



REPUBLIC OF GHANA

**MINISTRY OF ENVIRONMENT, SCIENCE,
TECHNOLOGY AND INNOVATION
(MESTI)**

**SECTOR MEDIUM-TERM DEVELOPMENT PLAN
(2018 – 2021)**

JULY, 2018

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LIST OF ACRONYMS

AAP	Annual Action Plan
APR	Annual Performance Report
APR	Annual Progress Report
ARI	Animal Research Institute
BoQ	Bill of Quantity
BNARI	Biotechnology and Nuclear Agriculture Research Institute
BRRI	Building and Road Research Institute
CBO	Community Based Organisation
COTVET	Council for Technical and Vocational Education and Training
CRI	Crops Research Institute
CSIR	Council for Scientific and Industrial Research
DA	District Assembly
DMTDP	District Medium Term Development Plan
DST	Department of Science and Technology
ECOWAS	Economic Community of West African States
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EU	European Union
F&A	Finance and Administration
FORIG	Forestry Research Institute of Ghana
FRI	Food Research Institute
FRISMO	Food Research Institute Smoking Oven

GAEC	Ghana Atomic Energy Commission
GCC	Guinea Current Commission
GCLME	Guinea Current Large Marine Ecosystem
GE	Green Economy
GEMP	Ghana Environment Management Programme
GETFund	Ghana Education Trust Fund
GH-SA	Ghana-South Africa
GIF	Gamma Irradiation Facility
GIP	Ghana Institute of Planners
GIS	Geographic Information System
GMO	Genetically Modified Organism
GPS	Global Positioning System
GSC	Ghana Science Congress
GSSTI	Ghana Space Science and Technology Institute
HR	Human Resource
IAEA	International Atomic Energy Agency
ICT	Information Communication Technology
ICU	Information Communication Unit
IGF	Internally Generated Funds
IIR	Institute of Industrial Research
IPM	Integrated Pest Management
INSTI	Institute for Scientific and Technological Information
LAN	Local Area Networks

LI	Legislative Instrument
M&E	Monitoring and Evaluation
MASTESS	Mathematics, Science and Technology Scholarship Scheme
MDA	Ministries, Departments and Agencies
MEST	Ministry of Environment, Science and Technology
MESTI	Ministry of Environment, Science, Technology and Innovation
MLGRD	Ministry of Local Government and Rural Development
MLNR	Ministry of Lands and Natural Resources
MMDA	Metropolitan, Municipal and District Assembly
MoE	Ministry of Education
MoF	Ministry of Finance
MoFA	Ministry of Food and Agriculture
MoH	Ministry of Health
MoTI	Ministry of Trade and Industry
MoU	Memorandum of Understanding
MTDP	Medium Term Development Plan
NADMO	National Disaster Management Organisation
NCP	National Contact Points
NDPC	National Development Planning Commission
NDT	Non-Destructive Techniques
NEP	National Environment Policy
NMTDPF	National Medium-Term Development Policy Framework
NNRI	National Nuclear Research Institute

OHCS	Office of the Head of Civil Service
OPRI	Oil Palm Research Institute
PGEC	Post Graduate Education Course
PoA	Programme of Action
PGRI	Plant Genetic Resources Research Institute
PPME	Policy Planning, Monitoring and Evaluation
PPP	Public Private Partnership
PSC	Public Services Commission
RCC	Regional Coordinating Council
R&D	Research and Development
RAMSRI	Radiological and Medical Science Research Institute
RPI	Radiation Protection Institute
RSIM	Research, Statistics and Information Management
SA	South Africa
SADA	Savannah Accelerated Development Authority
SARI	Savannah Agricultural Research Institute
S&T	Science and Technology
SC	Steering Committee
SDF	Skills Development Fund
SEA	Strategic Environmental Assessment
SIT	Sterile Insect Technique
SKA	Square Kilometre Array
SLWMP	Sustainable Land and Water Management Project

SMTDP	Sector Medium Term Development Plan
SNAS	School of Nuclear and Allied Sciences
SONA	State of the Nation Address
SRI	Soil Research Institute
STEPRI	Science and Technology Policy Research Institute
STI	Science, Technology and Innovation
STIDEP	Science, Technology and Innovation Development Programme
STIP	Science, Technology and Innovation Policy
SWOT	Strengths, Weaknesses, Opportunities and Threats
TCPD	Town and Country Planning Department
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VOIP	Voice Over Internet Protocols
WASCAL	West Africa Science Centre for Climate Change
WAN	Wide Area Networks
WG	Working Group
WRI	Water Research Institute

