | <ul style="list-style-type: none"> <li>Funding available</li> <li>Stakeholder commitment</li> <li>Public interest</li> <li>Willingness of agencies to collaborate</li> <li>Women's groups are actively involved</li> </ul> |

**Tasks:**

- 8.5.5.1 Hold consultations to agree on a strategy for collaboration.
- 8.5.5.2 Develop an action plan to facilitate collaboration on implementation of laws and regulations on discriminatory practices against women.
- 8.5.5.3 Enforce implementation of the laws and regulations on discriminatory practices against women.

**Outcome:**

- I. Women and men have equal chances of experiencing minimized impacts of disasters and participating in disaster risk reduction.

## Summary

### Timeline for Actions to be taken on Programme Areas

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 8: Gender and Climate Change  |  | Lead Organization     | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$  |
|---|--|-----------------------|------|---|------|---|------|---|------|---|------|---|------|---|----------------------|
| Programme Area and Actions  |  |                       | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                      |
| <b>Programme Area 8.1: Gender-responsive climate change research</b>  |  | <b>MOGCSP and EPA</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>18,000,000</b>    |
| 8.1.1   | Identify key gender- and climate change-related themes for research, and design research methodology through participatory approaches (e.g., vulnerability to hazards and long-term climate change), |                       | x    | x |      |   |      |   |      |   |      |   |      |   |                      |
| 8.1.2   | Build capacity in gender and climate change research.  |                       |      |   | x    |   |      |   |      |   |      |   |      |   |                      |
| 8.1.3   | Undertake research, including fieldwork and sex-disaggregated data analysis.   |                       |      |   | x    | x |      |   |      |   |      |   |      |   |                      |
| 8.1.4   | Develop strategies for the dissemination and implementation of gender-sensitive data by organizing validation workshops.   |                       |      |   |      |   | x    |   |      |   |      |   |      |   |                      |
| 8.1.5   | Disseminate research results.  |                       | x    | x | x    | x | x    |   |      |   |      |   |      |   |                      |
| <b>Programme Area 8.2: Livelihood protection, alternative and sustainable livelihoods and poverty reduction</b> |  | <b>MOGCSP and GSS</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>1,800,000,000</b> |
| 8.2.1   | Develop criteria to identify and map gender-specific vulnerable groups and individuals who are likely to be worst affected by climate change.  |                       | x    |   |      |   |      |   |      |   |      |   |      |   |                      |
| 8.2.2   | Identify and register nature of vulnerability, and livelihood needs, gaps and interventions, according to gender.  |                       |      | x |      |   |      |   |      |   |      |   |      |   |                      |
| 8.2.3   | Develop new interventions and improve and scale up existing ones, through gender-responsive consultations and approaches to address identified needs to build resilience and sustainability.         |                       |      |   | x    | x | x    |   |      |   |      |   |      |   |                      |
| 8.2.4   | Implement interventions, including continuous monitoring and evaluation and also the impact assessment of climate change from a gender perspective.  |                       |      |   |      |   | x    |   |      |   |      |   |      |   |                      |

|  |  |                               |   |   |   |   |   |   |   |   |   |   |   |   |  |                   |
|--|--|-------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|--|-------------------|
| <b>Programme Area 8.3: Gender responsiveness in natural resource management</b>                                    |  | <b>MLNR and GSS</b>           |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>50,000,000</b> |
| 8.3.1  | Create a sex-disaggregated database on access to and control over natural resources.   |                               | x | x | x | x |   |   |   |   |   |   |   |   |  |                   |
| 8.3.2  | Scale up existing initiatives that promote women's access to and control over natural resources.   |                               | x | x | x | x | x | x | x | x | x | x | x |   |  |                   |
| 8.3.3  | Harness and use the knowledge of both women and men, including traditional knowledge on the management of natural resources.   |                               | x | x | x | x | x | x | x | x | x | x | x |   |  |                   |
| 8.3.4  | Initiate and build new programmes to enhance and safeguard women's interest in, access to and control over natural resources.  |                               | x | x | x | x | x | x | x | x | x | x | x | x |  |                   |
| <b>Programme Area 8.4: Gender-sensitive education, training and capacity-building on gender and climate change</b> |  | <b>MOGCSP and MIMR</b>        |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>17,000,000</b> |
| 8.4.1  | Conduct gender-sensitive education, training and capacity-building for women, men, girls and boys on climate change adaptation, finance, mitigation, technology, and regulatory frameworks, and for institutions that deal directly with women and their groups. |                               |   |   |   |   | x | x | x | x | x | x | x | x |  |                   |
| 8.4.2  | Educate the general public and train and build the capacities of institutions in the area of gender and climate change.  |                               | x | x | x | x | x | x | x | x | x | x | x | x |  |                   |
| <b>Programme 8.5: Gender-responsive disaster risk reduction and management</b>                                     |  | <b>NADMO, MOGCSP and MIMR</b> |   |   |   |   |   |   |   |   |   |   |   |   |  | <b>13,000,000</b> |
| 8.5.1  | Review existing policies, programmes and projects on gender and climate-related disaster risks.  |                               | x | x | x | x | x | x | x | x | x | x | x | x |  |                   |
| 8.5.2  | Implement interventions that address gender-specific resource use patterns that can degrade the environment.   |                               | x | x | x | x | x | x | x | x | x | x | x | x |  |                   |
| 8.5.3  | Invest in training and capacity-building programmes on gender and disaster risk management and reduction at all levels.  |                               | x | x | x | x | x | x | x | x | x | x | x | x |  |                   |
| 8.5.4  | Implement a gender-sensitive community education initiative on early warning systems and hazard management.  |                               | x | x | x | x | x | x |   |   |   |   |   |   |  |                   |
| 8.5.5  | Address social, legal, cultural and economic inequalities that increase the risks and impacts of disasters.  |                               | x | x | x | x | x | x |   |   |   |   |   |   |  |                   |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 8: Gender and Climate Change</b>  | <b>Lead Org</b>               | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 8.1: Gender-responsive climate change research</b>   | <b>MOGCSP and EPA</b>         | 1,000,000   | 15,000,000  | 2,000,000   |             |             |             | <b>18,000,000</b>          |
| <b>Programme Area 8.2: Livelihood protection, alternative and sustainable livelihoods and poverty reduction</b>    | <b>MOGCSP and GSS</b>         | 100,000,000 | 700,000,000 | 400,000,000 | 400,000,000 | 190,000,000 | 10,000,000  | <b>1,800,000,000</b>       |
| <b>Programme Area 8.3: Gender responsiveness in natural resource management</b>                                    | <b>MLNR and GSS</b>           | 5,000,000   | 5,000,000   | 15,000,000  | 10,000,000  | 10,000,000  | 5,000,000   | <b>50,000,000</b>          |
| <b>Programme Area 8.4: Gender-sensitive education, training and capacity-building on gender and climate change</b> | <b>MOGCSP and MIMR</b>        | 1,000,000   | 3,000,000   | 4,000,000   | 4,000,000   | 4,000,000   | 1,000,000   | <b>17,000,000</b>          |
| <b>Programme Area 8.5: Gender-responsive disaster risk reduction and management</b>                                | <b>NADMO, MOGCSP and MIMR</b> | 1,000,000   | 2,000,000   | 4,000,000   | 1,000,000   | 3,000,000   | 2,000,000   | <b>13,000,000</b>          |



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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### **Policy Focus Area 9: Climate Change and Migration**

## Policy Focus Area 9: Climate Change and Migration

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### Introduction

Migration is an important climate change plan for both the poor and non-poor in Ghana. As a reaction to the threat of climate change, migrants tend to leave environmentally fragile areas for ones that are more ecologically sound, or move to urban areas where they mostly join the informal sector. The northern savannah is the origin of the highest rate of internal migration, mostly to the transition and forest zones.

Climate change redefines the types, driving forces and outcomes of migration, thereby affecting the migration-development nexus. Migration is the product of the combination of economic, political, demographic, social and environmental factors. Of these, economic and social factors are perceived as having the greatest effect on the volume and patterns of migration, although the interactions between these driving forces are equally important in determining the outcomes of migration.

Climate change will affect migrants at their destinations. Migrants moving to cities are often among the most vulnerable. The situation of migrants is given scant attention in urban planning; they tend to be low-skilled and live in concentrated numbers in high-density housing and in informal settlements, all of which potentially makes them even more vulnerable. This vulnerability includes increasing incidences of diseases, unemployment, limited availability of and access to basic services, greater pressure on infrastructure and conflicts, and loss of labour in the areas from where the migration originated. Migration is an important livelihood and developmental strategy that needs to be managed and supported.

### Principles and Challenges

#### *Key principles*

- Carefully planned and proactive migration can represent a significant and effective adaptation to potentially difficult conditions;
- Climate change will have varying degrees of influence on the different driving forces behind migration;
- Migration, including that influenced by climate change, can amplify political or geopolitical problems, and in particular can raise tensions and exacerbate conflict in destination areas.

#### *Challenges*

- Absence of an institutional regulatory framework for the effective management of migration for development;
- Increasing trend of irregular migration, which can result in the loss of lives;
- Very limited involvement of migrants in development activities;
- Structural differences between urban and rural areas in health care and education;
- Tensions and conflict over resources, natural and otherwise;
- Lack of access by migrants to basic social services such as health care and education;
- Lack of security for migrants;
- Poor links between source and destination areas;
- Increased trend in independent migration by children;
- Inadequate coordination of climate-induced migration by the relevant authorities.

### Policy Objectives

The objectives of this policy option are to:

- Ensure that migrants have equal opportunities to enjoy the economic and social amenities at destination locations that they need in order to adapt to climate change;
- Promote development and resilience in the sites of both origin and destination.

### **Policy Actions**

The Government will achieve this objective by the following key interventions:

- Conducting vocational training – especially for youth – in places with high immigration and potential migrants;
- Investing in agriculture in vulnerable areas to help curb rural-urban migration, such as by developing and promoting crops and livestock that are pest and drought resistant, encouraging the use of early yielding crops and, where culturally acceptable, irrigation;
- Facilitate flows of remittances, goods and services between source and destination locations;
- Targeting social assistance and including migrants in the social safety nets;
- Improving access to microcredit for migrants;
- Promoting alternative livelihood programmes in order to develop the skills of people living in rural areas;
- Facilitating the proper use of rural and peri-urban lands by improving land use and land management schemes;
- Setting up social protection for migrants;
- Mainstreaming migration policy into national development frameworks;
- Establishing a national institution for the management of migration for development;
- Enforcing the rules and regulations covering housing and sanitation in migrant societies.

### **Strategies on mainstreaming thematic programmes and actions on climate change and migration into national policy planning and budgetary processes**

This section outlines strategies for mainstreaming the six identified thematic programmes into processes for national policy planning and estimated costing. It systematically outlines the processes of identifying targets and evaluating the impacts of climate change, and of the awareness and capacity of institutions. It also covers evaluating the possible impacts of the mainstreaming process, and developing strategies and mechanisms for mainstreaming climate change and migration policies.

### **Alternative livelihoods**

Livelihood diversification reduces vulnerability to climate change by ensuring the spread of risks over several areas. Reliance on several sources of income will therefore improve the security and wellbeing of migrants, particularly of those whose incomes are dependent on climate-sensitive resources and those living under poor housing conditions and in flood-prone areas in urban centres. In order to mainstream alternative livelihoods as a major strategy for improving the well-being of migrants, combined efforts by the following sectors and organizations are needed: the Ministry of Finance and Economic Planning (MoFEP), the National Development Planning Commission (NDPC), the Ministry of Food and Agriculture (MoFA), ministries, departments and agencies, Metropolitan, Municipal and District Assemblies (MMDAs), and civil society organizations. Livelihood activities can be specified by area and sector. In line with the medium-term development plan, MoFEP should incorporate the policy objectives and estimated costs from the ministries and metropolitan and districts assemblies of various sectors. To ensure efficiency, the NDPC needs to coordinate the various sector ministries, Metropolitan, Municipal and District Assemblies and civil society organizations so as to avoid duplication. Since livelihood

activities are specified by area, according to natural resource base, level of urbanization and other characteristics, there should be an appropriate level of implementation by the district assemblies aided by sector ministries and civil society organizations on the ground.

Since most Metropolitan, Municipal and District Assemblies already have climate change factors incorporated into their development plans, integrating alternative livelihood programmes by extension represents a major opportunity. Local development strategies and plans should detail alternative livelihood programmes that provide an opportunity for migrants and would-be migrants to enable them to cope with and adapt to the impact of climate change. Adverse climate change will have negative impacts on existing livelihoods, especially those that are climate dependent such as agriculture, leading to a loss of jobs and income for people who are employed in those sectors. This is likely to exacerbate poverty and increase social hardship in the country. It may also cause people to move to urban areas to search for non-existent jobs in other sectors, resulting in people settling and eking out livelihoods in hazardous areas. Providing alternative livelihoods will therefore be a major policy initiative that will minimize the social impacts of climate change.

Implementation of this programme requires the capacities of the institutions to be strengthened. Local development agents such as MMDAs and civil society organizations must collaborate among themselves, the information services department and the media to increase their capacity. This will raise awareness and improve the capacity for mainstreaming the diversification of livelihoods as a major policy goal in response to climate change and migration.

The mainstreaming process will improve institutional coordination, and increase efficiency in programme planning and implementation and in estimated costing processes. However, it may lead to the loss of institutional specialization especially among non-governmental

organizations (NGOs) if an appropriate division of labour is not implemented.

The NDPC should coordinate the process of mainstreaming alternative livelihoods as a major adaptive strategy. The NPDC should send out guidelines to respective MMDAs and civil society organizations. Inputs and programmes from participating organizations should be collated by the NDPC into a comprehensive national programme and submitted to MoFEP for budgetary support. In the first two years of implementation, the structures (that is, training centres, credit facilities, training of trainers, etc.) should be set up, to be followed by full-scale implementation of the programme.

### **Social protection for the migrant poor**

The impact of climate change on hosts and migrants is uneven with the latter being the most negatively affected because they usually occupy and cultivate marginal lands and flood-prone areas. They also do not have the basic information required to live a dignified life in the destination locations. Thus, mainstreaming social protection into development planning will enhance the living standards of migrants and ensure peace and security in the destination areas. Mainstreaming this programme will involve key sectors of the economy such as the Ministry of the Interior, National Health Insurance Authority, the Department of Social Welfare, the National Commission for Civic Education (NCCE), Ministry of Works, Water Resources and Housing, MMDAs, traditional authorities and NGOs – especially those involved in migration and human rights issues. The Department of Social Welfare is to lead this exercise as a coordinator and provider of information to the migrants by setting up an advice bureau and through the Information Services Department and the media.

Climate change that results in people moving will lead to rapid population growth in the destination areas. The increasing number of people could bring about a greater demand for goods and services in



these areas and boost economic activities. It will increase competition for the use of resources, with the marginalized – especially the poor migrants – pushed to hazardous areas. If this is not managed well it could lead to instability, thereby disrupting economic growth. It could also result in demand exceeding supply, and bring about inflation and a high cost of living, thus impoverishing the marginalized.

Although there is a general awareness of migration, there is no institution or organization set up to deal with migrants – especially in relation to social protection. This implies that the capacity to deal with social protection is virtually non-existent. This is most probably because the welfare of migrants has not been given serious thought in the development agenda of the country. Migrants have a special need for information, including on accommodation, job openings, issues of health and on their rights to a decent and dignified life and associated responsibilities. Thus building institutional capacity is necessary for the realization of this objective.

Mainstreaming the social protection programme will lead to capacity-building for the various institutions to collect and disseminate information relevant to migrants including information about the support services available, and how and where to access them. It could also lead to increased awareness of the rights and responsibilities of migrants in their destination areas, resulting in improved sanitation and healthier living conditions of migrants and enhanced peace and development in the host areas. However, the mainstreaming process could result in the abuse or misuse of the rights and responsibilities of migrants and lead to migrants insisting on their rights as they see them, and this could derail the peace.

As a lead institution coordinating this exercise, the Department of Social Welfare should set up an information desk to collect and provide information to prospective and current migrants that will improve their lives in destination locations. The provision of such information could be done by distributing flyers and through the

media and information services departments in the various districts. It should also prepare and integrate cost estimates from the various districts and from participating organizations and submit them to the MoFEP for budgetary support. It is expected that by the end of the first year of implementation an information desk will have been set up and baseline data collected. Subsequently workshops, theatre and other instruments should be devised and used for public education alongside the collection and dissemination of basic information of particular importance to migrants. An annual cost estimate should be drawn up and submitted to the MoFEP for support.

### **Structures to enhance dialogue and migrant integration into host societies so as to prevent or minimize conflict**

Climate change is expected to exacerbate already existing problems and be a burden on natural resources. This will lead to increased competition for non-climate-sensitive resources, which may result in conflicts and instability. Enhancing peace and avoiding conflict through establishing and/or enhancing structures for dialogue among host and migrant communities must therefore be seen as imperative to ensuring the well-being of migrants. Peacebuilding between migrants and established local populations can be a very difficult task. This process of peacebuilding must therefore be all-inclusive, meticulous and gradual. The Ministry of the Interior should champion the process, assisted by the Department of Social Welfare. The process should include all major sectors of the economy: the Department of Social Welfare, security services, regional and district planning authorities, local chiefs, NGOs and civil society organizations, indigenous communities and migrants, and political parties. To begin with, hotspots and key receiving areas should be given urgent attention, while managing other areas so as to ensure peace and stability.

As climate change will reduce resource potential, and is likely to result in tensions and conflict over natural resources and other sources

of livelihood, with many people leaving their homes for major cities or other favourable areas, mainstreaming and implementing peacebuilding policies is essential to help to prevent conflict over resources and promote peace and development. The fact that migration is a relatively new subject in the planning process in Ghana presents a serious challenge to mainstreaming programmes in this area, particularly given that there is no national policy on migration. This therefore requires a series of workshops and interactions of relevant partners to improve their understanding of the concepts and ideas in migration literature and practice. Conflict resolution committees should be set up at the community level to resolve conflicts and serve as peer educators on the need for peaceful co-existence by the end of the first year of implementation. Instruments for peacebuilding such as audio-visual materials, drama, song, etc., should be produced and disseminated through the media and cinemas.

#### **Enhance migrants' access to health and education**

Access by all Ghanaians to good health and education has been a continuous policy goal throughout the history of the country. Health and educational benefits have not been specifically targeted for migrants, however, because it has always been assumed that all and sundry will automatically benefit equally from the State provision of public goods. The realization that migrants may be a special group who are excluded from national-level processes demands conscious efforts to mainstream policy that takes care of their special needs and encourages their participation. By enhancing migrants' access to health and education, the country will be removing one of the major sources of social vulnerability of this group, and building the individual capabilities of migrants.

Mainstreaming this policy goal will need the participation of the Ministry of Health, Ministry of Education, NGOs, and donor agencies. Ultimately, MoFEP should mainstream the cost estimating process so as to avoid duplication and increase efficiency through the

appropriate division of labour and integrative implementation. Proposals for programmes targeted at donors must be defined by area so as to allow for wider coverage without overlapping by different donors.

There needs to be a greater awareness among the ministries of the sectors indicated above of the plight of migrants. NGOs and District Assemblies are important sources of information on the plight of migrants and their specific needs. In some instances, strategies such as school meals and free uniforms are effective, while the mass free registration of poor migrants for national health insurance and health education enhances migrant access patterns. Research units could possibly be set up in the ministries of the two sectors, which, using the ministries' monitoring and evaluation facilities, would investigate the extent to which different social groups are able to access these services, especially those from migrant communities.

The possible impacts of mainstreaming migrant needs into sectoral plans include wider outreach by the ministries to the excluded poor, increased efficiency via specific targeting of the needs of these communities, and allowance for special donor-assisted programmes. A possible negative impact will be the stretching of the budget and the inability of mainstream units to deal with such an idiosyncratic programme.

Targeting migrant communities in the provision of quality health and education needs a systematic approach involving a specific understanding of the issues in different local development areas. Regional offices of the ministries of education and health should report on the issues in their areas of jurisdiction, for coordination into a national action plan that is geographically disaggregated. Proposals containing area development strategies, using best examples and their respective costs, should be presented simultaneously to the national cost estimating process and the donors. Funds from both donors and

the State budget should be administered by MoFEP to be used for implementation in the bodies in the agreed local development areas.

The various sector ministries are already involved in trying to improve access to basic services by increasing infrastructure and implementing measures to reduce their cost. It is recommended that these efforts be continued with greater focus on migrants and their children, since these people have special needs. It is therefore recommended that the Government and donor partners should increase funding in the sectors to enhance the well-being of the citizenry – especially the migrants. More schools and health facilities and other interventions such as the school meals programme, free uniforms, etc., should be made available in migrant communities so that more of their children of school-going age can be rescued from the streets and put in school.

### **Measures to enhance existing livelihoods**

Improving the living standards of migrants requires joint productivity increases in both existing and alternative livelihoods. Mainstreaming efforts at enhancing the resilience and productivity of existing livelihood strategies, especially in agriculture and non-farm sectors, forms the economic foundation for social development.

The major economic sectors should be the fulcrums around which existing livelihoods are enhanced. The target organizations include the Ministry of Food and Agriculture, the Ministry of Local Government and Rural Development, the Ministry of Employment and Social Welfare, the Bank of Ghana, the Ministry of Finance and Economic Planning and NGOs.

Climate change has impacts on existing livelihoods which are especially devastating in agriculture, given its interaction with environmental degradation, urbanization processes and liberalized imports of agricultural commodities. Local development strategies need to respond to these specific threats in order to ensure the

sustainability of the economic, social and environmental sectors. Strategies and plans by sector ministries and District Assemblies will be useless unless supporting organizations such as the Bank of Ghana and the Ministry of Finance and Economic Planning create enabling conditions that lead to their success when being locally implemented.

The possible impacts of mainstreaming measures to enhance existing livelihoods would mainly be the resultant policy incoherencies. Policy dilemmas resulting from the global prescriptions of liberalizing markets and free exchange rates can militate against those policies that seek to protect livelihoods from the devastating impacts of competition, devaluation or overvaluation. Subsidies, loans, interest rates, import duties and a host of measures can have different effects. It is important there is coordination of different policy goals and associated mechanisms with their trade-offs.

Area development is an important approach whereby sector ministries develop programmes according to the ecological and sectoral composition of appropriate spatial units in the country in collaboration with NGOs, sister ministries and district assemblies. These spatial plans should be disaggregated by sectoral plans with responsibilities and estimated costs appropriately apportioned. Demands on policy instrument changes should be clearly spelled out and communicated to the executive branch of government for appropriate action in decision-making. The implementing bodies of conditioning policies should mainstream the concerns of the sector ministries. Budgeting and financing should be handled by MoFEP with broader control being handed over to the coordinating body dealing with area development, which is composed of different organizations, including NGOs directly involved in improving the productivity of livelihoods.

In implementing this programme, government and donor partners should channel more resources into the provision of modern irrigation

schemes and educating farmers in best practices, inputs, processing and storage facilities, markets and other related infrastructure (e.g., roads). Owing to budgetary constraints, the provision of these facilities should be spread over the period of implementation in such a way that farmers will have maximum benefits.

### **Enhancing remittance flows**

Remittances are increasingly playing an important role in the improvement of livelihoods in rural areas. However, migrants still face problems with the sending of remittances. This relates to the channels through which they are sent and the costs involved. Hence ensuring the efficient, effective and low cost of transfers will improve the lives of both the migrants and their households of origin. The MMDAs, MoFEP, members of local and migrant communities, financial institutions, and telecommunications companies should be involved in the development of specific projects. The Ministry of Finance and Economic Planning should lead and coordinate strategies to attain this objective.

The various strategies should be socially inclusive. Of particular importance is social differentiation based on educational attainment, and access to infrastructure such as roads and banks needed to implement or facilitate the efficient, effective and low cost of sending remittances. Since illiteracy is still very high in the country it is important to determine a wide range of measures that would be suitable for both the literate and illiterate. In addition, mobile phone operators should be encouraged to create mobile money collection points in rural areas. These measures must, however, be accompanied by education about the various channels for sending remittances, for migrants and people in key sending areas.

Efficiency, effectiveness and low cost of sending remittances can improve the livelihoods in migrants' places of origin – particularly rural areas – and reduce vulnerability to climate change. In addition,

as migration is increasingly becoming a strategy to adapt to climate change, this could also ensure effective adaptation for areas ravaged by climate change. Ensuring that transfers are efficient, effective and cheap has the potential to increase the remittance size and flow to people in rural areas, thereby reducing the migration to key destinations.

In the first year of implementation, the structures to enhance remittance flow should be established. These will then be followed by education in the form of flyers, advertisements, mobile vans and media announcements of the various types of facilities available for sending remittances back home.

### Programme 9.1: Alternative Livelihoods

**Objective:** To facilitate the adoption of alternative sources and diversification of livelihoods to enhance well-being.

**Justification:**

Alternative livelihood sources prevent or reduce continuous dependence on unsustainable livelihood sources. They also allow for diversification, which ensures the spread of risks to several areas thereby reducing vulnerability to climate change. Reliance on several sources of income will therefore improve the security and well-being of migrants, particularly those whose incomes are dependent on climate-sensitive resources and those living under poor housing conditions and in flood-prone areas in urban centres.

**Action:**

- 9.1.1 Raise awareness of alternative livelihood sources.
- 9.1.2 Provide skills training.
- 9.1.3 Provide microcredit support.
- 9.1.4 Build institutional capacity to manage migration.

**Timeline:** 2015–2020

**Responsibilities:** Department of Social Welfare (DSW); Ministry of Employment and Labour Relations, Ministry of Finance and Economic Planning (MoFEP), National Commission on Civic Education (NCCE), Ministry of Education; civil society organizations (CSOs), non-governmental organizations (NGOs).

**Estimated Cost:** US\$20,000,000

### Programme 9.2: Social Protection for the Migrant Poor

**Objective:** To reduce vulnerability to climate change impacts.

**Justification:**

Migrants are usually among the most vulnerable in society. For example, they usually occupy and cultivate marginal areas where land becomes scarce and also often pursue unsustainable agricultural practices in a bid to maximize output. In addition, many inhabit hazard-prone areas such as those with a high risk of flooding. Generally, the impacts of climate change on hosts and migrants are therefore expected to be disproportionate with the latter being the most negatively affected. Programmes targeting the social protection of migrants will therefore inevitably reduce their vulnerability to various threats and hazards emanating from or related to climate change. This has the potential to enhance sustainable livelihood strategies pursued by migrants with the possibility of increasing their income-earning potential and remittances to their areas of origin. Remittances have been recognized as one of the key sources of survival and investment particularly in rural areas.

**Action:**

- 9.2.1 Collect and disseminate information relevant to migrants.
- 9.2.2 Promote education on citizenship rights with emphasis on migrants.
- 9.2.3 Facilitate and provide cash transfers.

**Timeline:** 2015–2020

**Responsibilities:** Ministry of Gender, Children and Social Protection (MoGCSP) and Department of Social Welfare (DSW), MMDAs; MoFEP, National Health Insurance Authority, NCCE; CSOs, NGOs.

**Estimated Cost:** US\$40,000,000

### Programme 9.3: Structures for Dialogue between Migrants and Host Communities to prevent conflicts

**Objective:** Enhance peacebuilding as a means to improve the security of migrants and their livelihood resources.

**Justification:**

Migrants are often regarded by the host community as intruders. In addition, they often compete with local populations for livelihood resources and opportunities. This, coupled with the fact that migrants often have fewer rights and less access to such resources and opportunities, often gives rise to tensions and conflicts in which migrants are normally the victims. Such tensions and conflicts have the potential to increase the vulnerability of the migrant populations to climate change as they may experience displacement or reduced access to key social amenities and livelihood resources such as those of housing and agriculture. Such a situation also has the potential to draw social support from the government thereby putting even more pressure on scarce national resources. It is therefore imperative that dialogue be promoted between the host community and migrants to prevent conflicts and resulting debilitating effects on livelihoods.

**Action:**

- 9.3.1 Promote the establishment of migrant representative committees.
- 9.3.2 Facilitate dialogue between all social groups.
- 9.3.3 Promote peace and conflict resolution at the community level.

**Timeline:** 2015–2020

**Responsibilities:** Traditional authorities and security services; political parties, DSW, District Assemblies, the Judiciary; NGOs.

**Estimated Cost:** US\$5,000,000

### Programme 9.4: Improve Access to Health and Education

**Objective:** To remove the major sources of social vulnerability and build personal capacities.

**Justification:**

Migrants, especially those moving from rural areas to urban areas, often have reduced entitlements in their host societies. In addition to the poor working and living conditions to which they are exposed – an indication of the likelihood of poor health – they also have reduced access to health care for a number of political, administrative and cultural reasons. Furthermore, most of the migrants moving into the cities have no education or skills and therefore work in the informal sector earning very little, and not enough to take care of their health needs or the educational needs of their children. If not properly catered for, some of these children may grow to become misfits in society. Thus, policies aimed at promoting the health and education of the citizenry need to be accompanied by a more general effort to reduce inequalities and to promote the full participation of these groups in mainstream society.

**Action:**

- 9.4.1 Improve health education.
- 9.4.2 Promote quality health care in rural areas and migrant communities.
- 9.4.3 Enforce compulsory education of children.

**Timeline:** 2015–2020

**Responsibilities:** Ministry of Health, Ministry of Education; Ministry of Local Government and Rural Development (MLGRD), School feeding programme, MoGCSP, Ghana Education Trust Fund; development partners, donor agencies, NGOs.

**Estimated Cost:** US\$5,000,000

### Programme 9.5: Measures to Enhance Existing Livelihoods

**Objective:** Enhance the resilience and productivity of existing livelihood strategies.

**Justification:**

People have built competences over the years on the livelihood activities that they choose according to the economics and conditions of their environment. Building on the strengths of people, rather than searching for alternatives from experts' perspectives, is a major shift in the sustainable livelihoods paradigm. Existing agricultural and non-agricultural livelihoods in the different ecological zones of Ghana are confronted by constraints that need to be addressed. Migrants need to understand new environments and adapt their knowledge systems accordingly. Multitasking is an important means of survival in seasonal and highly commercialized systems. There should be direct and indirect support of a wide range of activities engaged in by migrants and other categories of people. Enhancing the resilience of livelihood strategies to climate change and enhancing productivity will increase incomes, thereby reducing poverty. Reduced poverty also has the potential to reduce poverty-driven migration.

**Action:**

- 9.5.1 Promote and introduce other sound agricultural practices.
- 9.5.2 Improve the quality of and access to modern agricultural inputs.
- 9.5.3 Promote improved access to markets.
- 9.5.4 Develop non-agricultural small businesses.
- 9.5.5 Build the capacities of rural development partners.

**Timeline:** 2015–2020

**Responsibilities:** Ministry of Food and Agriculture (MoFA); Bank of Ghana, MoFEP, National Vocational Training Institute; CSOs, NGOs, Peasant Farmers Association of Ghana.

**Estimated Cost:** US\$10,000,000

### Programme 9.6: Measures to Enhance Remittance Flows

**Objective:** To ensure effective, efficient, regular and inexpensive transfer of remittances.

**Justification:**

Remittances play an important role in the improvement of livelihoods in the rural areas. However, remittances from migrants in urban areas to their relatives in the rural areas pass through different routes, and in some cases do not reach the intended recipients on time if at all. Most of the remittances are sent by informal means, often through somebody who is returning to the rural area. It is therefore necessary to put measures in place so that remittances sent by migrants reach their intended destinations safely and on time to alleviate the situation of people in the rural areas. This will go a long way towards improving the livelihoods of migrants and their households of origin, thereby helping to reduce rural poverty with the potential to breach rural-urban gaps in development.

**Action:**

- 9.6.1 Improve rural banking services using low-cost products and methodologies in financial service delivery.
- 9.6.2 Improve the knowledge of rural people about the use of banking services.
- 9.6.3 Enhance the use of mobile money transfer systems.
- 9.6.4 Improve transport services to rural areas.

**Timeline:** 2015–2020

**Responsibilities:** Metropolitan, Municipal and District Assemblies (MMDAs), Bank of Ghana (BOG), transport service operators; MoFEP; members of the local and migrant communities, financial institutions, telecommunications companies.

**Estimated Cost:** US\$10,000,000



## FOCUS AREA 9: CLIMATE CHANGE AND MIGRATION

### Programme 9.1: Alternative Livelihoods

| <b>Action 9.1.1: Raise awareness of alternative livelihood sources</b><br>Purpose of action: To increase knowledge of other possible sources of livelihood that could improve living conditions and well-being.  |  |   |   |
|--|--|---|---|
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Promote educational programmes on alternative livelihoods.   | <ul style="list-style-type: none"> <li>Stakeholder consultations organized</li> <li>Database on alternative livelihoods created</li> <li>Outreach unit established and functional</li> </ul>   | <ul style="list-style-type: none"> <li>Document indicating readiness for and commitment to collaboration</li> <li>An outreach desk created at the coordinating ministry or agency</li> </ul>  | <ul style="list-style-type: none"> <li>Existence of CSOs and ministries, departments and agencies with competent knowledge and practice of alternative livelihoods</li> </ul>   |
| <b>Tasks:</b><br>9.1.1.1 Collaboration with stakeholders to build capacity for engaging in alternative or diverse livelihood strategies in different environments.<br>9.1.1.2 Collection of data and sources of possible funding on alternative livelihoods.<br>9.1.1.3 Organizing outreach programmes to educate people on alternative livelihood strategies in areas of both origin and destination. |  |   |   |
| <b>Outcomes:</b><br>I. A functioning outreach unit.<br>II. Funding opportunities identified.<br>III. Diversified livelihoods of households.  |  |   |   |
| <b>Action 9.1.2: Provide skills training</b><br>Purpose of action: To provide migrants with employable and/or entrepreneurial skills.  |  |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Skills training offered to migrants and returning migrants   | <ul style="list-style-type: none"> <li>New training centres established</li> <li>More than 50 per cent of migrants trained in a skill</li> <li>Revolving fund created, number of beneficiaries employed or in self-employment</li> </ul> | <ul style="list-style-type: none"> <li>Documents indicating government and other stakeholder commitment to funding and supporting training programmes</li> <li>Database on beneficiaries</li> <li>Functional training centres in existence</li> <li>Documents establishing revolving fund and appointment of fund manager</li> <li>Report on training programmes</li> </ul> | <ul style="list-style-type: none"> <li>People are ready to learn skills to improve their employment opportunities</li> <li>There exist dozens of NGOs and bilateral agencies interested in skills training of migrants</li> </ul> |

**Tasks:**

- 9.1.2.1 Assess existing technical and vocational training schools and programmes.
- 9.1.2.2 Establish additional technical and vocational training centres.
- 9.1.2.3 Develop more relevant training programmes.
- 9.1.2.4 Enrol migrants in skills training centres and programmes.
- 9.1.2.5 Create revolving fund to offer start-up capital loans to graduated trainees.

**Outcomes:**

- I. Enhanced vocational training and new employment opportunities created.
- II. Reduced youth unemployment.
- III. Competencies of migrants enhanced.

**Action 9.1.3: Provide microcredit support**

Purpose of action: To improve the livelihoods of migrants and returning migrants through credit for setting up small-scale enterprises.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|--|--|--|--|
| <b>Output:</b><br>Small loans made accessible to migrants and returning migrants | <ul style="list-style-type: none"> <li>• Loan schemes established</li> <li>• Regional and district outfits created</li> <li>• Awareness creation workshops conducted for migrants and return migrants</li> <li>• Loans handed to approved applicants</li> <li>• At least 80 per cent of loans recovered</li> </ul> | <ul style="list-style-type: none"> <li>• Documents establishing loan scheme</li> <li>• Database indicating profiling of applicants</li> <li>• Database of beneficiaries</li> <li>• Bank transactions showing repayment of loans</li> </ul> | <ul style="list-style-type: none"> <li>• CSOs involved in migrant welfare are willing and able to support loan scheme in various ways</li> <li>• Beneficiaries have acquired relevant working skills that will enable them to use loans</li> <li>• Migrants are willing to refund loans</li> </ul> |

**Tasks:**

- 9.1.3.1 Canvass support on ideas and funding from relevant organizations.
- 9.1.3.2 Establish a loan scheme.
- 9.1.3.3 Acquire office space for microfinance project.
- 9.1.3.4 Recruit and train staff for the facility.
- 9.1.3.5 Create an account and lodge monies for the fund into that account.
- 9.1.3.6 Sensitize the people on the fund and its objectives.
- 9.1.3.7 Organize community members into farmers' groups or business groups.

**Outcomes:**

- I. The percentage of migrants compelled to engage in or remain in unsustainable and degrading livelihood conditions is reduced.
- II. Returning migrants are not compelled by lack of employment to re-migrate and engage in unsound practices.
- III. People's businesses are recapitalized and their incomes improved.
- IV. Agricultural production is increased.

**Action 9.1.4: Build institutional capacity to manage migration**

Purpose of action: To improve institutions' and human capabilities in supporting or executing programmes targeting migrants.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Increased overall capability of institutions | <ul style="list-style-type: none"> <li>• Approved cost estimates are funded</li> <li>• Scheme for capacity-building for various institutions developed</li> <li>• All employees have acquired the required qualifications or are in the process of doing so</li> <li>• Technical cooperation with at least five major development partners</li> <li>• New course modules developed</li> </ul> | <ul style="list-style-type: none"> <li>• Accountant-General vouchers</li> <li>• Approved schemes for capacity-building of institutions</li> <li>• Acquired certificates and letters of attestation of educational programmes in progress</li> <li>• Memorandum of understanding on or document indicating commitment of cooperation</li> </ul> | <ul style="list-style-type: none"> <li>• Institutions are ready to cooperate and to learn with and from other partners</li> <li>• There might be unexpected monetary constraints to fund projects based on cost estimates</li> <li>• Some employees may be trained when they are already close to retirement age</li> </ul> |

**Tasks:**

- 9.1.4.1 Train staff of institutions and partner agencies to manage migrants.
- 9.1.4.2 Train trainers of the skills training programmes.
- 9.1.4.3 Provide financial and technical assistance and infrastructure.
- 9.1.4.4 Acquire new equipment and build infrastructure.
- 9.1.4.5 Develop a scheme for enhancing institutional and human capacity in consultation with different institutions.
- 9.1.4.6 Facilitate and promote technical cooperation between stakeholders.

**Outcomes:**

Efficient functioning of institutions in the implementation of working objectives and attainment of targets.

## Programme 9.2: Social Protection for the Migrant Poor

### Action 9.2.1: Collect and disseminate information relevant to migrants

Purpose of action: To ensure that potential migrants have sufficient information on available social support services and knowledge on where and how to access these services.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|---|--|---|--|
| <b>Output:</b><br>Information desk is created and tasked to collect up-to-date information for migrants | <ul style="list-style-type: none"> <li>Information collection and dissemination programme put in place</li> <li>Office space in regional districts acquired</li> <li>Staff trained to effectively collect the information</li> <li>Awareness created of the existence of the office</li> </ul> | <ul style="list-style-type: none"> <li>National and district websites created</li> <li>Documents of information collected</li> <li>Visitors book records</li> <li>Radio and television advertisements, leaflets</li> <li>Reports</li> </ul> | <ul style="list-style-type: none"> <li>Migrants need information on support services at their destination locations</li> </ul> |

#### Tasks:

9.2.1.1 Acquire office space for the programme.

9.2.1.2 Collect the information relevant to migrants and potential migrants.

9.2.1.3 Make the public aware of the location of the office and the type of information that can be accessed.

9.2.1.4 Task the office with regularly updating the information.

#### Outcomes:

Potential migrants are well informed before they embark on their journey.