EXECUTIVE SUMMARY

The Ministry of Environment, Science, Technology and Innovation (MESTI) as it now stands, has experienced a number of significant institutional changes since its inception. The Ministry was originally established in 1994 in response to Agenda 21, an action plan for implementation of sustainable development, which emerged from the 1992 United Nations Conference on Environment and Development (UNCED).

MESTI was transformed into the Ministry of Environment and Science (MES), when the Technology portfolio was transferred to Ministry of Communications, which became the Ministry of Communications and Technology. In 2006, the entire Ministry of Environment and Science (MES) was dissolved, with its Science portfolio absorbed by the Ministry of Education, which then became the Ministry of Education, Science and Sports (MoESS).

The Environment portfolio was absorbed by the Ministry of Local Government and Rural Development which was renamed the Ministry of Local Government, Rural Development and Environment (MoLGRDE).

The Ministry was reconstituted in 2009 and named Ministry of Environment, Science and Technology (MEST); under Executive Instrument (E.I.) 7 Civil Service (Ministries) Instrument, 2009. However, in 2013, the Innovation Portfolio was added and the Ministry renamed Ministry of Environment, Science, Technology and Innovation (MESTI), under Executive Instrument (E.I.) 1 Civil Service (Ministries) Instrument, 2013.

The Ministry of Environment, Science, Technology and Innovation (MESTI) exists to promote sustainable environmental management and the adoption and application of science and technological innovations through the formulation of policies, monitoring and evaluation of the implementation of sector plans, programmes, and projects for national development. MESTI's vision is "Sustainable development of Environment, Science, Technology and Innovation for all".

The functions of the Ministry and its Agencies/Department are among others to

- Provide leadership and guidance for Environment, Science, Technology and Innovation within the broad sector of the economy through sound policy formulation and implementation;
- Ensure the establishment of the regulatory framework and setting of standards to govern the activities of science and technology and the management of the environment for sustainable development;
- Promote activities needed to underpin the standards and policies required for planning and implementation of sound scientific and technological development activities;
- Ensure the coordination, supervision, monitoring and evaluation of activities of Environment, Science, Technology and Innovation while fulfilling national benefits-sharing commitments;

- Set out the parameters required for programmes on environment, science, technology and human settlement in consultation with the National Development Planning Commission (NDPC) in guiding the Districts Assemblies as the planning authorities at the local level;
- Analyse and coordinate all planned programmes as well as budgets in the environment, science, technology and innovation sector of the economy for purposes of achieving a single integrated management system;
- Initiate, simulate and coordinate research including the continuous development and review of policies, laws, rules and regulations in the environment, science, technology and innovation sector of the economy; and
- Ensure effective environmental management and governance, in line with the functions of the Act 490, with the EPA as the main implementing agency and the MESTI playing an oversight, coordination and facilitating role.

Over the medium term (2018-2021), the general thrust of development programmes and sub-programmes to be undertaken by MESTI and its Agencies will aim at ensuring that the sector projects and programmes are in line with national development agenda by developing appropriate policies, programmes and projects that relate to the environment and Science, Technology and Innovation; as well as ensures the successful implementation of all activities that relate to the environment, Science, Technology and Innovation.

This will include implementing national priority projects such as; mainstream STI into National Development Agenda, promote STI Culture in Ghana, build STI Infrastructure Capacity, develop Human Capital for STI development, establish an effective National Innovative System, develop indigenous knowledge and Technologies, promote International Cooperation and Linkages, develop National capacity for Space Science and Technologies, strengthen STI Advisory System for Policy Makers and finance the STI Implementation Programme which seek to create jobs, reduce poverty and make science, technology and innovation accessible to all economic sector players. MESTI will also continue the implementation of the Sustainable Land and Water Management Project (SLWMP), the Adaptation Fund Project and also ensure the enhancement of the management of Hazardous, Electronic and Plastic waste in the country.