### Action 9.2.2: Promote education on citizenship rights with emphasis on migrants

Purpose of action: To enhance the security of migrants and to facilitate sustainable livelihoods.

| Output/Task/Outcome  | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|--|--|--|---|
| <b>Output:</b><br>Promote awareness of the constitutional rights of citizens and migrants. | <ul style="list-style-type: none"> <li>More than 70 per cent of the adult citizen population in the country are aware of their rights and those of national and international migrants</li> <li>All children of school-going age are engaged in an activity or activities directed towards learning their rights</li> <li>All migrants undergo introductory education on their rights and those of citizens</li> </ul> | <ul style="list-style-type: none"> <li>Reports of awareness raising</li> </ul> | <ul style="list-style-type: none"> <li>Citizens and or migrants are aware of the concept of rights</li> <li>Ghana Education Service already has related subjects on rights</li> <li>Some traditional and cultural rights and cherished practices are likely to be in conflict with constitutional rights thereby hindering understanding and acceptance of constitutional rights</li> </ul> |

**Tasks:**

- 9.2.2.1 Conduct a study on the level of awareness of citizens and internal and international migrants on their rights and responsibilities.
- 9.2.2.2 Conduct community education programmes on the rights and responsibilities of citizens and migrants.
- 9.2.2.3 Promote education on the rights of citizens and migrants in educational institutions.
- 9.2.2.4 Start educational programmes in the state media and other media outlets.
- 9.2.2.5 Conduct a short introductory programme on the rights and responsibilities of legal international immigrants.

**Outcomes:**

- I. Hosts and migrants respect each other's rights.
- II. Hosts and migrants seek appropriate redress when their rights are encroached upon or disregarded.
- III. Hosts and migrants live together in peace and harmony.

**Action 9.2.3: Facilitate and provide cash transfers**

Purpose of action: To ameliorate abject poverty, enhance social welfare and also to avoid trapped migration – where people are too poor to stay but too poor to migrate.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Cash support provided to poor and vulnerable people. | <ul style="list-style-type: none"> <li>Baseline survey on living conditions of migrants is conducted</li> <li>Cash is periodically transferred to selected vulnerable and poor people</li> <li>In the event of disasters a database indicating the most affected people is prepared within 20 days.</li> <li>Cash is handed over to selected beneficiaries within 40 days of disaster</li> </ul> | <ul style="list-style-type: none"> <li>Poverty profiles of households or individuals</li> <li>Database of all affected households or individuals</li> <li>Receipts or vouchers of cash transfers</li> </ul> | <ul style="list-style-type: none"> <li>Ghost names may be introduced as beneficiaries</li> <li>National Identification Authority will complete national identification exercise</li> </ul> |

**Tasks:**

- 9.2.3.1 Profile people living in abject poverty.
- 9.2.3.2 Periodically transfer cash to selected most poor.
- 9.2.3.3 Profile the most affected people in the wake of disasters.
- 9.2.3.4 Hand over cash to selected people.

**Outcomes:**

- I. Basic food requirements and health needs are met.
- II. Trapped migrants are able to return home or relocate.

### Programme 9.3: Structures for Dialogue between Migrants and Host Communities to prevent conflicts

| <b>Action 9.3.1: Promote the establishment of migrant representative committees</b><br>Purpose of action: To enhance effective dialogue with local populations and also ensure the effective involvement of migrants in development planning.  |   |  |   |
|--|---|--|---|
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Representative committee for migrants is established   | <ul style="list-style-type: none"> <li>National House of Chiefs agrees to establish migrant committee</li> <li>Legislation establishing committee is put in place</li> <li>At least one migrant committee is established in every district</li> </ul>   | <ul style="list-style-type: none"> <li>National House of Chiefs report on terms of operation of migrant committees</li> <li>Documents on legislation establishing migrant committees</li> </ul>  | <ul style="list-style-type: none"> <li>Migrants will be willing to accept nomination or volunteer to act as representatives</li> </ul>  |
| <b>Tasks:</b><br>9.3.1.1 Consult national and regional House of Chiefs on the practicality of the action.<br>9.3.1.2 Enable the national House of Chiefs to determine the terms of operation of the representative committee for migrants.<br>9.3.1.3 Pass legislation establishing migrant committees to select members of council. |   |  |   |
| <b>Outcomes:</b><br>I. Effective dialogue between the host and migrant populations is achieved.<br>II. Readily available structure for engaging migrants in development initiatives is created.  |   |  |   |
| <b>Action 9.3.2: Facilitate dialogue between all social groups</b><br>Purpose of action: To promote positive interaction as a cornerstone for dialogue on pertinent issues and to help address migrants' challenges in development and reduce competition with local populations over resources.                                     |   |  |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Migrant communities are represented in development planning exercises.   | <ul style="list-style-type: none"> <li>Migrants and their committees are officially recognized as stakeholders in development</li> <li>Official representation of migrant committee at meetings of regional and national House of Chiefs</li> <li>Official representation of at least one migrant committee at all District Assemblies</li> </ul> | <ul style="list-style-type: none"> <li>Legislation of local government and House of Chiefs recognizing migrants and their representative committees as legitimate development partners</li> <li>Attendance sheets of the meetings of the House of Chiefs quarterly and annual meetings of the and District Assemblies</li> </ul> | <ul style="list-style-type: none"> <li>Migrants are already involved in development planning in some areas</li> <li>Local chiefs may perceive the representation and recognition of migrants committee at higher levels as a threat to their authority and legitimacy to rule over</li> </ul> |

|   |   |   | migrants <ul style="list-style-type: none"> <li>• Migration is not mainstreamed in development planning in Ghana. This will pose operational challenges of how to involve migrants</li> </ul>      |
|---|---|---|--|
| <b>Tasks:</b><br>9.3.2.1 Promote the recognition of the role of migrants in development by government and development partners.<br>9.3.2.2 Promote hosts' recognition of migrants as development partners.<br>9.3.2.3 Ensure that the migrants committee or the Migrants' Representative Council are represented in development planning consultation and implementation. |   |   |  |
| <b>Outcomes:</b><br>I. Migrants are accepted in host communities.<br>II. Legitimacy of migrants representatives is enhanced.<br>III. Enhanced dialogue between host and migrants.<br>IV. Conflict resulting from resource competition is minimized or avoided.  |   |   |  |
| <b>Action 9.3.3: Promote peace and conflict resolution at the community level</b><br>Purpose of action: To strengthen peacebuilding efforts and sustain the gains for peace and development in Ghana.   |   |   |  |
| Output/Task/Outcome   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
| <b>Output:</b><br>Peacebuilding and conflict transformation (prevention, management and resolution) capacities of actors and institutions are strengthened and in place and operational   | <ul style="list-style-type: none"> <li>• Conflict resolution committees are put in place</li> <li>• Members are trained</li> <li>• Committees are resourced to enable them to function</li> </ul> | <ul style="list-style-type: none"> <li>• Number of communities engaging in interfaith dialogues, healing and reconciliation initiatives</li> <li>• Number of disputes and conflicts peacefully settled</li> <li>• Training reports</li> </ul> | <ul style="list-style-type: none"> <li>• Peaceful coexistence will promote rural development and enhance livelihoods</li> <li>• Stakeholders are committed to the peacebuilding process</li> </ul> |
| <b>Tasks:</b><br>9.3.3.1 Identify key stakeholders for committee formation.<br>9.3.3.2 Set up committees at the local level.<br>9.3.3.3. Train stakeholders on peace and conflict management.<br>9.3.3.4 Committees to conduct awareness-raising and advocacy on peace.   |   |   |  |

**Outcomes:**

- I. Forced migration resulting from conflicts is reduced.
- II. Development of rural areas is achieved.

**Programme 9.4: Improve Access to Health and Education****Action 9.4.1: Improve health education**

Purpose of action: To reduce the incidence of avoidable diseases and ensure that early health care is sought by patients.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Enhance basic knowledge on hygiene and disease. | <ul style="list-style-type: none"> <li>Nationwide health education programmes conducted</li> <li>Increased voluntary testing of diseases such as HIV, hepatitis B, etc.</li> </ul> | <ul style="list-style-type: none"> <li>Completed activity schedule of health education units or consultants</li> <li>Records of health centres on voluntary testing for diseases</li> <li>Evaluation reports of programme</li> </ul> | <ul style="list-style-type: none"> <li>People have the facilities and opportunities to practice good hygiene and lifestyles</li> </ul> |

**Tasks:**

- 9.4.1.1 Promote outreach health education to communities on hygienic practices.
- 9.4.1.2 Educate people on the nature and spread of disease.
- 9.4.1.3 Encourage early health-seeking behaviour.
- 9.4.1.4 Campaign for voluntary testing of key diseases so as to obtain early attention.

**Outcome:**

Decline in general levels of morbidity and mortality.

**Action 9.4.2: Promote quality health care in rural areas and migrant communities**

Purpose of action: To ensure that the poor have access to health care and thereby reduce vulnerability to climate change.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Quality health care is provided to the rural and migrant communities. | <ul style="list-style-type: none"> <li>Mobile health-care delivery is introduced and strengthened</li> <li>Incentives are put in place to encourage health professionals to accept postings to rural areas</li> </ul> | <ul style="list-style-type: none"> <li>Rural or outreach health department</li> <li>Inducement policy or package</li> </ul> | <ul style="list-style-type: none"> <li>Rural areas and migrant communities lack access to health care</li> </ul> |



**Tasks:**

- 9.4.2.1 Provide mobile health care services to rural areas and migrant communities.
- 9.4.2.2 Collaborate with traditional medical practitioners to improve the quality of traditional medicine.
- 9.4.2.3 Train more traditional birth attendants in communities.
- 9.4.2.4 Improve sanitation in migrant communities.
- 9.4.2.5 Ensure access to food that is of good quality and nutritious.

**Outcomes:**

- I. Increased access to health care services.
- II. Cost of health care is reduced.

**Action 9.4.3: Enforce compulsory education of children**

Purpose of action: To provide migrants and potential migrants with formal education and skills.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|---|--|---|--|
| <b>Output:</b><br>Free compulsory and basic education is effectively implemented. | <ul style="list-style-type: none"> <li>• Enrolment rates of schools are increased</li> <li>• Social interventions are efficiently implemented</li> <li>• Teaching aids are provided</li> </ul> | <ul style="list-style-type: none"> <li>• Enrolment reports</li> <li>• Contract document</li> <li>• Revised curricula</li> <li>• Increased number of schools benefiting from school feeding programme</li> </ul> | <ul style="list-style-type: none"> <li>• Migrants lack opportunities to receive basic education and skills training</li> </ul> |

**Tasks:**

- 9.4.3.1 Increase school feeding programmes and other social interventions to cover all public schools.
- 9.4.3.2 Train more teachers and motivate teachers to work.
- 9.4.3.3 Provide educational materials and tools for teaching.
- 9.4.3.4 Institute incentives for teachers in rural areas.
- 9.4.3.5 Increase vocational and technical training centres and institutes to take the majority of the junior high school leavers.
- 9.4.3.6 Strengthen the inspectorate unit of the Ghana education service.
- 9.4.3.7 Decentralize school feeding at the local level and enable schools to buy foodstuffs directly from farmers and stores for this purpose.
- 9.4.3.8 Make the public aware of the need to send their children to school.
- 9.4.3.9 Introduce various kinds of educational competition programmes and talent shows and organize educational fairs at all levels.

**Outcomes:**

- I. More people are provided with skills.
- II. Migrants and potential migrants have the skills needed for the job market in the urban areas.

## Programme 9.5: Measures to Enhance Existing Livelihoods

### Action 9.5.1: Promote and introduce other sound agricultural practices

Purpose of action: To increase agricultural productivity while maintaining the integrity of the environment and ensuring the production of quality food and other produce for consumption.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Best practices for agricultural production are introduced and adopted by farmers  | <ul style="list-style-type: none"> <li>• Good farming systems are promoted or put in place</li> <li>• Waste water is treated for use in vegetable farming in urban areas</li> <li>• Policies developed to preserve land for urban agriculture</li> <li>• Storage facilities and preservation methods developed</li> </ul> | <ul style="list-style-type: none"> <li>• Number of farmers maintaining and or adopting improved method</li> <li>• Policy documents</li> <li>• Number of wastewater treatment plants</li> <li>• Land tenure policy</li> </ul> | <ul style="list-style-type: none"> <li>• Traditional farming systems need to be modernized</li> <li>• Urban agriculture will contribute to increased incomes of migrants</li> <li>• Indigenous people and tenant farmers in peri-urban and rural areas have some secured tenancy to encourage them to invest in their land and stay to work, thus reducing migration</li> </ul> |
| <b>Tasks:</b><br>9.5.1.1 Train farmers on land preparation and the use of agro-chemicals.<br>9.5.1.2 Provide facilities for treating wastewater for urban and peri-urban agriculture.<br>9.5.1.3 Strengthen the land tenure systems.<br>9.5.1.4 Engage the major stakeholders, especially the traditional authorities and landowners, on the need to preserve agricultural lands.<br>9.5.1.5 Enforce land-use planning schemes.<br>9.5.1.6 Provide facilities to harvest rainwater and run-off water for agricultural activities. |   |  |   |
| <b>Outcomes:</b><br>I. Eliminated use of polluted wastewater.<br>II. Production of healthy food.<br>III. Increased confidence in and consumption of locally produced vegetables.<br>IV. Urban flooding is reduced as a result of decreased run-off.<br>V. Land is preserved for agriculture (i.e., urban and peri-urban land).<br>VI. Soil erosion is reduced.  |   |  |   |

**Action 9.5.2: Improve the quality of and access to modern agricultural inputs**

Purpose of action: To increase agricultural production.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b><br>Agricultural inputs are available and easily accessed.  | <ul style="list-style-type: none"> <li>• Outlets for agricultural inputs increased</li> <li>• Inputs are readily available</li> </ul>  | <ul style="list-style-type: none"> <li>• Number of new outlets established</li> <li>• Procurement documents of inputs</li> <li>• Records of stock of distribution outlets</li> </ul> | <ul style="list-style-type: none"> <li>• Agricultural inputs are difficult to obtain</li> <li>• Farmers' productivity is low because of lack of inputs</li> </ul> |
| <b>Tasks:</b><br>9.5.2.1 Open more office where agricultural inputs can be obtained.<br>9.5.2.2 Provide inputs at subsidized rates.<br>9.5.2.3 Provide structures providing credit for inputs.<br>9.5.2.4 Ensure timely distribution of inputs.<br>9.5.2.5 Ensure that inputs do not run out. |  |  |   |
| <b>Outcome:</b><br>Agricultural productivity increases.   |  |  |   |
| <b>Action 9.5.3: Promote improved access to markets</b><br>Purpose of action: To ensure that farmers get equitable returns on their investment, thereby increasing household incomes.   |  |  |   |
| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
| <b>Output:</b><br>Market centres built and upgraded.  | <ul style="list-style-type: none"> <li>• New market centres built and operating effectively</li> <li>• Efficient transport systems put in place</li> <li>• Markets and road infrastructure maintained</li> </ul> | <ul style="list-style-type: none"> <li>• Contract documents</li> <li>• Price policy document</li> <li>• Maintenance schedule</li> </ul>  | <ul style="list-style-type: none"> <li>• Sufficient market demand and adequate prices for produce exist</li> </ul>  |

**Tasks:**

- 9.5.3.1 Construct new markets.
- 9.5.3.2 Upgrade existing markets.
- 9.5.3.3 Construct roads to link markets to production areas.
- 9.5.3.4 Promote the consumption of local foods.
- 9.5.3.5 Formulate policies to regulate prices.
- 9.5.3.6 Maintain markets and roads regularly.

**Outcomes:**

- I. Farmers get good prices for goods produced.
- II. Reduction of post-harvest losses.
- III. Incomes of farmers increased.
- IV. Reduction in poverty-driven rural-urban migration.

**Action 9.5.4: Develop non-agricultural small businesses**

Purpose of action: To enhance existing non-agricultural businesses in order to increase the incomes of the people.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|---|--|---|--|
| <b>Output:</b><br>Non-agricultural enterprises formed and registered properly | <ul style="list-style-type: none"> <li>• Small-scale enterprises properly registered</li> <li>• Small-scale businesses organized into associations and functioning effectively</li> <li>• Management and business plan development <ul style="list-style-type: none"> <li>• Capacities of small-scale enterprises built</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Records of Registrar General</li> <li>• Number of associations formed</li> <li>• Minutes of meetings of associations</li> <li>• Workshop reports on training</li> <li>• Business plan developed</li> </ul> | <ul style="list-style-type: none"> <li>• Small-scale businesses are willing to participate</li> <li>• Small-scale enterprises lack basic business management skills</li> </ul> |

**Tasks:**

- 9.5.4.1 Register small enterprises.
- 9.5.4.2 Organize small enterprises into groups.
- 9.5.4.3 Organize training workshops to build the capacities of small enterprises on business management.
- 9.5.4.4 Guide small enterprises to develop business plans.
- 9.5.4.5 Provide credit to small enterprises.

**Outcomes:**

- I. Business operations improved.
- II. Employment opportunities created.
- III. People's incomes are increased.

**Action 9.5.5: Build the capacities of rural development partners**

Purpose of action: The purpose of this action is to ensure that the Government and the private sector partners effectively to support sustainable agriculture and economic development.

| Output/Task/Outcome  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|--|--|---|--|
| <b>Output:</b><br>Capacity of rural development organizations and agencies strengthened. | <ul style="list-style-type: none"> <li>• Capacities of agricultural extension department and NGOs strengthened to enhance rural development</li> <li>• Farmers organize into associations</li> </ul> | <ul style="list-style-type: none"> <li>• Number of staff trained</li> <li>• Training reports</li> <li>• Number of farmer groups formed</li> <li>• Minutes of meetings of farmer groups</li> </ul> | <ul style="list-style-type: none"> <li>• There are sufficient financial and human resources to support rural development</li> <li>• The incentives for adopting new agricultural-production or income-generating activities are enough for people to be interested in the extension support</li> </ul> |

**Tasks:**

- 9.5.5.1 Conduct organizational assessment of extension department and NGOs.
- 9.5.5.2 Train staff.
- 9.5.5.3 Provide logistics and resources with which staff can work.
- 9.5.5.4 Introduce inducement package for performance.
- 9.5.5.5 Organize farmers into groups.

**Outcomes:**

- I. Well-trained and motivated staff to provide extension service.
- II. Incomes of farmer and business groups are increased.

## Programme 9.6: Measures to Enhance Remittance Flows

| <b>Action 9.6.1: Improve rural banking services using low-cost products and methodologies in financial service delivery</b>   |  |  |   |
|---|--|--|---|
| Purpose of action: To reduce transaction costs and allow for sustainable outreach of financial services to remote and low-density areas.  |  |  |   |
| <b>Output/Tasks/Outcomes</b>  | <b>Objectively Verifiable Indicators</b>   | <b>Sources of Verification</b>   | <b>Assumptions and Risks</b>  |
| <b>Output:</b><br>New products and methodologies in service delivery introduced.  | <ul style="list-style-type: none"> <li>• Mobile banking introduced</li> <li>• Credit provided to farmers</li> <li>• Agreement is signed with farmers to buy back produce</li> </ul>  | <ul style="list-style-type: none"> <li>• Loans portfolio</li> <li>• Agreements with mobile networks</li> </ul>                               | <ul style="list-style-type: none"> <li>• Improving rural banking with enhanced credit facilities to rural farmers to increase production</li> </ul> |
| <b>Tasks:</b><br>9.6.1.1 Conduct feasibility studies on products such as mobile banking, loan cards, micro-insurance, etc.<br>9.6.1.2 Introduce these banking products in rural areas that have no banking facilities.<br>9.6.1.3 Establish rural bank network with mobile phone operators to enhance mobile money transfer.<br>9.6.1.4 Provide loans to farmers to improve production.<br>9.6.1.5 Facilitate marketing of farm produce to increase income and loan repayment rate. |  |  |   |
| <b>Outcomes:</b><br>I. Low-cost financial services are available to the rural poor.<br>II. Loan repayments enhanced.  |  |  |   |
| <b>Action 9.6.2: Improve the knowledge of rural people about the use of banking services</b>  |  |  |   |
| Purpose of action: To bring banking services to the doorstep of the rural people and reduce the risks associated with remittance transfers.   |  |  |   |
| <b>Output/Tasks/Outcomes</b>  | <b>Objectively Verifiable Indicators</b>   | <b>Sources of Verification</b>   | <b>Assumptions and Risks</b>  |
| <b>Output:</b><br>Outreach unit established in the banks.   | <ul style="list-style-type: none"> <li>• Number of flyers printed</li> <li>• Regular radio talk shows instituted</li> <li>• Number of customers registered per week</li> <li>• Depth of outreach in terms of villages covered</li> </ul> | <ul style="list-style-type: none"> <li>• Increased remittances received through the banks</li> <li>• Membership application forms</li> </ul> | <ul style="list-style-type: none"> <li>• High financial illiteracy among poor rural dwellers</li> </ul>   |
| <b>Tasks:</b><br>9.6.2.1 Educate the public on the banking services available to the rural people.<br>9.6.2.2 Promote the sending and receiving of remittances through the rural banking services.<br>9.6.2.3 Conduct house-to-house education on banking services.<br>9.6.2.4 Distribute flyers on the services available.<br>9.6.2.5 Conduct public lectures and road shows on market days.   |  |  |   |

| <b>Outcome:</b><br>Knowledge and delivery of banking services deepened in rural areas.   |  |   |   |
|--|--|---|---|
| <b>Action 9.6.3: Enhance the use of mobile money transfer systems</b><br>Purpose of action: To enhance the safe sending of money from urban to rural areas.  |  |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Mobile money transfer system is extended to rural areas  | <ul style="list-style-type: none"> <li>Agreements to transact mobile money transfer business put in place</li> </ul> | <ul style="list-style-type: none"> <li>Agreements signed between banks providing rural services and mobile operators</li> </ul> | <ul style="list-style-type: none"> <li>Government will facilitate the agreement</li> </ul>          |
| <b>Tasks:</b><br>9.6.3.1 Make agreements between mobile operators and the rural banks on mobile banking services.<br>9.6.3.2 Open more mobile outlets in rural areas.<br>9.6.3.3 Strengthen the national switch common platform – e-zwich – for money transfer services. |  |   |   |
| <b>Outcome:</b><br>Timely, convenient and safe remittances.  |  |   |   |
| <b>Action 9.6.4: Improve transport services to rural areas</b><br>Purpose of action: To ensure that farm produce reaches market centres on time in order to reduce post-harvest losses arising from the inability of farmers to cart produce from their farms.           |  |   |   |
| Output/Tasks/Outcomes  | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
| <b>Output:</b><br>Good road network to link rural areas to urban centres.  | <ul style="list-style-type: none"> <li>Number of feeder roads constructed</li> </ul>                                 | <ul style="list-style-type: none"> <li>Tender documents</li> <li>Contract documents</li> </ul>                                  | <ul style="list-style-type: none"> <li>Roads linking rural areas are in deplorable state</li> </ul> |
| <b>Tasks:</b><br>9.6.4.1 Draw up and advertise tenders for bidding.<br>9.6.4.2 Award contracts.<br>9.6.4.3 Maintain roads.   |  |   |   |
| <b>Outcomes:</b><br>I. More roads are constructed and existing roads are rehabilitated.<br>II. Agricultural produce reaches markets on time and good condition.  |  |   |   |

## Summary

### Timeline

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action.

| Policy Focus Area 9: Climate Change and Migration   |   | Lead Org   | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$ |
|---|---|--|------|---|------|---|------|---|------|---|------|---|------|---|---------------------|
| Action  |   |  | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                     |
| <b>Programme Area 9.1: Alternative Livelihoods</b>  |   | <b>DSW and MOELR</b>                                 |      |   |      |   |      |   |      |   |      |   |      |   | <b>20,000,000</b>   |
| 9.1.1   | Raise awareness of alternative livelihood sources                 |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.1.2   | Provide skills training   |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.1.3   | Provide microcredit support                                       |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.1.4   | Build institutional capacity to manage migration                  |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 9.2: Social protection for the migrant poor</b>   |   | <b>MoGCSP, DSW and MMDAs</b>                         |      |   |      |   |      |   |      |   |      |   |      |   | <b>40,000,000</b>   |
| 9.2.1   | Collect and disseminate information relevant to migrants          |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.2.2   | Promote education on citizenship rights with emphasis on migrants |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.2.3   | Facilitate and provide cash transfers                             |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 9.3: Structures for dialogue between migrants and host communities to prevent conflicts</b> |   | <b>Traditional authorities and security services</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>5,000,000</b>    |
| 9.3.1   | Promote the establishment of migrant representative committees    |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.3.2   | Facilitate dialogue between all social groups                     |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 9.3.3   | Promote peace and conflict resolution at the community level      |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 9.4: Improve access to health and education</b>   |   | <b>MOH and MoE</b>                                   |      |   |      |   |      |   |      |   |      |   |      |   | <b>5,000,000</b>    |
| 9.4.1   | Improve health education  |  | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |



|   |  |   |   |   |   |   |   |   |   |   |   |   |   |   |                   |
|---|--|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------------|
| 9.4.2   | Promote quality health care in rural areas and migrant communities                                     |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.4.3   | Enforce compulsory education of children   |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| <b>Programme Area 9.5: Measures to enhance existing livelihoods</b> |  | <b>MoFA</b>   |   |   |   |   |   |   |   |   |   |   |   |   | <b>10,000,000</b> |
| 9.5.1   | Promote and introduce other sound agricultural practices   |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.5.2   | Improve the quality of and access to modern agricultural inputs  |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.5.3   | Promote improved access to markets   |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.5.4   | Develop non-agricultural small businesses  |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.5.5   | Build the capacities of rural development partners   |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| <b>Programme Area 9.6: Measures to enhance remittance flows</b>     |  | <b>MMDAs,<br/>BOG and<br/>transport<br/>service<br/>operators</b> |   |   |   |   |   |   |   |   |   |   |   |   | <b>10,000,000</b> |
| 9.6.1   | Improve rural banking services using low-cost products and methodologies in financial service delivery |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.6.2   | Improve the knowledge of rural people about the use of banking services                                |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.6.3   | Enhance the use of mobile money transfer systems   |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |
| 9.6.4   | Improve transport services to rural areas  |   | x | x | x | x | x | x | x | x | x | x | x | x |                   |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 9 Climate Change and Migration</b>   | <b>Lead Org</b>                                      | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|---|--|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 9.1: Alternative Livelihoods</b>  | <b>DSW and MOELR</b>                                 | 7,000,000   | 10,000,000  | 3,000,000   | 2,000,000   | 4,000,000   | 2,000,000   | <b>28,000,000</b>          |
| <b>Programme Area 9.2: Social protection for migrant poor</b>   | <b>MoGCSP, DSW and MMDAs</b>                         | 7,200,000   | 8,800,000   | 8,000,000   | 8,000,000   | 4,000,000   | 4,000,000   | <b>40,000,000</b>          |
| <b>Programme Area 9.3: Structures for dialogue between migrants and host communities to prevent conflicts</b> | <b>Traditional authorities and security services</b> | 750,000     | 850,000     | 850,000     | 850,000     | 850,000     | 850,000     | <b>5,000,000</b>           |
| <b>Programme Area 9.4: Improve access to health and education</b>   | <b>MOH and MoE</b>                                   | 500,000     | 900,000     | 900,000     | 900,000     | 900,000     | 900,000     | <b>5,000,000</b>           |
| <b>Programme Area 9.5: Measures to enhance existing livelihoods</b>   | <b>MoFA</b>  | 500,000     | 2,500,000   | 1,800,000   | 1,800,000   | 1,700,000   | 1,700,000   | <b>10,000,000</b>          |
| <b>Programme Area 9.6: Measures to enhance remittance flows</b>   | <b>MMDAs, BOG, transport operators</b>               | 500,000     | 4,000,000   | 1,500,000   | 2,000,000   | 1,500,000   | 500,000     | <b>10,000,000</b>          |



## **Ghana National Climate Change Policy Action Programme for Implementation: 2015–2020**



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**Policy Focus Area 10: Appropriate Energy and Infrastructure Development  
(minimizing greenhouse gas emissions)**

## Policy Focus Area 10: Appropriate Energy and Infrastructure Development (minimizing greenhouse gas emissions)

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### Introduction

Ghana contributes marginally to the global volume of greenhouse gas emissions. The country's total emissions for 2006 are estimated at 18.370 Mt (excluding those from the land-use, land-use change and forestry sectors), representing about 0.06 per cent of the global carbon emissions of about 29,190 Mt (see the Wikipedia file: World CO<sub>2</sub> emission by country 2006.svg). The emission trends over the period 2000–2006 show an annual growth rate of 3.7 per cent per year (excluding the land-use, land-use change and forestry sectors) and an overall increase of 24.6 per cent over the same period (according to the second national communication, 2006). The dominant economic activities driving the increasing carbon emissions between 1990 and 2000 are the sectors of energy generation (1682 per cent); agriculture (44 per cent) and waste (257 per cent). If emissions and removals from the land-use, land-use change and forestry sectors are included, Ghana has become a net emitter, moving from -8.416 Mt (1993) net removals to 23.984 Mt (2006) net emissions as a result of increasing deforestation (forest and grassland conversion) and forest degradation through the abandonment of managed lands.

Increasing greenhouse gas emissions must therefore be addressed in the nation's near-to-medium-term development plans. The opportunities provided by low-emissions development strategies (LEDS) include improving national and sectoral capacity in greenhouse gas inventories, support for research and an analysis of their impact on policy, development, transfer and diffusion of low emission and clean technologies. The others are greater efficiency in

the consumption and production of energy, the development and increasing penetration of renewable energy, reduced emissions from deforestation and degradation (REDD), sustainable waste management, and minimal gas flaring in the emerging oil and gas sector. Ghana acknowledges that investing in more efficient systems and upgrading existing infrastructure would help cut greenhouse gas emissions while still driving economic growth.

The National Development Planning Commission (NDPC) Guidelines for the Preparation of Sector Medium-Term Development Plan for the Ghana Shared Growth Development Agenda (GSGDA) do provide steps to mainstream and integrate cross-cutting issues into strategies in the formulation of programmes of action and a sector action plan under the Medium-Term Expenditure Framework (MTEF) strategic planning and forecasting process. The sectoral monitoring and evaluation guidelines outline the procedures under their national system for data collection, verification and reporting on performance to assess the policy impacts on economic development.

The guidelines on cross-cutting issues, which include the environment and such emerging issues as the National Climate Change Policy (NCCP) framework, recommends that the MTEF strategic planning processes should provide sectoral environmental analysis of opportunities and risks associated with the implementation of sectoral programmes and the emerging issues of climate change and sustainable consumption and production and their implications for sectoral programmes.

The mainstreaming strategy for the sectoral climate change policy and measures for energy, industry and infrastructure have been developed in accordance with the NDPC guidelines.

### **Sector Linkages with the Medium-term Development Policy Framework (MTDPF)**

The links between the MTDPF and the focus areas of energy, industry and infrastructure, that include climate-related actions and non-intended climate actions that lead to greenhouse gas emissions, reduction opportunities or LEDS, are summarized in the table below:

| <b><i>III. Accelerated Sustainable Natural Resource Management</i></b>  |  |
|---|--|
| III. Climate change and climate variability   |  |
| <b>Policy</b>   | <b>Strategies/Measures</b>   |
| 1. Nationally appropriate mitigation actions (NAMAs) to minimize or limit greenhouse gas emissions, while increasing the economic growth rate and gross domestic product (GDP). | Promote energy efficiency in all aspects of social and economic life. Promote energy efficiency in the transport sector, and end-use energy in residential, commercial and industrial categories, and improve waste management infrastructure. |
| 2. Use of low-carbon growth (LCG) opportunities to reduce emissions with increasing GDP growth.   | Develop long-term LCG approach or low emissions development strategies (LEDS) based on scientific assessment of economic policy impacts of LCG and LEDS.   |
| <b><i>IV. Oil and Gas Development</i></b>   |  |
| IV. Development of low emissions in the oil and gas industry  |  |
| Zero flaring of gas and total use of gas for  | Promote LCG by fuel switching from light crude oil (LCO) of high   |

| increased power generation.   | carbon intensity to natural gas in thermal power generation.   |
|---|--|
|   | Promote LCG by fuel switching from diesel or residual fuel oil (RFO) of high carbon intensity to natural gas in residential and commercial stand-by electricity generation and industrial heat and power production.   |
|   |  |
| <b><i>V. Infrastructure, Energy and Human Settlements Development</i></b>                       |  |
| <b><i>Infrastructure</i></b>  |  |
| <b><i>V-1-1. Transport Infrastructure: road, rail, water and air transport</i></b>              |  |
| Efficient use of petroleum/fossil fuel in transportation (rail, water, land vehicles, aviation) | Develop and implement measures to reduce petroleum consumption and equivalent carbon emissions from the transport sector (including the use of fuel-enhancing additives, engine tuning and retrofitting, emissions standards regulations and a ban of non-compliant vehicles). |
|   | Implement urban transport projects such as the Ghana Urban Transport Project (GUTP) including Bus Rapid Transit (BRT) and schemes for school buses.  |
|   | Develop a rail-based mass transport system in: Accra-Tema, Kumasi-Ejisu, Accra-Nsawam, and Takoradi-Kojokrom as part of an integrated  |

|  |  |
|--|--|
|  | transport plan.  |
|  | Facilitate the efficient and safe use of non-motorized transport facilities such as bicycle lanes and pedestrian walkways in congested central business districts. |
| <i>V-1-2: Science, technology and innovation to support productivity and development</i> |  |
| Promote science, technology and innovation in all sectors of the economy.                | Actively encourage the development, promotion, diffusion and transfer of environmentally sound technologies (e.g., climate mitigation technologies).               |
| <i>V-1-3: Development of information and communications technology (ICT) for growth</i>  |  |
| Promote the rapid development and deployment of the national ICT infrastructure.         | Promote the rapid development and deployment of the national ICT infrastructure for emissions reduction.   |
|  | Promote the use of ICT in all sectors of the national economy to reduce emissions.   |
| <i>V-2: Energy</i>   |  |
| <i>Energy supply (generation, transmission, distribution)</i>                            |  |
| Ensure the increased access by households and industries to an efficient, reliable and   | Promote energy-efficient technologies that safeguard the health of domestic users, especially of women and children.   |

|  |  |
|--|--|
| adequate energy supply.  |  |
| Reduce transmission and distribution losses.   | Facilitate the upgrading of the transmission and distribution systems to reduce losses and increase efficiency.  |
| <i>Electricity and thermal energy</i>  |  |
| Provide adequate and reliable power to meet the needs of Ghanaians and for export (500MW by 2015).   | Secure long-term reliable gas supplies for the operation of the thermal power plants.  |
|  | Reduce power system losses and waste in the supply and consumption of electricity.   |
| <i>V-3: Renewable energy supply (hydro, biomass, and wind and solar)</i>   |  |
| Increase the proportion of zero-carbon sources (renewable energy including hydro-sources) in the national energy supply (50% of 500MW by 2015) | Support the use of decentralized off-grid alternative technologies (solar photovoltaic (PV), wind and wave) where they are competitive with conventional electricity supply (10% by 2020). |
|  | Support the development of identified small and medium-scale hydro power projects on other rivers, including the western rivers (Ankobra, Tano and Pra), River Oti, and the White Volta.   |
|  | Complete the development of the Bui Hydropower Project on the Black  |

|  |  |   |
|--|--|---|
|  | Volta.   | Explore how sectors of industry which are energy-intensive can be incentivized to improve upon energy efficiency. |
|  | Balance biofuel development against food security.   |   |
|  | Provide incentives for estate developers and other construction designers to incorporate renewable energy sources in the development of residential and commercial infrastructure. |   |
| <i>V-4: Other energy sources, including nuclear and geothermal</i> |  |   |
| Explore the options for nuclear and geothermal energy.             | Continue to explore nuclear energy as an option in the diversification of the country’s energy mix.  |   |
|  | Undertake research in and develop geothermal power sources.  |   |
| <i>V-5: Energy efficiency and conservation</i>                     |  |   |
|  | Develop and implement programmes and measures to help consumers to optimize their use of energy.   |   |
|  | Discourage the importation and use of high-fuel-consumption vehicles.  |   |
|  | Provide incentives for real estate developers and other construction designers to incorporate energy conservation into their designs.  |   |
|  | Support a sustained and comprehensive public education and awareness-raising campaign on the methods and benefits of energy conservation.  |   |

**The National Climate Change Policy (NCCP) framework:  
Mainstreaming targets and low-carbon growth (LCG) and low  
emissions development (LED) capacity needs linked with the  
Medium-Term Development Policy Framework (MTDPF)**

**Focus area: Minimizing greenhouse gas emissions and  
development of Low Emissions Development Strategies (LEDS)**

**Policy actions**

P-1: Institutional roles and responsibilities in the national inventory system.

P-2: Sectoral greenhouse gas emissions estimations capacity needs for business-as-usual scenario development, development of a scenario for projections and emissions, and analysis of emissions trends.

P-3: Generation, transmission, and distribution of low emissions energy.

P-4: Energy efficiency improvement and sustainable energy consumption.

P-5: Zero-emissions and renewable energy development.

P-6: Public consultation, awareness-raising and education on LCG and LEDS.

P-7: Emissions reduction in the transport sector.

P-8: Emissions reduction in waste management.

P-9: Minimal gas flaring and total use of natural gas from oil and gas infrastructure for the generation of power, residential and commercial electricity, and industry heat and power.

P-10: Institutional capacity needs to strengthen regulatory agencies in the enforcement of policy legislation.

P-11: Sectoral capacity needs to monitor, verify and report LCG and LEDS outcomes for the assessment of policy impacts on economic development, and the use of investments as leveraging of climate finance under the UNFCCC post-Kyoto negotiations.

P-12: Sectoral capacity needs to develop the enabling environment (legal, fiscal, and regulatory) required to attract private and public sector finance and private sector investment in LED and LCG projects.

P-13: Capacity needs of science and technology research for the analysis of the impact of LCG and LED policies, and information for a wide range of stakeholders to raise awareness and understanding of trade-offs, so as to achieve a broad consensus on LCG and LEDS in the mainstreaming of nationally appropriate mitigation actions.

P-14: Assessment of the needs and transfer of low emissions development technologies.

**Mainstreaming methodology based on the National Development  
Planning Commission (NDPC) Guidelines**

Mainstreaming the policy actions into sector-wide planning requires: estimating costs, based on the NDPC guidelines for the preparation of sectoral medium-term development plans; sectoral monitoring and evaluation plans; and drawing on lessons learned from best practices in the Environmental Protection Agency (EPA) and the Strategic Environmental Assessment (SEA) process of mainstreaming sustainable development action plans through improved environmental and natural resource governance. The specific activities for this programme are summarized below:

**Step I: Stakeholder consultation workshop and development of  
road map**

*Output:* Stakeholders identified based on the recommended institutions for collaboration in the MTDPF 2010–2013.

**Step II: Institutional mapping and capacity needs assessment**

*Output 1:* Development of the road map and estimated costs for emissions reduction strategies.

*Output 2:* Capacity needs identified.



### **Step III - LEDS capacity-building workshops**

*Output:* Low emissions capacity-building programmes implemented by the United Nations Development Programme (UNDP) Low Emission Capacity-Building Programme (LECBP)

### **Step IV - Integrate monitoring, verification and reporting system in the monitoring and evaluation plan (see Annex B of the monitoring and evaluation guidelines)**

**1.** Workshop to disseminate sector-specific indicators, baselines and targets of emissions reductions and to produce the monitoring, reporting and verification (MRV) plan to measure progress.