CHAPTER ONE

PERFORMANCE REVIEW AND PROFILE/CURRENT SITUATION/BASELINE

1.1. Introduction

The Ministry of Environment, Science, Technology and Innovation (MESTI) forms part of the Central Management Agencies of government machinery. It was created in 1993 as the Ministry of Environment and Science and abolished in 2006 (the Environment portfolio was added to the Local Government Ministry; and Science, added to the Education Ministry). The Ministry was reconstituted in January 2009, and named Ministry of Environment, Science and Technology (MEST); under Executive Instrument (E.I.) 7 Civil Service (Ministries) Instrument, 2009. However, in 2013, the Innovation portfolio was created and added to the mandate of the Ministry. The Ministry was then renamed Ministry of Environment, Science, Technology and Innovation (MESTI), under Executive Instrument (E.I.) 1 Civil Service (Ministries) Instrument, 2013.

This chapter reviews the Ministry as an institution, focusing on the background of the Sector with respect to its Mission, Vision, Goal and core functions. It goes on further to highlight some of the challenges and critical lessons learnt from implementation of the 2014-2017 Sector Medium Term Plan.

1.2. Vision

The Ministry envisages to attain “Sustainable development of Environment, Science, Technology and Innovation for all”

1.3.Mission

The Ministry of Environment, Science, Technology, and Innovation exists to promote sustainable environmental management and the adoption and application of science and technological innovations through the formulation of policies, monitoring and evaluation of the implementation of sector plans, programmes, and projects for national development.

1.4.Core Values

Values are an integral part of an organization’s culture and create a sense of identity, belonging and purpose. The Ministry of Environment, Science, Technology and Innovation (MESTI) has therefore agreed to uphold the following seven principles, as the core values for the sector:

1. *Customer Satisfaction*: Through a deliberate open-door policy, we are committed to satisfying both our internal and external customers
2. *Team Work*: By consciously and deliberately nurturing team spirit, collaboration and consultation, we will maximize our synergies in working together

3. *Professionalism*: Through a continuous assessment of training and capacity needs, we will be able to build a professional human resource base and ensure effective and efficient service delivery;
4. *Integrity*: We aim to be accountable, transparent, ethical and honest, and at the same time adopt a 'zero-tolerance to corruption
5. *Creativity and Innovativeness*: We will be open and proactive in seeking better methods of delivery of service
6. *Commitment to Environmental Sustainability*: We will be committed to ensuring a sustainable industrial development process through management policies and practices that guarantee environmental protection
7. *Gender Equity*: We will embrace the principles of gender equity, gender fairness and gender balance
8. *Accountability*: We will seek to uphold accountability in all our undertakings
9. *Feedback and improvement*: We will seek to dialogue and respond to suggestions from stakeholders.

1.5.Functions

The core functions of the Sector are:

1. Provide leadership and guidance for Environment, Science, Technology and Innovation within the broad sector of the economy through sound policy formulation and implementation;
2. Ensure the establishment of the regulatory framework and setting of standards to govern the activities of science and technology and the management of the environment for sustainable development;
3. Promote activities needed to underpin the standards and policies required for planning and implementation of sound scientific and technological development activities;
4. Ensure the coordination, supervision, monitoring and evaluation of activities of Environment, Science, Technology and Innovation while fulfilling national benefits-sharing commitments;
5. Set out the parameters required for programmes on environment, science, technology and human settlement in consultation with the National Development Planning Commission (NDPC) in guiding the Districts Assemblies as the planning authorities at the local level;
6. Analyse and coordinate all planned programmes as well as budgets in the environment, science, technology and innovation sector of the economy for purposes of achieving a single integrated management system;
7. Initiate, simulate and coordinate research including the continuous development and review of policies, laws, rules and regulations in the environment, science, technology and innovation sector of the economy; and

8. Ensure effective environmental management and governance, in line with the functions of the Act 490, with the EPA as the main implementing agency and the MESTI playing an oversight, coordination and facilitating role.

1.6.Sector Performance Review

This section covers the extent of implementation of all broad projects/activities as well as achievements of the policy objectives implemented during 2014 to 2017 with respect to the appropriate thematic areas of GSGDA II. During the period under review (2014-2017), the Ministry and its Agencies/Authorities achieved the following under the three (3) Thematic Areas;

1.6.1. Key Achievements

Accelerated Agriculture Modernization and Sustainable Natural Resource Management;

Under Accelerated Agriculture Modernization and Sustainable Natural Resource Management, the following was accomplished:

H.E. the President launched the *National Environment Policy* in 2014 to guide the implementation of various activities that impact on the environment. The Ministry also mainstreamed environment into the national development planning process by covering 65% of MDAs/MMDAs. Additionally, all MDAs and MMDAs were trained to help all actors adequately deal with environmental concerns that might come up while implementing various activities, projects plans and policies. A budget code for environment was also developed in collaboration with the Ministry of Finance for fiscal compliance. As at 2016, 65% MDAs/MMDAs have been mainstreamed.

A total of 840ha of the Ambalara and Kulpawn forest Reserves were reforested between 2015 and 2016 under the Sustainable Land and Water Management Project (SLWMP). Additionally, Ecotourism strategy to promote tourism in the Western Wildlife Corridor was developed under the same project. Additionally, the Ministry, as at 2016, provided 14,109 farmers with inputs in 118 communities to adopt Sustainable Land and Water Management (SLWM) technologies. One (1) waterhole was constructed in 2016 within the Gbele Resource Reserve under the SLWMP.

A Spatial Development Framework for Northern Savannah Zone (NSZ) was developed and published in 2016. In addition, four (4) forest management plans for Pudo Hills, Sissili North, Sissili Central and Bepona forest reserves were also developed and published. A baseline study for impact evaluation of the SLWMP, as well as an audit of 2015 SLWMP account was done. The Ministry held four (4) review meetings on the National implementation of Chemical Weapon Convention (CWC). A draft legislation for CWC was submitted to Attorney General's Department. Further stakeholder consultations on the draft will be undertaken in 2017 to satisfy Cabinet requirements. Additionally, one (1) member from the Ministry was sponsored to participate in the Annual CWC meeting.

The Ministry upscaled the integrated watershed planning to 12 districts and 172 communities. Additionally, two (2) Community Resource Management Area (CREMA) management plans have been completed and are being implemented, with an additional two (2) expected to be completed by the end of the year 2017.

A *zero draft of the National Biodiversity Policy* was developed to reduce loss of biodiversity. The Policy, when completed, will guide the conservation and use of biological resources. Additionally, the Ministry reviewed the National Biodiversity Strategy and Action Plan (NBSAP) and submitted it to the Convention on Biodiversity (CBD) Secretariat.

The National Climate Change Policy (NCCP) was launched by H.E. the President of the Republic of Ghana in 2014. In addition, the National Climate Change Policy (NCCP) Master Plan was developed. A Low Carbon Development Strategy was also developed. In order to enhance the Nation's capacity to adapt to climate change and its impacts, the Ministry developed the climate change inclusive guidelines and trained 432 key officials in 216 MMDAs to mainstream Climate Change issues. Additionally, the National Climate Change Steering Committee (NCCPSC) was set up to make inputs into Ghana's position towards the Paris Agreement.

The Ministry also prepared and submitted Ghana's INDC, Third National Communication, Biennial Update Report and Green House Gases (GHG) Inventory Report to the United Nations Framework Convention on Climate Change (UNFCCC). The INDC Action Plan was also prepared and submitted to UNFCCC in 2016. The Third national communication, biennial update report and Green House Gas (GHG) inventory was also prepared and submitted to the United Nations Framework Convention on Climate Change (UNFCCC).

The Parliament of Ghana ratified the *Paris Climate Agreement on 4th August 2016*, pledging to reduce Ghana's Green House Gases emission by 45% below BAU emission levels of 73.9 MTCO_{2e} by 2030. The ratification of the Paris Agreement will create opportunities for the flow of technical and financial support to Ghana. After receiving approval for implementation to start in May, the Ministry secured *US\$8 million from the adaptation fund* to implement the *Adaption Fund Project* in the three Northern Regions. The Project is aimed at restoring degraded river Basins (black and white Volta).

The Ministry under the GCF Readiness programme established a NDA secretariat, developed Pipeline projects for funding, selected two National Implementing Entities (NIEs), built capacity of private sector to promote investment in climate change programmes and developed the tracking tool for climate finance and development of NDA operational documents. As part of efforts of transitioning Ghana into a green economy, the Ministry developed sector actions plans for Five (5) key MDAs (MESTI, Energy, MOFA, MLNR, MOH). Climate change communications plan and materials were developed for various stakeholders, as well as technical follow-ups and reviews of 216 MMDA MTDPs.