*Output 1:* Complete list of the sector indicators (both core and sector specific).

*Output 2:* Sector MRV matrix.

**2.** Workshop to develop the MRV workplan and estimated cost.

*Output 1:* monitoring and evaluation calendar (workplan).

*Output 2:* monitoring and evaluation estimated costing for the sectoral medium-term development plans.

**3.** Two-day workshop to work on evaluations and participatory MRV plan on data collection, collation, validation and analysis.

Reporting and dissemination of implementation outcomes.

*Output 1:* Sector-specific data sets and indicators for greenhouse gas emissions adopted.

*Output 2:* Reporting formats and communication strategies adopted.

**4.** Collation of all the reports and preparation of draft MRV plan.

*Output:* Zero-MRV draft plan.

**5.** Dialogue with a wide range of stakeholders to present the draft MRV plan.

*Output:* First draft of final plan.

**6.** Public hearing on the first draft of the final MRV plan.

*Output:*

Second draft of the final MRV plan, submitted to NDPC.

**7.** Integration of NDPC comments in the second draft of the final MRV plan.

*Output:* Third draft of the MRV plan.

**8.** Submission of the third draft of the final MRV plan to the sector minister for approval.

*Output 1:* Integration of ministerial comments in the third draft of the final MRV plan.

*Output 2:* Approved monitoring, reporting and verification plan of the sectoral medium-term development plan.

**9.** Implementation and quarterly progress reporting.

*Output 1:* Quarterly and annual reports.

*Output 2:* Progress reports.

### **Conclusion**

The development of the road map, the capacity-building of the stakeholders and the integration of the monitoring and evaluation plan will provide the required information to undertake the following:

- (i) Identifying targets of the mainstreaming process;
- (ii) Evaluating the impacts of climate change on socioeconomic, sectoral and local development strategies and plans;
- (iii) Evaluating the awareness and capacity needed for mainstreaming in the context of the theme;
- (iv) Evaluating the possible impacts (both negative and positive) of the mainstreaming process;
- (v) Developing strategies and mechanisms for mainstreaming in the thematic area, including the financial, economic and policy aspects.

### Programme 10.1: National Institutional Framework for Greenhouse Gas Inventory

**Objective:** To institutionalize the National Inventory System (NIS) for the preparation and reporting of greenhouse gas inventories on a continuous basis.

**Justification:**

Ghana has prepared and submitted its initial and second national communications to the UNFCCC in 2000 and 2011 respectively. The second national communication notes the improvements in the institutional arrangements since the preparation of the initial national communication. However, the current system of data collection continues to rely largely on relationships of the EPA and individual national experts with the institutions that provide the data, to obtain the information for the preparation of the national inventory, and thus tends to be ad hoc and often not very reliable.

The institutional arrangements are also constituted in the inventory year and are not sustained between submissions of national communications, and thus tend to be ad hoc. There is therefore a need to define and formalize institutional roles and responsibilities with adequate incentives; and also to provide the necessary legal backing to integrate inventory data collection in their mandates.

Such integration will ensure the establishment of effective data management systems (for the collection, collation and archiving of data) for the timely preparation and compilation of national greenhouse gas inventories between national communications. The mandate is necessary to mainstream the greenhouse gas inventory processes in budgetary allocations to facilitate adequate institutional strengthening and capacity-building to continuously improve the transparency, consistency, comparability, completeness and accuracy of Ghana's greenhouse gas inventories.

**Action:**

- 10.1.1 Institutionalize the roles, procedures and legal arrangements used to collect and archive data for national greenhouse gas inventories.
- 10.1.2 Build the technical capacity and competence of selected institutions in data collection in required data sets and formats, and in documentation systems for the inventories and reporting of greenhouse gas emissions.

**Timeline:** 2015–2020

**Responsibility:** **Ministry of Environment, Science, Technology and Innovation (MESTI)**

*Energy and industrial sector:*

**Energy Commission**, Ministry of Energy and Petroleum (MOEP), Energy Efficiency and Climate Change Unit (EECCU) of the Environmental Protection Agency (EPA), Industrial Processes and Products Unit of the **Council for Scientific and Industrial Research (CSIR) – Institute of Industrial Research**, Ministry of Industry, National Cleaner Production Centre (GCPC)

*Agriculture sector:*

**Institute of Agricultural Research**, Ministry of Agriculture (MoFA)

*Waste sector:*

**EPA**, Ministry of Local Government and Rural Development

*Land-use, land-use change and forestry sector:*

**Forest Research Institute**, Ministry of Lands and Natural Resources, Forestry Commission of Ghana (FC), Centre for Remote Sensing and Geographic Information Systems (CERSGIS), University of Ghana, Energy Resources and Climate Change Unit, **Environmental Application and Technology (ENAPT) Centre**.

External peer review institutions.

**Estimated Cost:** US\$2,000,000

## **Programme 10.2: Improve the capacity of relevant sectors (public and private) for the reduction of national greenhouse gas emissions**

**Objective:** Strengthen measures to reduce sectoral greenhouse gas emissions in determinant and key sectors (electricity production and consumption, transport and waste handling)

**Justification:**

Capacity-building in the reduction of greenhouse gas emissions recognizes that national development paths usually emerge from fragmented decision-making processes involving numerous private actors and public agencies within varied institutional governance frameworks of the State, markets, and civil society. Decisions about the development paths of most significant sectors that shape emissions are made by sector ministries, departments and agencies, and facilitated by national research institutions engaged in policy and performance monitoring, evaluation and reporting of implemented strategies.

Decision-makers operating existing non-climate policy framework do not integrate opportunities of low carbon development in the policy decision-making process because budgetary constraints do not allow for making provision for the perceived high initial cost of mitigation options. There exist inadequate datasets and models and tools for sectoral greenhouse gas emission trends and projections to facilitate low emissions development (LED) policy decision-making. In addition, sectoral institutions have not built the capacity and skills necessary for climate mitigation and the assessment of the impact of a low emissions policy on economic growth.

There is, therefore, a need to build the capacity of a national system and existing institutional arrangements for governance in the design of low-emissions development strategies (LEDS) within the context of the sustainable development needs of the country and to enable the

National Climate Change Committee (NCCC) to fulfil its mandate of coordinating and mainstreaming LEDS in national policy, plans, programmes and projects.

**Action:**

10.2.1 Build the capacity of relevant actors in the public and private sectors in low-carbon development policy and measures (LCD-PaMs) and low emissions development strategies (LEDS) for dominant sectoral emission source categories (energy, transport, deforestation, waste handling).

10.2.2 Build technical and financial capacities of research and other relevant institutions in sectoral emission trends and projections to support the public and private sectors with sustainability impact analysis of LEDS and low-carbon development policies and measures, and monitoring, verification and reporting.

**Timeline:** 2015–2020

**Responsibility:**

Energy Commission, **Ministry of Energy and Petroleum (MOEP)**

Industrial Processes and Products Unit

CSIR – Institute of Industrial Research

Ministry of Industry

*Agriculture sector:*

Institute of Agricultural Research

Ministry of Agriculture (MoFA)

*Land-use, land-use change and forestry sector:*

Forest Research Institute

Ministry of Lands and Natural Resources

Forestry Commission of Ghana

Centre for Remote Sensing and Geographic Information Systems (CERSGIS)

University of Ghana

*Waste sector:*

Ministry of Local Government and Rural Development.

**Estimated Cost:** US\$5,000,000

### **Programme 10.3: Low emission and clean energy technology research, development, diffusion, deployment and transfer**

**Objective:** To strengthen measures to adopt and implement greenhouse gas emissions reduction technologies in key determinant source categories (energy industries, transport, natural gas infrastructure and use, and waste handling)

**Justification:**

Technology and technological development, while being among the main drivers of production and consumption, and economic growth, are also major driving forces of greenhouse gas emissions. At the same time, they offer opportunities for low greenhouse gas emissions in the short and the long term, particularly in reducing the energy intensity of GDP growth and the carbon intensity of energy generation and consumption (for example, through the deployment of more efficient end-use technologies, such as lighting or vehicles), fuel switching (substituting high-greenhouse-gas-emitting technologies for low or zero-emitting technologies such as renewable or nuclear), and ultimately the capture of carbon dioxide and storage technologies.

In Ghana, the opportunities of key low carbon technologies and practices currently commercially available in the energy sector for power generation are: natural gas combined cycles; and fuel switching from light crude oil to natural gas-fired thermal plants using gas from the West African Gas Pipeline and from the emerging oil and gas sector. The application of technology and use of gas will significantly reduce fugitive emissions from gas flaring in Ghana and Nigeria.

Natural gas infrastructure will also promote decentralized or on-site combined heat and power (CHP) technologies and eliminate transmission losses estimated at 25 per cent in Ghana compared to 5 per cent in developed countries. Anaerobic digestion technologies (with methane capture and use) in solid and liquid waste management will not only reduce emissions from current on-site treatment system (septic tanks and Kumasi ventilated improvised pit latrines (KVIPs)), they will also produce biomass energy and improve sanitation and public health.

Key challenges, addressed in the NCCP framework, have been identified in Ghana's technology needs assessment (TNA) and policy dialogues, and in the climate change policy consultation process. They include inadequate technical and financial support for research in and transfer of low-emission technologies (LETs), high initial cost, as well as inadequate technical and human resource capacities in estimating and certifying potential greenhouse gas reductions required in such technologies deployment. A further challenge is an inadequate technology transfer policy and implementation plan.

**Action:**

10.3.1. Build national capacity and support research into and development and transfer of low-emission technologies (LETs) for energy production and consumption, transport and waste handling.

**Timeline:** 2015–2020

**Responsibility:**

**National Committee on Climate Change (NCCC)**

*Energy sector:*

**Volta River Authority**

National Petroleum Authority

Ministry of Energy and Petroleum (MOEP)

Energy Commission

**CSIR – Institute of Industrial Research Institute**

Ministry of Industry

*Waste sector:*

Ministry of Local Government and Rural Development

**Estimated Cost:** US\$60,000,000

**Programme 10.4: Improve energy efficiency in production and consumption of energy**

**Objective:** To strengthen measures to reduce sectoral greenhouse gas emissions, especially in energy generation, transmission, end-use in manufacturing industries and construction, transport, and refineries.

**Justification:**

The key activities and sources of greenhouse gas emissions in the energy sector in Ghana are: the use of fossil fuels for electricity generation in power plants, and transmission and distribution plants; fuel used in electricity generation for residential and commercial activities due to unreliable power supply and the need for off-grid power generation due to low coverage; and fossil fuel use in the petroleum refinery. Energy loss in high tension transmission and distribution is estimated at 25 per cent while inefficiency in the end-use of electricity is estimated at about 30 per cent (Energy Commission, 2010). Other sources of emissions are energy consumption in manufacturing industries and construction, mining, agriculture, and transport (road vehicles, railways, and domestic water-borne navigation on the Akosombo River).

The national greenhouse gas inventories for 1990–2006 indicate that the energy sector is the fastest growing source of greenhouse gas (11 per cent over the period 1990–2006), contributing 5.9Mt of equivalent carbon dioxide (CO<sub>2</sub>e) in 2000, which represents 41 per cent of total national emissions. The main drivers are fuel consumption for

power generation, and in transport, mining, and agriculture. The transport category is the highest contributor to energy emissions accounting for 43 per cent because electricity production is still largely from hydropower generation. Emissions from the energy sector under business-as-usual scenarios (without oil and gas infrastructure) was projected to increase to 234Mt (2030) and 520Mt (2050). The economic growth of the country is projected to reach double digits, with oil and gas revenues also increasing energy demand and consumption. Enhanced sub-regional cooperation in energy will open up this market for electricity trading and increased production.

While oil and gas infrastructure could potentially increase Ghana's emissions, the construction of gas pipelines from the Jubilee Fields to a planned gas processing plant and to the West African Gas Pipeline by 2013 (EC, 2010) offer opportunities to reduce the greenhouse gas emissions intensity of GDP growth. Fuel switching and use of natural gas and natural gas combined cycles and combined heat and power technologies will also reduce carbon intensity of power generation. Energy efficiency improvement technologies, methods and techniques can also reduce energy consumption losses in transmission and distribution, in manufacturing, and in residential and commercial activities. The measures will slow down the rate of increase of the carbon content of Ghana's energy mix and slow down emission growth and the rate of increase of the national grid emissions factor. Thus, challenges of potential future emissions do offer opportunities for low carbon growth economic development.

**Action:**

10.4.1 Support the transfer, uptake and monitoring, reporting and verification of low emission technologies deployment, such as natural gas combined cycle (NGCC), combined heat and power (CHP), in natural gas thermal power generation and natural gas distribution system.



10.4.2 Promote infrastructure energy efficiency and management activities (innovative energy efficiency methodologies and techniques) in power transmission and distribution, and energy consumption in manufacturing industries and the construction, residential and commercial sectors, petroleum distribution and agriculture.

10.4.3 Promote energy efficiency (innovative energy efficiency technologies, practices and techniques) in the transport sector (railways, vehicles, navigation) to reduce mobile emissions.

**Timeline:** 2015–2020

**Responsibility:**

**National Committee on Climate Change (NCCC)**

*Energy sector:*

Energy Commission

Ministry of Energy and Petroleum (MOEP)

Public and private thermal power producers

Ghana Grid Company (GRIDCo)

Electricity Company of Ghana (ECG)

Bulk Oil Storage and Transportation Company (BOST)

Oil Marketing Companies (OMCs)

*Transport sector:*

Ministry of Transport

Environmental Protection Agency

Vehicle Examination and Licensing Department

*Industrial sector:*

CSIR – Institute of Industrial Research Ministry of Trade and Industry

Industry associations

**Estimated Cost:** US\$120,000,000

## Programme 10.5: Renewable Energy Development

**Objective:** To strengthen measures to reduce sectoral greenhouse gas emissions with renewable energy resources.

**Justification:**

Renewable energy resources particularly biomass, biofuel, solar, wind, geothermal energy resources, and to a lesser extent mini-hydro, are major potential sources of Ghana's energy forms. Biomass sources (charcoal, fuel wood, palm kernels) exploited from about 20.8 million hectares of land mass constitutes the sources of solid fuel production. Biodiesel is a growing source of liquid fuel. The consumption of biomass energy represents 60 per cent of the total energy used in the country. The associated forest and grassland conversion through deforestation activities led to the continuous decline of the carbon dioxide removals from land-use, land-use change and forestry from -26.5Mt equivalent carbon dioxide (CO<sub>2</sub>-e) (1990) to net emissions of 2.6Mt equivalent carbon dioxide (CO<sub>2</sub>-e) (2006) (NC, 2011), making Ghana a reduced REDD+ country.

Solar radiation levels are estimated at about 4-6 kWh/m<sup>2</sup>. Average wind speed along the eastern coastal areas is estimated at 5m/s at a height of 12 metres. Wind speeds of 9 m/s have also been recorded along the south-eastern coastline. The wind speed regime along the coastline and solar radiation levels offer good opportunities for wind and solar energy production. Furthermore, the vast arable and degraded land mass of Ghana has potential for the cultivation of crops and plants that could be converted into a wide range of solid and liquid biofuel. The conversion to crop-lands could increase carbon removals if practised as sustainable agro-forestry and help to tackle the threat of deforestation.

The harnessing of renewable energy resources and technologies contribute to Ghana's energy security, while limiting the growth of

greenhouse gas emissions per GDP and reducing Ghana's potential missions under the business-as-usual scenario. The key challenges that must be addressed in this sector to realize the potential penetration in the national energy mix include low efficiency in the use of biomass energy, and the very high initial cost of solar, wind, geothermal and mini-hydro technologies.

**Action:**

10.5.1 Promote the use and more efficient production of solid and liquid biomass fuels with lower net greenhouse gas emissions potential.

10.5.2 Promote the production and use of zero-carbon emissions sources of renewable energy (solar, wind, geothermal and mini-hydro).

**Timeline:** 2015–2020

**Responsibility:**

**Energy Commission, Ministry of Energy and Petroleum (MOEP), Forestry Research Institute of Ghana (FORIG),**  
Ministry of Lands and Natural Resources, Forestry Commission of Ghana, Centre for Remote Sensing and Geographic Information Systems (CERSGIS)

**Estimated Cost:** US\$70,000,000

## **Programme 10.6: Comprehensive Waste (solid, liquid and human) Management for renewable energy production**

**Objective:** To strengthen measures to reduce greenhouse gas emissions from the waste sector by the generation and capture of methane in anaerobic treatment of municipal solid waste (MSW), commercial and industrial wastewater, and from the decentralized sewage treatment of human waste.

**Justification:**

The main sources of greenhouse gas emissions from the waste sector are principally methane (CH<sub>4</sub>) emissions from solid waste disposal sites, nitrous oxide and CH<sub>4</sub> from wastewater handling and composting, nitrous oxide from human sewage, and CO<sub>2</sub> emissions from the burning or incineration of non-biogenic waste fractions, particularly plastics. All the emissions categories percentages quoted in this section are dependent on urban populations.

In Ghana, the total emissions from the waste sector were 1.6Mt CO<sub>2</sub>e (2000) and 2.3 Mt CO<sub>2</sub>e (2006), representing 10 per cent of national total greenhouse gas emissions in 2000 and 2006. The emission increased by some 49 per cent from 2000 to 2006 driven by the growth in urban population from 36.4 per cent in 1990 to 51.50 per cent in 2010 and the transition from dumping in urban cities to engineered landfill. The other significant source is emissions of methane from decentralized anaerobic sewage treatment in septic tanks in urban areas and KVIPs in the peri-urban and rural areas.

The waste sector emissions represent 0.13 per cent (2000) and 0.17 per cent (2006) of global emissions while the overall national emissions equal 0.06 per cent of global total emissions in 2000. As in many other developing countries, waste sector emissions constitute the most significant source of contribution to global emissions as a result of the doubling of populations in 25–30 years compared to 60–250 years for developed countries. For instance, the time line for population doubling at 2010 growth rates in selected developed countries are as follows: Australia – 60, United Kingdom – 123, United States of America – 72, and Denmark – 276.

The high population growth rates provide opportunities for the reduction of greenhouse gas emissions in the waste sector. For septic tanks in existing residential areas, vermicomposting technologies (an endogenous aerobic composting system) currently being promoted in

Ghana prevents anaerobic decomposition and eliminates methane emissions associated with all traditional sewage handling at the domestic level. For large population point sources such as educational facilities, hospitals, hotels, and housing estates, the most promising technology is the substitution of the existing sewage treatment plants with bio-digester plants with methane capture for energy use. For solid waste management in designated landfill sites, the integration of biogas capture and use systems would enable the conversion of the methane fraction to carbon dioxide with lower equivalent unit emissions (global warming potential) and thus reduce net emissions. Thus waste-to-energy technologies are a means of exploiting residual energy in waste for supply and their use as biomass energy sources for direct cooking or power generation. The technologies would also provide an effective mechanism for addressing the growing water, sanitation and public health problems from solid and liquid waste handling facing urban communities in Ghana.

**Action:**

10.6.1 Promote sustainable waste management technologies for recovery of residual energy in municipal solid waste (MSW) at designated landfill sites to reduce emissions from solid waste handling.

10.6.2 Promote sustainable endogenous waste management technologies that prevent methane emissions or capture methane for energy use to reduce net emissions from septic tank handling systems for sewage in domestic and community wastewater management.

**Timeline:** 2015–2020

**Responsibility:** **Energy Commission**, Ministry of Energy and Petroleum (MOEP), Waste Management Departments (WMDs), EPA, Ministry of Local Government and Rural Development.

**Estimated Cost:** US\$300,000,000

### Programme 10.7: Minimize Gas Flaring and fugitive emissions

**Objective:** To strengthen measures to reduce sectoral greenhouse gas emissions, especially in energy industry, transport industry, flaring in oil and gas, and waste handling.