The *Hazardous and Electronic Waste Control and Management Bill*, 2016 was also passed into law. This Act will provide for the control, management and disposal of hazardous waste, electrical and electronic waste and for related purposes.

The Ministry together with the KFW successfully signed a €10 Million Grant project on *Recycling and Disposal of Waste of Electrical and Electronic Equipment in an Environmentally Sound Way*. The Financing and Separate Agreements were prepared for signature by both parties. Separate Agreements were also signed with GIZ for a €5 Million Grant for a Technical Cooperation component to complement the project.

An EPA assessment in 2016 showed that 6 sectors had integrated climate change mitigation and adaptation strategy priorities integrated into their plans and programmes. The EPA gave approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations. The Agency issued a total of 3,422 in 2014, 4,784 in 2015, and 7,167 in 2016. Monitoring over the period also showed 100% compliance. In addition, four annual compliance monitoring events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas) were also carried out between 2014 and 2016. The Pesticides register was updated for each year between 2014 – 2016 register to show list of pesticides approved for use, banned and those for experimental purposes.

The EPA sampled and analysed level of pollution of effluent quality from industries and hotels (54 industries in 2014, 47 industries in 2015, 80 industries in 2016). the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm. The EPA also monitored selected sites (11 in 2014, 14 in 2015, and 14 in 2016) for air quality and pollutants, including PM10, CO, NO2, SO2. Results showed that pollution values were higher than the EPA recommended levels. The National Oil Spill Contingency Plan (NOSCP) contingency plan was finalized in 2014 and was published and disseminated for signing in 2016. The Memorandum of Understanding for operationalizing the National Oil Spill Plan was endorsed by non- contributors in 2016 and a simulation exercise undertaken by key stakeholders.

The EPA monitored to assess **19 mining** companies operating in line with environmental legislations (AKOBEN Rating). The number of mining companies was increased to **22** in 2016. To help increase the level public awareness on environmental issues, **4,223 articles**, **4,645 articles**, **5,111 articles** on various environmental issues were covered on national media in 2014, 2015 and 2016 respectively. Thirteen (13) Board members, 3 NBA staff and 8 Technical Advisory Committee members were trained on risk assessment of GMOs each year from 2015 to 2017. Additionally, 6 Principal Investigators, 7 Institutional Biosafety Committee members and 10 journalists were also trained on biosafety issues each year over the same period.

Laboratory equipment were procured in 2015 to establish a Genetically Modified Organisms (GMOs) detection laboratory. GMOs detection laboratory space was also acquired at Ghana Standards Authority by the NBA in 2016. It was commissioned and made functional in 2017. Seven (7) draft MoUs were prepared in 2015 for signature with the seven (7) Regulatory Agencies specified in the Biosafety Act. As at 2017, one (1) MOU had been signed with the Ghana Standards Authority (GSA). Guidelines on the general release of GMOs were produced in 2015. The NBA also collaborated with the Attorney Generals' Department and drafted the Final Regulations on GMOs. This was submitted to the sector Minister. Application forms were prepared and approved by the NBA Board. In addition, a GMO detection laboratory was setup and commissioned at Ghana Standards Authority in 2017. In addition, six (6) members of the NBA Appeals Tribunal were inaugurated.

Infrastructure and Human Settlement

The under listed was achieved under the Infrastructure and Human Settlement Thematic Area; One thousand (1,000) laptops were distributed to Secondary and tertiary institutions Schools in 2014 under the Better Ghana ICT Project. The Ministry also signed contracts with 5 R & D selected Institutions in 2014 for the establishment of the Technology Transfer Centres. They are: *University of Ghana, Kumasi Polytechnic, Ghana Atomic Energy Commission, Council for Scientific and Industrial Research, and Ghana Technology University College.*

The Ministry constituted a Technical committee in 2014 to draft the LI on STI Bill. in 2015, 4 Technical committee meetings were held on the establishment of the STI Fund. Finally, a draft Legislative Scheme was prepared in 2016 while a stakeholder consultation was organized with the Ministry of Finance on "Sustainable Sources of Funding".

The Ministry organized a one-day STI fair in 2015 for five (5) institutions namely; GAEC, CSIR, University of Ghana, Kumasi Polytechnic, GTUC showcasing 50 exhibits. Subsequently, in 2016, the Ministry organized a 3-day National STI Fair from 14-16, September 2016 which consisted of exhibitions and symposium. The Ministry launched three (3) Technology Transfer Centres (TTCs) and profiled 50 Existing Technologies. in addition, 350 Scientist were trained in Technology Transfer processes. 80 Senior Management of R & D institutions were also trained while 6 Research-Industry workshops were organized. The Ministry installed Tv. White facility in 5 SHS in Accra and collected data for the project. Provided 80 laptops to implement the Pilot project in 2016.

Three Thousand Eight Hundred and Sixty-one (3,861) scholarships were awarded under the MASTESS program in 2015. The Ministry organized a 2-day Ghana-South Africa bilateral to develop a 3-year Plan of Action in 2016. The Ministry awarded 17 technology grants to researchers, trained 63 researchers and marketing officers and organized 3 R&D Business Seminars with industry players. The Ministry conducted a national STI Baseline to manage STI

data, report on national trends for R&D and monitor and evaluate system for public research. Participating in the surveying were about 38 private/public universities, R&D institutions and media organizations.

Twenty (20) improved technologies for improved rice production were promoted. In addition, 800 copies of rice production guides were produced by the CSIR between 2014 and 2016. One thousand and six (1006) farmers adopted the SAWAH Technology in the catchment areas in order to promote the use of water management structures for rice production. 1,200 farmers are expected to adopt the SAWAH Technology in 2017. The CSIR provided grafted mango seedlings and certified planting materials to 900 farmers between 2014 and 2016. One thousand and two hundred farmers are expected to be provided for in 2017.

The CSIR trained 82 target group persons (commercial farmers, Agricultural Extension Agents (AEAs) and NGOs) on good agricultural practices (GAPs) for increased productivity in mango production. One hundred and thirty (130) enterprises/entrepreneurs were supported through training in agro-processing and production of fruit juice between 2014 and 2016. A total of 150 enterprises/entrepreneurs are expected to be trained in 2017. Five (5) fruit processors adopted technology which promotes solar and/or cabinet drying of mango fruits for local consumption. Screening of these varieties are on-going.

The CSIR developed two (4) high yielding disease and pest tolerant varieties of pepper and eggplant for local and export markets. One hundred and five (105) farmers were supplied with 240 improved seedlings of oil palm and coconut respectively. Eight (8) technologies were promoted for poultry and livestock farmers to increase meat and egg production. Additionally, twelve (12) technologies on sustainable fishery management promoted while 1,450 processors were trained on the FRISMO technologies. Three (3) additional technologies on sustainable fishery management practices are expected to be rolled over in 2017.

Rain Water Harvesting (RWH) technology was adopted by 1,500 households in small communities and schools. The total number of households is expected to reach 1,800 in 2017. Additionally, seventy-five (75) communities benefitted from boreholes drilled by the CSIR. Ten (10) schools and sixteen (16) communities adopted the bio-sanitation toilets technology. Three thousand eight hundred (3,800) affordable houses were built with local building material and fast track construction technologies between 2014 and 2016. One hundred and five (105) lesser known wood species also promoted in the construction industry over the same period. One thousand four hundred and fifty (1,450) processors trained on the FRISMO technologies in 2016 while the training of 50 fish processors was rolled over to 2017.

In 2014, GAEC monitored 1,593 occupationally exposed workers in the mining industry in Ghana and also inspected and authorized 152 radiation devices and sources in order to ensure safety of

radiation workers. Additionally, the Commission carried out safety assessments in 2 mines in 2015, one (1) housing construction site and three (3) gold mines for Monitor Naturally Occurring Radioactive Materials (NORMS). GAEC also conducted hazard assessment on Chirano Mines and Newmont Goldmines in 2016.

Hazard Assessment of Electromagnetic Radiation from Mobile phones operators and Radio Stations was done across the country. 333 base station sites and 727 RF and FM sites were assessed and monitored in 2014 and 2015. In addition, safety assessment on 244 base stations and 808 RF and FM cell sites were done in 2016.