**Justification:**

Oil and natural gas systems comprise all the infrastructure required to produce, collect, process or refine and deliver natural gas and petroleum products to market. The system begins at the well head – the source of oil and gas – and ends at the final point of sale to the consumer. The emissions associated with oil infrastructure are termed “fugitive emissions”. The term is broadly applied in greenhouse gas inventories to mean all greenhouse gas emissions from oil and gas systems except those contributions from fuel combustion from the use of the gas for the generation of heat and electricity.

The sources of fugitive emissions in oil and gas systems include, but are not limited to, venting, flaring and all other sources (equipment leaks, evaporation and flashing losses, incineration and accidental releases from pipelines, and well blow-outs and spills). Streams containing pure or high concentrations of carbon dioxide may occur at oil production facilities in which wells have a significant gas cap and the gas is conserved and used, as in the case of Ghana. Ghana has urgently adopted a policy of regulating and avoiding carbon dioxide from being injected into an oil reservoir in order to achieve high conservation efficiency (EC, 2010). The regulation will ensure the development of the Jubilee Field’s natural gas distribution infrastructure in addition to the West African Gas Pipeline. The increased natural gas infrastructure will maximize Ghana’s opportunity to use natural gas combined cycle technology for power generation. The policy will limit the growth of greenhouse gas emissions and the



rate of increase of the national grid emissions factor (i.e., the carbon content of the Ghana energy mix).

**Action:**

10.7.1 Establish efficient natural gas infrastructure and mechanisms for the processing and use of by-products from oil fields to prevent gas flaring and minimize venting.

10.7.2 Promote the use of natural gas as a cleaner and low-carbon source of energy for thermal power production.

**Timeline:** 2015–2020

**Responsibility:**

**Energy Commission**, Ghana National Petroleum Corporation (GNPC), independent power producers, Ministry of Energy and Petroleum (MOEP), Ghana Grid Company (GRIDCo), Electricity Company of Ghana (ECG).

**Estimated Cost:** US\$500,000,000

## FOCUS AREA 10: APPROPRIATE ENERGY AND INFRASTRUCTURE DEVELOPMENT

### Programme 10.1: National Institutional Framework for Greenhouse Gas Inventory

#### Action 10.1.1: Institutionalize the roles, procedures and legal arrangements used to collect and archive data for national greenhouse gas inventories

Purpose of action: To establish a national inventory system (NIS) to replace ad hoc arrangements used in the country's initial and second national communication.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks   |
|---|--|--|---|
| <b>Output:</b><br>Functional national inventory system (NIS).   | <ul style="list-style-type: none"> <li>Timely preparation of greenhouse gas report for biennial national communication</li> <li>Legal backing for greenhouse gas inventory activities in collaborating institutions</li> <li>Official access to available data and information from institutions</li> <li>Greenhouse gas data and information gaps continuously addressed</li> </ul> | <ul style="list-style-type: none"> <li>Collaborating institutions in NIS</li> <li>Laws and regulations of institutions in NIS</li> <li>Estimated cost allocation in the MTEF for greenhouse gas inventories for periods between biennial national communications</li> <li>National inventory report</li> <li>National communication</li> </ul> | <ul style="list-style-type: none"> <li>Annex 1 parties meet their obligation under Article 12.7 to provide financial support for national communications</li> <li>Ghana develops voluntary projects on country-specific emissions and obtains additional financial support under Article 12.4 for projects in development of nationally appropriate emission factors</li> <li>Selected institutional capacities and competence built for greenhouse gas inventory activities</li> </ul> |
| <b>Tasks:</b><br>10.1.1.1 Adopt Ghana's biennial inventory cycle based on the generic inventory plan of the United States Environmental Protection Agency (US EPA) greenhouse gas capacity-building programme for non-Annex 1 Parties in Annex 1.<br>10.1.1.2 Select relevant institutions to participate in the NIS to replace the ad hoc institutional arrangements adopted for the first national communication and the second national communication.<br>10.1.1.3 Formalize sectoral roles and responsibilities, procedures and arrangements of selected institutions and organizations for greenhouse gas inventories in accordance with relevant decisions from the Conference of the Parties serving as the meeting of the Parties to the Protocol, UNFCCC guidelines, IPCC guidelines and good practice guidance.<br>10.1.1.4 Amend the existing legal mandate of selected institutions to include roles and responsibilities for the collection, archiving and sharing of greenhouse gas data in required greenhouse gas data sets and inventories.<br>10.1.1.5 Build the capacity of institutions for the collection, archiving and sharing of greenhouse gas data in required data sets for greenhouse gas inventories across inventory sectors. |  |  |   |

**Outcomes:**

- I. A functioning national inventory system effectively preparing and delivering biennial inventories beginning 2020.
- II. Documented institutional and organizational roles and responsibilities within the biennial inventory cycle with legal backing.
- III. Documented arrangements and procedures for greenhouse gas inventories within the national inventory system.
- IV. Data management systems created in collaborating institutions for data collection, archiving and networking between national communications.
- V. Adequate annual quantitative and qualitative inventory information for implementation of Ghana's commitments under Article 4, paragraph 1 (a), and Article 12, paragraph 1 (a), of the Convention.

**Action 10.1.2: Build the technical capacity and competence of selected institutions in data collection in required data sets and formats, and in documentation systems for the inventories and reporting of greenhouse gas emissions**

Purpose of action: To produce adequate and reliable information on annual greenhouse gas inventory estimation and reporting on a continuous basis.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks  |
|---|--|---|--|
| <b>Output:</b><br>Quality, covering transparency, consistency, comparability, completeness and accuracy (TCCCA) of national greenhouse gas inventories continuously improved. | <ul style="list-style-type: none"> <li>Timely preparation of national inventory report for biennial national communications</li> <li>Estimation methods are in accordance with IPCC guidelines and good practice guidance</li> <li>Uncertainties in the estimates by categories and the national greenhouse gas inventories reduced over time</li> <li>Number of revisions of category-specific inventory guide books reflecting national circumstances</li> </ul> | <ul style="list-style-type: none"> <li>National inventory reports</li> <li>Revised category-specific inventory books</li> <li>National communications synthesis and compilation reports of the UNFCCC</li> <li>Sectoral inventory institutions' greenhouse gas data sets and formats</li> </ul> | <ul style="list-style-type: none"> <li>Annex 1 parties meet their obligations under Article 12.7 to provide financial support for national communications</li> <li>Ghana develops voluntary projects on country-specific emissions and obtains additional financial support under Article 12.4 for projects in the development of nationally appropriate emission factors</li> <li>Selected institutional capacities and competence built for greenhouse gas inventory activities</li> </ul> |

**Tasks:**

- 10.1.2.1 Assess and build technical capacity and human resources needs of institutions and organizations for sectoral estimation and reporting including critical roles in the inventory cycle (quality assurance and control, international greenhouse gas policy development, data and document management, uncertainty analysis).
- 10.1.2.2 Identify relevant institutions to act as external peer reviewers of sectoral inventories in accordance with IPCC good practice guidance.
- 10.1.2.3 Support greenhouse gas inventory training programmes in the use of new UNFCCC guidelines, estimation methodologies, tools and IPCC

- inventory software, guidelines and good practice guidance for all sectoral experts from collaborating institutions.
- 10.1.2.4 Implement improvement plans for the national greenhouse gas inventory and continuously improve the quality of its subsequent biennial reports over time.
- 10.1.2.5 Request financial support provided by other Parties to the Convention, international organizations and the UNFCCC secretariat under Article 12.7.
- 10.1.2.6 Develop voluntary projects such as the development of nationally appropriate emission factors for additional financial support under Article 12.4 of the Convention.
- 10.1.2.7 Support scientific research for the development of country-specific disaggregated activity data and emission factors for key categories for the use of higher tier methods.
- 10.1.2.8 Explore funding opportunities under various bilateral and multilateral training programmes for capacity-building (e.g., United States International Development Agency (USAID), US EPA, United Nations Development Assistance Framework (UNDAF), UNDP, UNFCCC).
- 10.1.2.9 Integrate greenhouse gas inventories and environmental carbon accounting into relevant faculties and departments of research institutions (CSIR) and universities.
- 10.1.2.10 Document sectoral and category-specific reports into national greenhouse gas inventory guidebooks to protect institutional memory and continuous greenhouse gas inventory updates.

**Outcomes:**

- I. Institutions and organizations in the NIS have the requisite capacity and competence to use the new UNFCCC inventory guidelines and meet the reporting requirements.
- II. Timely delivery of inventory data and information for the compilation of biennial greenhouse gas inventories.
- III. Improved inventory quality (i.e., transparency, completeness, comparability of methods, and consistency in time series, accuracy and reduced uncertainty).
- IV. Sectoral guidebooks to the greenhouse gas inventory for the sectors of energy and industrial processes and products units (IPPU), agriculture, land-use, land-use change and forestry, and waste.
- V. Continuous improvement of national greenhouse gas inventories, and carbon accounting and inventory reports.
- VI. Comprehensive national greenhouse gas emissions and removals data for sectoral trends analysis and national policy and decision-making in sustainable development.
- VII. National compliance with implementation of obligations under Article 12.1 and Article 4.7 of the Convention which includes submitting greenhouse gas inventories in the national communications.
- VIII. Institutions able to access financial support under Article 12.4 and 12.7 for greenhouse gas inventory activities.

## Programme 10.2: Improve the capacity of relevant sectors (public and private) for the reduction of national greenhouse gas emissions

### Action 10.2.1: Build the capacity of relevant actors in the public and private sectors in low-carbon development policy and measures (LCD-PaMs) and low emissions development strategies (LEDS) for dominant sectoral emission source categories (energy, transport, deforestation, waste handling)

Purpose of action: To facilitate decision-making at national, regional and local levels to integrate a low emissions development growth path in plans, programmes, and projects.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|---|---|--|--|
| <p><b>Output:</b><br/>Low-carbon development strategies or policy and measures for key source categories</p>  | <ul style="list-style-type: none"> <li>Greenhouse gas reduction strategies in place for energy consumption and production, renewable energy penetration rate, gas recovery and use in energy and waste sector</li> <li>Number of nationally appropriate mitigation actions (NAMAs) implemented, in progress, or planned and monitoring, reporting and verification (MRV) reports produced</li> <li>Reducing sectoral greenhouse gas emissions as compared to GDP growth, reducing carbon intensity of thermal power production, methane capture from waste management)</li> </ul> | <ul style="list-style-type: none"> <li>Low emissions development (LED) project implementation reports ( e.g., NAMAs )</li> <li>Sectoral policy impact analysis papers on LEDS and GDP growth</li> <li>International registry of NAMAs, maintained by the UNFCCC secretariat</li> </ul> | <ul style="list-style-type: none"> <li>Carbon accounting and MRV capacities built to provide the information required to attract funding for NAMAs</li> <li>International support for technology, finance or capacity-building available under the Cancun agreements</li> <li>Reductions will be recorded in emissions relative to what would otherwise be ‘business-as-usual’ emissions by 2020 with increasing GDP growth</li> </ul> |
| <p><b>Tasks:</b></p> <p>10.1.2.1 Assess technical capacity and human resources needs of relevant institutions, organizations and national experts for impact analysis of sectoral policy and measures of LEDS on economic growth, environmental improvement and poverty reduction.</p> <p>10.1.2.2 Build technical capacity and support the NCCC for the coordination of LEDS policies, policy reforms and plans in the promotion of a green economy.</p> <p>10.1.2.3 Support the feasibility studies and implementation of NAMAs and their monitoring, reporting and verification.</p> |   |  |  |

10.1.2.4 Support LCG-related initiatives by multilateral and bilateral donor agencies in sectoral greenhouse gas emissions reduction to encourage a green economy.

10.1.2.5 Integrate LEDS and best practices into climate-resilient development policies, plans and programmes at the district, regional and national level.

**Outcomes:**

- I. Public and private sectors integrate greenhouse gas emissions reduction in sectoral policies, plans and projects at the national, regional and district levels.
- II. Sectoral activity data trends (such as vehicle fleet data, fuel consumption in transport and residential generators, deforestation rates) available on the use of national resources for the assessment and planning of sustainable consumption and production (SCP).
- III. Adequate information available for multilateral and bilateral training and awareness-raising programmes for key sectors for multi-stakeholders.
- IV. Stakeholders in the national governance structure better able to appreciate the impact of LEDS, climate change mitigation and economic growth and to make an informed contribution to the implementation of NAMAs.
- V. LEDS influence fuel switching to low-carbon-intensity fuels (natural gas), reduction of transport emissions, capture of methane emission in waste management, and the penetration of renewable energy in the national energy system.
- VI. Ghana achieving emissions reductions in NAMA target sectors that are dominant key emissions categories (energy production and consumption, transport and waste).

**Action 10.2.2: Build technical and financial capacities of research and other relevant institutions in sectoral emission trends and projections to support the public and private sectors with sustainability impact analysis of LEDS and low-carbon development policies and measures, and monitoring, verification and reporting**

Purpose of action: To facilitate decision-making in the public and private sectors to integrate the low-carbon growth (LCG) development path in plans, programmes, and projects.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>Sectoral greenhouse gas reduction policy impact reports and national sustainability indicators of low-carbon development | <ul style="list-style-type: none"> <li>Number of implemented NAMAs</li> <li>MRVs produced on implemented NAMAs</li> <li>Country-specific sustainability impact indicators for implemented LEDS and low-carbon development policies and measures ( e.g. NAMAs)</li> <li>Level of multilateral finance for NAMAs attracted</li> </ul> | <ul style="list-style-type: none"> <li>MRV of implemented LEDS projects ( e.g., NAMAs )</li> <li>Sectoral policy impact analysis papers on LEDS and GDP growth</li> <li>International registry of NAMAs, maintained by the UNFCCC secretariat</li> </ul> | <ul style="list-style-type: none"> <li>Carbon accounting and MRV capacities built to provide information required for MRV of NAMAs</li> <li>International financial support for capacity-building and implementation of NAMAs available under the Cancun Agreements</li> <li>Reductions will be recorded in emissions relative to what would otherwise be business-as-usual emissions by 2020, with increasing GDP growth</li> </ul> |

**Tasks:**

- 10.2.2.1 Build the capacity of sectoral institutions in mitigation methodologies, tools and software.
- 10.2.2.2 Collect sectoral development and economic data to improve on mitigation assessment for LED policy impact analysis.
- 10.2.2.3 Support the capacity- building of research institutions in greenhouse gas trends analysis and projections, and analysis of the impact of LED strategies, plans and projects such as NAMAs.
- 10.2.2.4 Use research findings on LEDS and GDP growth trends to facilitate decision-making at the national and local level, and existing governance institutional arrangements in designing low carbon growth strategies.
- 10.2.2.5 Support multilateral and bilateral donor agencies in the implementation of low-emissions-related programmes in the dominant carbon emissions and removals sectors.

**Outcomes:**

- I. Adequate institutional capacities built in estimating and certifying potential greenhouse gas reductions associated with nationally appropriate climate change mitigation.
- II. Country institutions strengthened in carbon accounting and reporting.
- III. Emission trends and projections capacity exist for monitoring, verification and reporting of the impacts of low emissions growth policy.
- IV. Sectoral activity data trends (such as vehicle fleet data, sectoral fuel consumption, deforestation rates) are available on natural resources use and consumption for sustainable consumption and production (SCP) assessment and planning.
- V. Adequate information available for multilateral and bilateral institutions for training and awareness-raising programmes for stakeholders in the national governance structure to better appreciate the impacts of LEDS on economic growth,
- VI. Sectoral greenhouse gas trends and projections reports on implemented, on-going, and planned greenhouse gas reduction to facilitate putting policies, policy reforms and plans into operation and promoting a green economy.

**Programme 10.3: Low emission and clean energy technology research, development, diffusion, deployment and transfer****Action 10.3.1: Build national capacity and support research into and development and transfer of low-emission technologies (LETs) for energy production and consumption, transport and waste handling**

Purpose of action: To facilitate the adoption and uptake of low-emission technologies (LETs) in sectoral low-emissions development (LED) plans, programmes and projects, in particular for the energy, transport and waste sectors.

| Output/Task/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>Public-private partnership (PPP) investment in the uptake of low-emission technologies | <ul style="list-style-type: none"> <li>• Penetration rate of LETs in greenhouse gas reduction projects (e.g., NAMAs)</li> <li>• Reducing sectoral greenhouse gas emissions as a ratio of GDP growth</li> <li>• Reduced the carbon intensity of thermal power production</li> <li>• Methane capture rate in municipal solid waste (MSW) and sewage management</li> </ul> | <ul style="list-style-type: none"> <li>• MRV reports on implemented NAMAs related to greenhouse gas emissions</li> <li>• MoFEP guidelines developed on estimated costing</li> <li>• National inventory report</li> <li>• Environmental and social impact assessments (ESIAs) and environmental sustainability action plans (ESAPs) of LET transfer projects</li> </ul> | <ul style="list-style-type: none"> <li>• Ghana will use sectoral estimated costing allocations to leverage multilateral and bilateral climate change finance</li> <li>• International support for technology transfer, finance or capacity-building will be made available under the Cancun Agreements</li> <li>• Incremental investment in LET transfer and application will be supported by Green Climate funds under the Cancun Agreements</li> </ul> |



**Tasks:**

- 10.3.1.1 Establish a low emissions technology development and innovation centre with international financing opportunities under the Cancun Agreements
- 10.3.1.2 Develop a technology transfer policy and a plan of implementation and integrate into LEDS with international financing opportunities under the Cancun Agreements.
- 10.3.1.3 Build the capacities of research institutions and universities in the application of greenhouse gas mitigation methodologies, tools and software to support transfer and uptake.
- 10.3.1.4 Mainstream opportunities to use LETs in sectoral LEDS (e.g., natural gas combined cycle, combined heat and power, fuel switching to natural gas, methane capture from solid waste disposal sites, and decentralized sewage treatment plants with methane recovery).
- 10.3.1.5 Implement the MoFEP initiative in coordinating and harmonizing all domestic and international climate financing to address potential overlaps and duplication.
- 10.3.1.6 Complete the MoFEP process of developing national climate change estimated costing guidelines for mainstreaming LEDS into sector plans and projects.
- 10.3.1.7 Build the capacity of the public and private sectors to access climate project finance from the emerging Green Climate Fund that will support LCD projects, programmes, policies and
- 10.3.1.8 Build the capacity of MoFEP and the private sector (banks and industries) to mobilize and access international funds for climate change mitigation and climate change financing.
- 10.3.1.9 Support bilateral and multilateral climate change initiatives (by USAID, UNDAF, UNDP, UNFCCC) for the capacity-building of relevant ministries, departments and agencies, and research institutions

**Outcomes:**

- I. Foreign direct investment (FDI) such as the Green Climate Fund are attracted for investment in the transfer of LETs.
- II. Public and private sectors integrate sectoral LETs into projects, programmes, and policies of the energy, transport and waste sectors.
- III. Research support providing adequate information on LETs at the technology development and innovation centre.
- IV. Transfer and uptake of LETs influencing natural gas infrastructure development for fuel switching to low carbon intensity power generation and transport, methane emission capture in waste management, and renewable energy penetration in national energy system.
- V. Continuously reducing greenhouse gas emissions intensity with higher GDP growth rates; and reduced carbon intensity of thermal power generation and distribution.
- VI. Ghana achieving emissions reduction in nationally appropriate mitigation action target sectors that are greenhouse-gas-emission intensive (energy production and consumption, transport and waste).
- VII. Incremental cost of LETs development, diffusion, transfer and uptake being financed through the Green Climate Fund under the Convention.

### Programme 10.4: Improve energy efficiency in production and consumption of energy

#### Action 10.4.1: Support the transfer, uptake and monitoring, reporting and verification of low emission technologies deployment, such as natural gas combined cycle (NGCC), combined heat and power (CHP), in natural gas thermal power generation and natural gas distribution system

Purpose of action: Use natural gas from the West African Gas Pipeline and emerging oil and gas fields, to reduce the carbon content of thermal power generation.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|---|---|--|---|
| <b>Output:</b><br>Increased fuel switching from light crude oil to natural gas in thermal power production.   | <ul style="list-style-type: none"> <li>• Conversion of the Osagyefo Power Barge Project (125MW) to 185MW combined cycle by 2015</li> <li>• Implementation of the Aboadze Takoradi International Company combined cycle to increase power from 550 MW to 660 MW</li> <li>• Reduced sectoral greenhouse gas emissions per GDP growth and carbon intensity of thermal power production</li> <li>• Construction of natural gas pipelines and processing plants by 2016</li> </ul> | <ul style="list-style-type: none"> <li>• MRV reports on implemented greenhouse gas emission related NAMAs</li> <li>• National inventory report</li> <li>• ESAs, ESAPs and environmental management plans of thermal power plants</li> <li>• Energy Commission, Ghana National Petroleum Corporation (GNPC), and Volta River Authority (VRA) project reports</li> </ul> | <ul style="list-style-type: none"> <li>• Ghana will use sectoral estimated costing allocations to leverage multilateral and bilateral climate finance to drive PPP projects in LETs</li> <li>• International support for technology transfer, finance or capacity-building will be made available under Cancun Agreements</li> <li>• Incremental investment in LET transfer and application will be supported by Green Climate Funds under the Cancun Agreements</li> </ul> |
| <b>Tasks:</b><br>10.4.1.1 Promote public-private partnership on technologies transfer for NGCC, CHP, and natural gas infrastructure in power production and high tension loss control.<br>10.4.1.2 Regulate the flaring or venting of the natural gas produced within Ghana to maximize the use of natural gas reserves of the country.<br>10.4.1.3 Develop a policy and plan of implementation for the transfer of technology for climate financing from the Green Climate Fund under the Cancun Agreements.<br>10.4.1.4 Develop best practice guidelines to encourage the adoption and uptake of LETs.<br>10.4.1.5 Build the capacity of research institutions and universities in the application of greenhouse gas mitigation methodologies, tools and software to support the transfer, uptake and monitoring, reporting and verification of NGCC and CHP technologies.<br>10.4.1.6 Organize round-table meetings with donors and the private sector for climate finance when developing specific LETs projects for the energy sector. |   |  |   |

- 10.4.1.7 Build the capacity of the public and private sectors to access climate project finance from the emerging Green Climate Fund that will support low-carbon development policies, programmes and projects.
- 10.4.1.8 Build the capacities of MoFEP and the private sector (banks and industries) to mobilize and access international funds for climate change mitigation and climate change financing.
- 10.4.1.9 Support bilateral and multilateral climate change initiatives for capacity-building programmes from relevant ministries, departments and agencies, and research institutions (USAID, UNDAF, UNDP, UNFCCC).

**Outcomes:**

- I. Foreign direct investment, such as Green Climate Funds, for the upgrade of existing thermal power plants and future thermal plants.
- II. Public and private sector integrating sectoral LETs in the energy, transport and waste sector projects, programmes, and policies at the national, regional and district levels.
- III. Research support providing adequate information for NGCC and CHP, and infrastructure for national distribution.
- IV. Natural gas infrastructure developing and driving fuel switching to low-carbon-intensity power generation and transport.
- V. Reducing greenhouse gas emission intensity relative to GDP and carbon intensity of thermal power generation and distribution.
- VI. Ghana achieving emissions reduction in NAMA target sectors, in particular the power generation and transport sectors.
- VII. Incremental cost in LETs transfer and uptake increasingly financed through the Green Climate Fund under the Convention.

**Action 10.4.2: Promote infrastructure energy efficiency and management activities (innovative energy efficiency methodologies and techniques) in power transmission and distribution, and energy consumption in manufacturing industries and the construction, residential and commercial sectors, petroleum distribution and agriculture**

Purpose of action: To efficiently transmit and distribute power, improve end-use efficiency, and conserve energy for sustainable energy transmission and consumption.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification  | Assumptions and Risks  |
|---|--|--|--|
| <b>Output:</b><br>Reduced losses in power production and improved end-use energy efficiency in residential, commercial and industrial consumption of fossil fuel. | <ul style="list-style-type: none"> <li>Reduction in percentage of per capita emissions in residential energy and emissions</li> <li>Reduce transmission losses from 25% to 18% by 2015 (EC, 2010)</li> </ul> | <ul style="list-style-type: none"> <li>MRV reports on implemented energy efficiency projects</li> <li>National inventory report</li> <li>ESIAs, ESAPs, and environmental management plans of refinery operations</li> <li>Programme reports from the National Cleaner Production Centre</li> <li>Energy Commission annual reports</li> </ul> | <ul style="list-style-type: none"> <li>Ghana will use sectoral estimated costing allocations to leverage multilateral and bilateral climate finance</li> <li>International support for finance or capacity-building will be made available under the Cancun Agreements</li> <li>Incremental investment in energy efficiency technologies transfer and application can be attracted from Green Climate funds under the Cancun Agreements</li> </ul> |

**Tasks:**

- 10.4.2.1 Reduce power transmission and distribution losses from the present 25 per cent to 18 per cent; and reduce the losses in end-use energy in residential, commercial and industrial use, presently reported at 30 per cent.
- 10.4.2.2 Improve the reliability of the electricity system by reducing demand through load shifting.
- 10.4.2.3 Promote compliance with energy use benchmarks in industry environmental management plans, projects, and programmes, using cleaner production tools.
- 10.4.3.4 Develop best practices guidelines to drive the adoption and uptake of cleaner production projects for industrial energy efficiency improvement.
- 10.4.2.5 Ensure strict implementation of the petroleum products lifting zoning mechanisms to reduce losses in petroleum production, storage, transportation and distribution, and consumption in transport sector.
- 10.4.2.6 Undertake capacity-building of the Ghana Cleaner Production Centre and of national consultants in cleaner production to promote improved energy efficiency and resource use efficiency in industry.
- 10.4.2.7 Provide economic incentives (e.g., a prepaid metering programme to replace credit metering in the residential and commercial sectors) to encourage self-regulation in domestic and industrial energy use; and power factor correction programme in public institutions and commercial and industrial facilities.
- 10.4.2.8 Enforce regulations on the local production, importation and use of inefficient electricity consuming equipment and appliances.
- 10.4.2.9 Improve the reliability of the electricity system by reducing demand through load shifting management.
- 10.4.2.10 Build the capacity of the public and private sector to access climate project finance from the emerging Green Climate Fund.
- 10.4.2.11 Support bilateral and multilateral (USAID, UNDAF, UNDP, UNFCCC) climate change initiatives for capacity-building programmes for relevant ministries, departments and agencies, and research institutions, in energy-efficiency improvement programmes.

**Outcomes:**

- I. A comprehensive demand-side management programme mainstreamed in energy transmission and distribution, and end-use in residential, commercial and industrial activities.
- II. Domestic and industry self-regulation and adoption of energy conservation and efficiency improvement programmes.
- III. Improved energy efficiency in power transmission and distribution, and end-use energy consumption in residential, commercial and industry activities.
- IV. Research support providing adequate information on innovative technologies and methods,
- V. Ghana achieving emissions reduction in NAMA target sectors of power generation and transport.
- VII. Incremental costs in energy conservation and efficiency improvement increasingly financed from the Green Climate Fund under the Convention.

**Action 10.4.3: Promote energy efficiency (innovative energy efficiency technologies, practices and techniques) in the transport sector (railways, vehicles, navigation) to reduce mobile emissions**

Purpose of action: To efficiently use energy in the transport sector and derive new ways of achieving this.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks   |
|--|---|--|---|
| <b>Output:</b><br>Reduced losses in petroleum production, storage, transportation and distribution, and improved vehicle fuel efficiency in the transport sector   | <ul style="list-style-type: none"> <li>Projected savings of 15% in the transportation, distribution and consumption of petroleum product (Energy Commission targets)</li> <li>Reduced influx of imports of excessively old and inefficient vehicles</li> <li>Retirement by the Vehicle Examination &amp; Licensing Division (VELD) of excessively old and inefficient vehicles in circulation</li> <li>Minimum fuel efficiency standards established</li> </ul> | <ul style="list-style-type: none"> <li>MRV reports on implemented energy efficiency projects</li> <li>National inventory report</li> <li>ESIAs, ESAPs and environmental management plans of petroleum refineries</li> <li>Programme reports of the National Cleaner Production Centre</li> <li>Energy Commission annual reports</li> </ul> | <ul style="list-style-type: none"> <li>Effective enforcement of regulations in the sector and adequate financing to implement sector projects</li> <li>International support for financing of capacity-building in vehicle efficiency and fuel standards monitoring and enforcement in the transport sector as part of the global strategy for sustainable consumption of fossil fuels</li> </ul> |
| <b>Tasks:</b><br>10.4.3.1 Enforce regulations on the importation of high-fuel-consuming vehicles, excessively old and inefficient vehicles.<br>10.4.3.2 Establish minimum fuel efficiency standards, enforceable by VELD, to reduce over-consumption and cost of fuel by imported and in-country excessively old vehicles<br>10.4.3.3 Develop best practice guidelines to encourage the acceptance and patronage of engine tuning and retrofitting for fuel efficiency improvement of vehicles.<br>10.4.3.4 Promote and encourage the use of fuel-enhancing additives to improve combustion and reduce emissions.<br>10.4.3.5 Ensure strict implementation of petroleum products lifting zoning mechanisms (PPLZM).<br>10.4.3.6 Implement a programme on vehicle fuel efficiency and conservation in the transport sector.<br>10.4.3.7 Promote the use of improved fuel performance additives and sale of new petroleum product formulations for the transport sector by 2015.<br>10.4.3.8 Establish a Centre for Research in Petroleum Efficiency and Conservation and undertake promotion activities<br>10.4.3.9 Improve water-borne navigation and transportation of fuel to the northern sector to enforce the implementation of the petroleum products lifting zoning mechanisms. |   |  |   |

10.4.3.10 Build the capacity of the public and private sectors to access climate change project finance from the emerging Green Climate Fund for mitigation projects under the transport sector.

10.4.3.11 Support bilateral and multilateral (USAID, UNDAF, UNDP, UNFCCC) climate change initiatives for capacity-building programmes for the transport sector.

**Outcomes:**

I. Comprehensive sustainable consumption programmes mainstreamed in the transport sector, with fuel savings and equivalent greenhouse gas emissions reductions.

II. Minimum fuel efficiency standards established and enforced by VELD during vehicle examination.

III. Improved petroleum energy efficiency in power transmission and distribution, and in end-use energy consumption in residential, commercial and industrial activities.

IV. Research support providing adequate information on innovative technologies and methods.

V. Ghana achieving emissions reduction in the source categories of the transport sector targeted NAMAs.

VII. Incremental cost in energy conservation and efficiency improvement increasingly financed from the Green Climate Fund under the Convention.

## Programme 10.5 Renewable Energy Development

### Action 10.5.1: Promote the use and more efficient production of solid and liquid biomass fuels with lower net greenhouse gas emissions potential

Purpose of action: To reduce non-CO<sub>2</sub> emissions in the production and consumption of solid and liquid biomass energy resources.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks   |
|--|---|---|---|
| <b>Output:</b><br>Reduced non-carbon emission factors in the production and consumption of biomass fuels to limit the growth of greenhouse gas emissions | <ul style="list-style-type: none"> <li>Renewable energy penetration increased to 10% by 2020</li> <li>Grid-connected solar photovoltaic pilot projects completed</li> <li>Emission Factors (EFs) for greenhouse gas emissions developed to monitor emissions reduction</li> <li>Dedicated woodlots established</li> <li>Reduced wood fuel energy intensity per urban household</li> <li>Reduced firewood intensity per rural household</li> </ul> | <ul style="list-style-type: none"> <li>Energy Commission project reports</li> <li>National inventory report</li> <li>Project ESIAs, ESAPs, and environmental management plans</li> <li>EPA state of the environment report</li> </ul> | <ul style="list-style-type: none"> <li>Continued financial and technical support of research projects in renewable energy efficiency improvement</li> <li>Ability of the NAMAs developed by the public and private sectors to access Green Climate Funds</li> <li>The Energy Commission has the capacity to enforce the renewable energy regulations to attract private sector investment in renewable energy projects</li> </ul> |

**Tasks:**

- 10.5.1.1 Support the conversion of degraded arable lands into crop land through sustainable agro-forestry for the production of wood lots for charcoal and firewood.
- 10.5.1.2 Promote the establishment of dedicated woodlots for wood fuel production.
- 10.5.1.3 Promote the production and use of improved and more efficient wood fuel utilization technologies.
- 10.5.1.4 Promote LPG as substitute for wood fuel and charcoal to reduce deforestation and wood fuel energy intensity per household.
- 10.5.1.5 Support biofuel development on appropriate and suitable land (e.g., reclaimed lands in the mining sector), ensuring avoidance of a potential threat to food security.
- 10.5.1.6 Support the development and use of biofuel as a substitute for fossil-based transportation fuel.
- 10.5.1.7 Develop and implement projects in renewable energy efficiency improvement and integration of sources of renewable energy into the national grid (sponsored by the World Bank).
- 10.5.1.8 Support private sector investments in the cultivation of biofuel feedstock, extraction of the bio-oil and refining of bio-oil into secondary products.
- 10.5.1.9 Enforce biofuel regulations to encourage in-country renewable energy technology development and use by the private sector, to be financed by the Green Climate Funds.
- 1.5.1.10 Support relevant research to develop national emission factors and activity data ( wood fuel intensity by urban population; and firewood intensity by rural population for improved systems to monitor and quantify emissions reductions.

**Outcomes:**

- I. Conversion of degraded and deforested lands to crop lands to reduce net emissions from wood fuel consumption
- II. Enacted Biofuel Regulations enforced to encourage PPP in woodlot plantations for charcoal and firewood.
- III. Combustion efficiencies of wood and charcoal improved continuously to reduce non-CO<sub>2</sub> emissions.
- IV. Liquid biofuel production controlled to limit competition with land for food production and food security.
- V. Liquid biofuel integrated in transportation energy to foster production and penetration.

**Action 10.5.2: Promote the production and use of zero-carbon emissions sources of renewable energy (solar, wind, geothermal and mini-hydro)**

Purpose of action: Sustainable production of renewable energy and substitution of carbon-based energy sources.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators  | Sources of Verification   | Assumptions and Risks   |
|---|--|---|---|
| <b>Output:</b><br>Reduced non-carbon emission factors for consumption and production of biomass fuels to limit the growth of greenhouse gas emissions.  | <ul style="list-style-type: none"> <li>Renewable energy penetration increased to 10% by 2020</li> <li>Grid-connected solar photovoltaic pilot projects completed</li> <li>Emission Factors (EFs) for greenhouse gas emissions developed to monitor emission reduction</li> <li>Wind farm demonstration projects implemented by 2015</li> </ul> | <ul style="list-style-type: none"> <li>Energy Commission project reports</li> <li>National inventory report</li> <li>Project ESIA, ESAPs, and environmental management plans</li> </ul> | <ul style="list-style-type: none"> <li>Continued financial and technical support of research in zero-carbon emission renewable energy projects</li> <li>Ability of NAMAs developed by the public and private sectors to access Green Climate Funds</li> <li>Energy Commission has the capacity to enforce the renewable energy regulations so as to attract private sector investment in renewable energy projects</li> </ul> |
| <b>Tasks:</b><br>10.5.2.1 Promote the exploitation and use of min-hydro, solar, wind and geothermal energy sources.<br>10.5.2.2 Complete the feasibility study of the 21 mini-hydro sites so as to apply for financial and technical support under NAMAs from the Green Climate Fund of the Convention.<br>10.5.2.3 Implement the identified mini-hydro demonstration project to encourage uptake by the private sector.<br>10.5.2.4 Implement the developed wind farm project.<br>10.5.2.5 Implement the grid-connected solar photovoltaic demonstration project for public institutions, financed by the ECOWAS Bank for Investment and Development (EBID).<br>10.5.2.6 Support cost-effective cutting-edge technologies to reap the benefits of the huge potential of zero-carbon renewable energy technologies.<br>10.5.2.7 Support indigenous research and development aimed at reducing the cost of renewable energy technologies.<br>10.5.2.8 Provide tax incentives for the importation of all equipment used in the development of renewable and waste energy projects.<br>10.5.2.9 Support the use of decentralized off-grid alternative technologies (such as solar photovoltaic and wind) where they are competitive.<br>10.5.2.10 Provide tax and other financial incentives to attract private sector investments in zero-carbon renewable energy technologies.<br>10.5.2.11 Build the capacity of the private sector to attract multilateral and bilateral funds in the transfer, promotion and uptake of renewable energy technology (e.g., climate finance from the Green Climate Funds).<br>10.5.2.12 Support relevant research to develop national emission factors based on Life Cycle Analysis zero-carbon emissions technologies. |  |   |   |



**Outcomes:**

- I. Increasing penetration of mini-hydro, solar, wind and geothermal energy resources in the national energy mix with an impact on the grid carbon emission factor.
- II. Enacted Renewable Energy Regulations to attract private sector participation in PPP in zero-carbon emission technologies.
- III. Combustion efficiencies of wood and charcoal improving continuously to reduce non-CO<sub>2</sub> emissions.
- IV. Grid-connected mini-hydro, solar, wind and geothermal energy demonstration projects encouraging private sector investment in zero-carbon energy systems.

### Programme 10.6: Comprehensive Waste (solid, liquid and human) Management for renewable energy production

#### Action 10.6.1: Promote sustainable waste management technologies for recovery of residual energy in municipal solid waste (MSW) at designated landfill sites to reduce emissions from solid waste handling

Purpose of action: To capture methane for energy use at landfill sites, thus reducing emissions from landfills while using the energy.

| Output/Tasks/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification  | Assumptions and Risks  |
|--|---|--|--|
| <b>Output:</b><br>Landfill infrastructure with biogas recovery and use facilities. | <ul style="list-style-type: none"> <li>Emission Factors (EFs) for greenhouse gas emissions developed for biogas plants to monitor emissions reduction</li> <li>Increased integration of biogas capture and use at landfill sites</li> </ul> | <ul style="list-style-type: none"> <li>Energy Commission project reports</li> <li>Biennial national inventory report</li> <li>State of the Environment reports of the Built Environment Department of the EPA</li> <li>ESIAs and ESAPs of methane capture and methane prevention plants</li> </ul> | <ul style="list-style-type: none"> <li>Continued financial, technical and capacity support of research in greenhouse gas reduction efficiency monitoring</li> <li>Capacity developed of the public and private sectors in NAMAs in the waste sector to access Green Climate Funds</li> <li>Energy Commission has the capacity to enforce the renewable energy regulations and to attract private sector investment in renewable energy projects</li> </ul> |

**Tasks:**

- 10.6.1.1 Develop infrastructure for the collection of municipal solid waste (MSW) and delivery to landfill sites or incinerators depending on the characteristics of the waste.
- 10.6.1.2 Improve waste collection efficiency so as to deliver sufficient MSW with a high proportion of plastic waste to non-hazardous incineration plants with energy recovery facilities.
- 10.6.1.3 Improve waste collection efficiency so as to deliver mixed MSW with high proportions of biodegradable waste to landfill sites with methane

- capture systems.
- 10.6.1.4 Improve waste collection efficiency so as to deliver segregated MSW with high proportions of biodegradable waste to composting plants.
  - 10.6.1.5 Implement metropolitan waste-to-power project as NAMAs.
  - 10.6.1.6 Implement combined heat and power energy capture for non-hazardous industrial waste.
  - 10.6.1.7 Integrate segregation of biodegradable fractions of MSW for composting and manure production to reduce net emissions.
  - 10.6.1.8 Support waste-to-energy initiatives for the use of agricultural and industrial waste (sawdust, oil palm, and other agricultural residues).
  - 10.6.1.9 Build private sector and institutional capacity to access technology, financial and capacity support under climate finance from the Green Climate Fund.
  - 10.6.1.10 Enforce biomass energy harnessing regulations to encourage public-private partnerships in the construction of landfill sites.
  - 10.6.1.11 Support relevant research to develop national emissions factors for landfill gas collection to monitor and quantify emissions reduction.
  - 10.6.1.12 Implement waste-to-energy projects as NAMAs to attract financial, technology, and capacity support from bilateral and multilateral funds (e.g., from the Green Climate Fund under the Convention) to address the high initial cost.

**Outcomes:**

- I. Recovery of residual energy in MSW (methane) at landfill sites contributing to national energy security, while reducing net emissions from landfills.
- II. Enforcement of renewable energy regulations on biogas generation and use to drive PPP in deployment of landfill gas recovery technology.
- III. Support for country-specific emissions factors for solid waste disposal for use in greenhouse gas inventories to monitor and account for deviations in emissions from business-as-usual scenarios by 2020.
- III. Integration of landfill gas capture for power generation in energy supply at landfill facilities, to drive the penetration of technology.
- IV.

### Action 10.6.2: Promote sustainable endogenous waste management technologies that prevent methane emissions or capture methane for energy use to reduce net emissions from septic tank handling systems for sewage in domestic and community wastewater management

Purpose of action: To capture methane for energy use or prevent methane emissions from residential septic tanks in traditional wastewater management.

| Output/Task/Outcomes  | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Anaerobic digester plants for biogas generation and use, and aerobic vermicomposting systems to prevent methane emissions | <ul style="list-style-type: none"> <li>• Increased biogas energy plants replacing septic tanks in communities for sustainable sewage treatment</li> <li>• Vermicomposting system of sewage treatment deployed in</li> </ul> | <ul style="list-style-type: none"> <li>• Energy Commission project reports</li> <li>• Biennial national inventory report</li> <li>• ESIA and ESAPs of methane capture and methane prevention</li> </ul> | <ul style="list-style-type: none"> <li>• Continued financial and technical support of research in greenhouse gas reduction efficiency monitoring of biogas plants and vermicomposting system for the treatment of sewage</li> <li>• Capacity of NAMAs in the waste sector</li> </ul> |

|   |   |        |  |
|---|---|--------|--|
| are deployed for waste emission reduction.  | demonstration estate development projects <ul style="list-style-type: none"> <li>• Emission Factors for greenhouse gas emissions developed for biogas plants and vermicomposting systems to monitor emissions reduction</li> <li>• Residential septic tanks replaced with vermicomposting aerobic technology</li> </ul> | plants | developed by the public and private sectors to access Green Climate Funds <ul style="list-style-type: none"> <li>• Energy Commission has the capacity to enforce the renewable energy regulations to attract private sector investment in renewable energy projects</li> </ul> |
| <b>Tasks:</b> <p>10.6.2.1 Promote endogenous digester plants for the recovery of residual energy (methane) in sewage and non-hazardous biodegradable MSW and hospital waste.</p> <p>10.6.2.2 Promote endogenous vermicomposting system for the treatment of the sewage component of domestic wastewater – this reduces net emissions by preventing methane emission and generating nitrous oxide only.</p> <p>10.6.2.3 Promote the above greenhouse gas reduction technologies to provide on-site or decentralized sewage treatment that prevents periodic dislodging and indiscriminate off-site disposal with associated sanitation problems due to lack of functional centralized waste treatment facilities.</p> <p>10.6.2.4 Integrate the segregation and treatment of biodegradable components of waste streams in biogas plants to reduce the cost of off-site disposal of MSW and sanitation problems.</p> <p>10.6.2.5 Implement institutional biogas plant projects in universities, polytechnics, senior high schools and hospitals.</p> <p>10.6.2.6 Build the private sector and institutional capacity to access technology and financial and capacity support for the deployment of these technologies under climate finance from the Green Climate Fund that can address the high initial cost in the market penetration phase.</p> <p>10.6.2.7 Enforce biomass energy harnessing regulations with economic incentives to attract private sector integration of the technologies in real estate development.</p> <p>10.6.2.8 Support relevant research to develop national emissions factors for the technologies to monitor and quantify attainable emissions reductions.</p> <p>10.6.2.9 Implement the waste-to-energy projects and methane emissions prevention as projects under NAMAs for technology, financial and capacity support under climate finance from the Green Climate Fund and the domestic natural resources and environmental governance fund for climate change mitigation.</p> |   |        |  |

**Outcomes:**

- I. Recovery of residual energy in MSW and sewage in biogas plants, contributing to national energy security, while reducing net emissions from landfills.
- II. Enforcement of renewable energy regulations on biogas generation and use, to drive PPP in biodigester plants for biogas recovery and use.
- III. Development of country-specific emission factors for biogas plants and the vermicomposting system of sewage treatment for greenhouse gas inventories, to monitor and account for deviations in emissions from business-as-usual scenarios.
- IV. Integration of biogas power generation in biodigester plant projects in the energy supply and security of facilities, to drive penetration of technology.

**Programme 10.7: Minimize Gas Flaring and fugitive emissions****Action 10.7.1: Establish efficient natural gas infrastructure and mechanisms for the processing and use of by-products from oil fields to prevent gas flaring and minimize venting**

Purpose of action: To maximize the use and efficient conservation of natural gas for power generation based on natural gas to reduce the carbon content of thermal power generation and limit the growth rate of national emissions.

| Output/Tasks/Outcomes   | Objectively Verifiable Indicators   | Sources of Verification   | Assumptions and Risks  |
|---|---|---|--|
| <b>Output:</b><br>Integration of the West African Gas Pipeline and the Jubilee Fields gas infrastructure for the sustainable supply of natural gas for power generation | <ul style="list-style-type: none"> <li>Reducing sectoral greenhouse gas emissions per GDP growth</li> <li>Decline of carbon intensity of thermal power production</li> <li>Jubilee natural gas pipelines and processing plants constructed</li> </ul> | <ul style="list-style-type: none"> <li>MRV of natural gas penetration projects</li> <li>NAMAs implemented</li> <li>National inventory report</li> <li>ESIAs, ESAPs and environmental management plans of power projects</li> <li>Reports of the Energy</li> </ul> | <ul style="list-style-type: none"> <li>Regulations are enacted and enforced to ensure the planning of natural gas infrastructure</li> <li>Ghana will use sector estimated costing allocations to leverage multilateral and bilateral climate finance to drive PPP projects</li> <li>International support for natural gas</li> </ul> |

|  |  |   |   |
|--|--|---|---|
|  |  | Commission, MOEP, GNPC, VRA and research institutes | based power technology as part of NAMAs will attract finance and capacity-building from the Green Climate Funds under the Cancun Agreements |
| <b>Tasks:</b><br>10.7.1.1 Enforce regulations to avoid flaring, venting, and CO <sub>2</sub> reinjection to maximize the efficient conservation and use of natural gas in Ghana's oil and gas industry.<br>10.7.1.2 Intensify the exploration for oil and gas at the Jubilee Fields to expand natural gas penetration in low-emission power production.<br>10.7.1.3 Complete pipelines from the Jubilee Field Gas Project to the Osagyefo Power Plant and Takoradi Thermal Power Station.<br>10.7.1.4 Complete natural gas pipelines from the Jubilee Field Gas Project to Osagyefo Power Plant and Takoradi Thermal Power Station.<br>10.7.1.5 Build the capacity of MoFEP and the private sector (banks and industries) to mobilize and access international funds for climate change mitigation and climate change projects.<br>10.7.1.6 Support bilateral and multilateral climate change initiatives (USAID, UNDAF, UNDP, UNFCCC) for capacity-building programmes of relevant ministries, departments and agencies, and research institutions. |  |   |   |
| <b>Outcomes:</b><br>I. Flaring and venting regulations sustained for the realization of the development of natural gas infrastructure.<br>II. Sustained public and private partnerships (PPP) for the continued development of natural gas infrastructure.<br>III. Development of natural gas infrastructure, which drives fuel switching to low-carbon-intensity power generation.<br>IV. Limiting of greenhouse gas emissions intensity per GDP and carbon intensity of thermal power generation and distribution.<br>V. Ghana achieves emissions reduction in NAMAs in target sectors for power generation.<br>VI. Incremental cost in natural gas infrastructure technologies transfer financed as climate change mitigation projects by the Green Climate Fund under the Convention and the Protocols.  |  |   |   |
| <b>Action 10.7.2: Promote the use of natural gas as a cleaner and low-carbon source of energy for thermal power production.</b><br>Purpose of action: To maximize the use and efficient conservation of natural gas for power generation based on natural gas to reduce the carbon content of thermal power generation and limit the growth rate of national emissions.  |  |   |   |
| <b>Output/Tasks/Outcomes</b>   | <b>Objectively Verifiable Indicators</b> | <b>Sources of Verification</b>                      | <b>Assumptions and Risks</b>  |

|  |   |   |  |
|--|---|---|--|
| <p><b>Output:</b><br/>West African Gas Pipeline and Jubilee Fields gas infrastructure integrated for sustainable natural gas supply for power generation.</p>  | <ul style="list-style-type: none"> <li>• Osagyefo Power Barge converted to 185MW combined cycle by 2015</li> <li>• Aboadze Takoradi International Company plant converted from 550 MW to 660 MW combined cycle</li> <li>• Reducing sectoral greenhouse gas emissions per GDP growth</li> <li>• Declining carbon intensity of thermal power production</li> <li>• Natural gas pipelines and processing plants constructed</li> <li>• Reduced residual fuel oil (RFO) in industry heating by natural gas substitution for steam generation and in combined heat and power (CHP) plants</li> </ul> | <ul style="list-style-type: none"> <li>• MRV of natural gas penetration projects and implemented NAMAs</li> <li>• National inventory report</li> <li>• ESIA, ESAPs and environmental management plans of power projects</li> <li>• Reports of the Energy Commission, MOEP, GNPC, VRA and research institutes</li> </ul> | <ul style="list-style-type: none"> <li>• Proposed natural gas infrastructure plans, projects and mechanisms implemented to support power generation based on natural gas</li> <li>• Ghana will use sector estimated costing allocations to leverage multilateral and bilateral climate finance to drive PPP projects</li> <li>• International support for natural gas based power technology as part of NAMAs will attract finance and capacity-building from Green Climate Funds under the Cancun Agreements</li> </ul> |
| <p><b>Tasks:</b></p> <p>10.7.2.1 Promote public-private partnerships on the transfer of technologies for natural gas based power generation.</p> <p>10.7.2.2 Complete pipelines from the Jubilee Field Gas Project to Osagyefo Power Plant and Takoradi Thermal Power Station.</p> <p>10.7.2.3 Accelerate the use of natural gas from the West African Gas Pipeline Project in place of crude oil at Aboadze.</p> <p>10.7.2.4 Implement a comprehensive plan and programmes for complete fuel switching from light crude oil to natural gas based thermal power plants.</p> <p>10.7.2.5 Promote on-site CHP plants and fuel switching from reduced residual fuel oil in industry as natural gas supply improves to reduce transmission and distribution losses.</p> <p>10.7.2.6 Intensify exploration for gas and oil at the Jubilee Fields to expand natural gas penetration in low-emission power production.</p> <p>10.7.2.7 Build the capacity of research institutions in greenhouse gas mitigation methodologies, tools and software to support monitoring, reporting and verification of NGCC and combined heat and power technologies.</p> <p>10.7.2.8 Organize round-table meetings with donors and private sector climate change finance on policy and programmes on fuel switching from light crude oil to natural gas in the energy sector</p> |   |   |  |

- 10.7.2.9 Include natural gas based power generation penetration projects in NAMAs for climate change finance from the Green Climate Fund.
- 10.7.2.10 Build the capacity of MoFEP and the private sector (banks and industries) to mobilize and access international funds for climate change mitigation and climate finance projects.
- 10.7.2.11 Support bilateral and multilateral climate change initiatives (USAID, UNDAF; UNDP, UNFCCC) for capacity-building programmes from relevant ministries, departments and agencies, and research institutions.

**Outcomes:**

- I. Increasing penetration of NGCC in centralized power generation, and CHP for decentralized power in industry.
- II. Natural gas based technology penetration in power generation sustained by public-private partnerships.
- III. Research support providing adequate information on NGCC and CHP implementation for greenhouse gas emission reduction.
- IV. Natural gas infrastructure developing and driving fuel switching to low-carbon-intensity power generation.
- V. Reducing greenhouse gas emissions intensity in relation to GDP and carbon intensity of thermal power generation and distribution systems.
- VII. Ghana achieving emissions reduction in NAMA target sectors in power generation and transmission.
- VIII. Incremental cost in NGCCs and CHP implemented as low emissions technologies attracting climate change financing from the Green Climate Fund under the Convention.

## Summary

### Timeline

The timeline shows the duration with which each action under the individual programmes must be accomplished and the lead organizations in charge of the respective action

| Policy Focus Area 10: Appropriate Energy and Infrastructure Development  |  | Lead Organization       | 2015 |   | 2016 |   | 2017 |   | 2018 |   | 2019 |   | 2020 |   | Estimated Cost US\$ |
|--|--|-------------------------|------|---|------|---|------|---|------|---|------|---|------|---|---------------------|
| Actions  |  |                         | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 | 1    | 2 |                     |
| <b>Programme Area 10.1: National institutional framework for greenhouse gas inventory</b>  |  | <b>MESTI and others</b> |      |   |      |   |      |   |      |   |      |   |      |   | <b>2,000,000</b>    |
| 10.1.1   | Institutionalize the roles, procedures and legal arrangements used to collect and archive data for national greenhouse gas inventories.  |                         | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| 10.1.2   | Build the technical capacity and competence of selected institutions in data collection in required data sets and formats, and in documentation systems for the inventories and reporting of greenhouse gas emissions.   |                         | x    | x | x    | x | x    | x | x    | x | x    | x |      |   |                     |
| 10.1.3   | Build the technical capacity of research institutions in impact analysis of low emissions and carbon development policies and measures.  |                         |      |   |      |   |      |   |      |   |      |   |      |   |                     |
| <b>Programme Area 10.2: Improve the capacity of relevant sectors (public and private) for the reduction of national greenhouse gas emissions</b> |  | <b>MOEP</b>             |      |   |      |   |      |   |      |   |      |   |      |   | <b>5,000,000</b>    |
| 10.2.1   | Build the capacity of relevant actors in the public and private sectors in low-carbon development policy and measures (LCD-PaMs) and low emissions development strategies (LEDS) for dominant sectoral emission source categories (energy, transport, deforestation, waste handling)                                 |                         | x    | x | x    | x |      |   |      |   |      |   |      |   |                     |
| 10.2.2   | Build technical and financial capacities of research and other relevant institutions in sectoral emission trends and projections to support the public and private sectors with sustainability impact analysis of LEDS and low-carbon development policies and measures, and monitoring, verification and reporting. |                         | x    | x | x    | x |      |   |      |   |      |   |      |   |                     |
| <b>Programme Area 10.3: Low emission and clean energy technology research, development, diffusion, deployment and transfer</b>                   |  | <b>NCCC</b>             |      |   |      |   |      |   |      |   |      |   |      |   | <b>60,000,000</b>   |
| 10.3.1   | Build national capacity and support research into and development and transfer of low-emission technologies (LETs) for energy production and consumption, transport and waste handling   |                         | x    | x | x    | x | x    | x | x    | x | x    | x | x    | x |                     |
| <b>Programme Area 10.4: Improve energy efficiency in production and consumption of energy</b>  |  | <b>NCCC</b>             |      |   |      |   |      |   |      |   |      |   |      |   | <b>120,000,000</b>  |
| 10.4.1   | Support the transfer, uptake and monitoring, reporting and verification of low   |                         | x    | x | x    | x | x    | x |      |   |      |   |      |   |                     |



## National Climate Change Policy Action Programme for Implementation: 2015–2020

|  |   |                          |   |   |   |   |   |   |   |   |   |   |   |   |   |                    |
|--|---|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|
|  | emission technologies deployment, such as natural gas combined cycle (NGCC), combined heat and power (CHP), in natural gas thermal power generation and natural gas distribution system.  |                          |   |   |   |   |   |   |   |   |   |   |   |   |   |                    |
| 10.4.2   | Promote infrastructure energy efficiency and management activities (innovative energy efficiency methodologies and techniques) in power transmission and distribution, and energy consumption in manufacturing industries and the construction, residential and commercial sectors, petroleum distribution and agriculture. |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 10.4.3   | Promote energy efficiency (innovative energy efficiency technologies, practices and techniques) in the transport sector (railways, vehicles, navigation) to reduce mobile emissions.  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 10.4.4   | Promote production methods and the use of cleaner and more efficient energy sources (liquefied petroleum gas (LPG), biofuel, biogas, biomass) that minimize resultant emissions and pollution.  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 10.5: Renewable energy development</b>                                   |   | <b>MOEP</b>              |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>70,000,000</b>  |
| 10.5.1   | Promote the use and more efficient production of solid and liquid biomass fuels with lower net greenhouse gas emissions potential.  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 10.5.2   | Promote the production and use of zero-carbon emissions sources of renewable energy (solar, wind, geothermal and mini-hydro)  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 10.6: Comprehensive waste management for renewable energy production</b> |   | <b>Energy Commission</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>300,000,000</b> |
| 10.6.1   | Promote sustainable waste management technologies for recovery of residual energy in municipal solid waste (MSW) at designated landfill sites to reduce emissions from solid waste handling.  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 10.6.2   | Promote sustainable endogenous waste management technologies that prevent methane emissions or capture methane for energy use to reduce net emissions from septic tank handling systems for sewage in domestic and community wastewater management  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| <b>Programme Area 10.7: Minimize gas flaring and fugitive emissions</b>                    |   | <b>Energy Commission</b> |   |   |   |   |   |   |   |   |   |   |   |   |   | <b>500,000,000</b> |
| 10.7.1   | Establish efficient natural gas infrastructure and mechanisms for the processing and use of by-products from oil fields to prevent gas flaring and minimize venting.  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |
| 10.7.2   | Promote the use of natural gas as a cleaner and low-carbon source of energy for thermal power production  |                          | x | x | x | x | x | x | x | x | x | x | x | x | x |                    |

### Estimated Costs

The total estimated cost of each programme over the period of programme execution is shown in the table below:

| <b>Policy Focus Area 10: Appropriate Energy and Infrastructure Development</b>   | <b>Lead Org</b>          | <b>2015</b> | <b>2016</b> | <b>2017</b> | <b>2018</b> | <b>2019</b> | <b>2020</b> | <b>Estimated Cost US\$</b> |
|--|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------------------|
| <b>Programme Area 10.1: National institutional framework for greenhouse gas inventory</b>                                      | <b>MESTI and others</b>  | 500,000     | 250,000     | 250,000     | 250,000     | 500,000     | 250,000     | <b>2,000,000</b>           |
| <b>Programme Area 10.2: Improve capacity of relevant sectors for the reduction of greenhouse gas emissions</b>                 | <b>MoEn</b>              | 3,000,000   | 2,000,000   |             |             |             |             | <b>5,000,000</b>           |
| <b>Programme Area 10.3: Low emission and clean energy technology research, development, diffusion, deployment and transfer</b> | <b>NCCC</b>              | 10,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | <b>60,000,000</b>          |
| <b>Programme Area 10.4: Improve energy efficiency in production and consumption of energy</b>                                  | <b>NCCC</b>              | 20,000,000  | 20,000,000  | 20,000,000  | 20,000,000  | 20,000,000  | 20,000,000  | <b>120,000,000</b>         |
| <b>Programme Area 10.5: Renewable energy development</b>   | <b>MOEP</b>              | 20,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | 10,000,000  | <b>70,000,000</b>          |
| <b>Programme Area 10.6: Comprehensive waste management for renewable energy production</b>                                     | <b>Energy Commission</b> | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | 50,000,000  | <b>300,000,000</b>         |
| <b>Programme Area 10.7: Minimize gas flaring and fugitive emissions</b>  | <b>Energy Commission</b> | 100,000,000 | 80,000,000  | 80,000,000  | 80,000,000  | 80,000,000  | 80,000,000  | <b>500,000,000</b>         |