Six (6) National Training Courses organized for end user Institutions for their specific applications. GAEC also identified and submitted list of professionals to undergo training to the IAEA. One Medical Doctor and one Medical Physicist are under training in South Africa. Trained Scientist, engineers and technologist. In addition, 18 professionals in the sub-region GAEC undertook a Post-Graduate Education Course (PGEC) in Radiation Protection in 2015.

First media forum was held in 2014 for 5 stakeholder groups (the military, the media, Engineers, Scientists} on nuclear related issues. GAEC rendered Seventy-five (75) Non- Destructive Testing (NDT) services to industry to detect any leakages in gas pipelines, fuel storage tanks and vehicles (tankers). The Commission also submitted a draft proposal for the establishment of the NDT training centre in 2015.

GAEC Assessed water quality of major rivers in the Northern regions and the coastal Central Region including the Densu Basin. Submitted Draft report on assessment to Water Resources Commission in 2015 Integration of Isotope Hydrology Technique into Water Resources Assessment in Ghana. Additionally, the commission conducted sampling of planktons from marine environment. Such physico-chemical properties like pH, temperature, conductivity, salinity, phosphates, nitrates, and carbonates on the water samples were done in 2016.

GAEC irradiated 80tote boxes (15 m3) of medical items and also sterilized 10 tonnes of peat using the Gamma Irradiation Facility (GIF) for IITA, Nigeria. Additionally, six (6) tonnes of food items were irradiated using the Gamma Irradiation Facility while 100 tote boxes of peat pellets and miscellaneous items were irradiated. GAEC also produced 30,000 kg of organic compost in collaboration with the International Water Management.

The Land Use and Spatial Planning Bill was passed into Act (Act 925) in 2016. Nominees for the Land Use and Spatial Planning Authority (LUSPA) board was sent to Office of the President for confirmation and inauguration in 2017. 90% Draft business plan complete. As at 2017, only 18% nation-wide coverage of land area had been digitally captured using orthophoto.

A total of 370 copies of 150 copies of zoning guidelines and planning standards were distributed. In addition, 420 copies of spatial planning manuals were distributed between 2014 and 2017. The LUPMIS was fully upgraded in 2016. All 10 regional representatives were trained on the upgraded version of LUPMIS.

The Basic version of Land Use Planning Management Information System (LUPMIS) was deployed to all MMDAs in 2014. Tax applications were also fully integrated into LUPMIS with stakeholders in all 216 MMDAs trained.

The National Spatial Development Framework (NSDF) was completed in 2015. 200 NSDF reports were distributed to MDAs and RCCs nationwide. The NSDF was publicized on TCPD website. In addition, the SDF for Northern Savannah Ecological zone completed in 2016. Regional SDFs for Ashanti and Greater Accra (90%) are expected to be completed in 2017. District SDF for Tamale Metropolis, as well as local plan for Buiepe to be completed by the end of the 2017

Transparent and Accountable Governance

The Transparent and Accountable Governance Thematic Area also recorded the following achievements;

The Ministry established the *Nuclear Regulatory Authority (NRA)* to regulate the use of radiological and nuclear activities to fulfill national and international obligations. Currently, regulations on *Basic radiation protection, radioactive waste management, Transport of radioactive sources, nuclear materials* and *Nuclear Safeguards* were drafted.

The Ministry also established the *National Biosafety Authority (NBA)* in 2015 to act as the National Focal Point responsible for liaising with any other agencies or international organizations concerned with Biotechnology and Biosafety.

The Ministry implemented a governance system for the mitigation of adverse environmental consequences as a result of the exploration and exploitation of oil and gas. A *draft Monitoring and Evaluation Plan* for the Oil and Gas Management Programme was prepared.

The Ministry instituted the incorporation of *Oxo-biodegradable additives* in the production process of flexible plastics. Compliance level to this directive is (86%). Measures are being put in place to ensure 100% compliance. The *National Biosafety Authority (NBA)* was established and operationalized in 2015.

Oil and Gas Development

Phase II cooperation agreement with Norway on the *Oil and Gas Management Programme* has been signed. This Oil and Gas management programme has led to the establishment of a *Petroleum Department at the EPA*. An Oil and Gas unit has been established within the Environment Directorate of MESTI. A *draft Environmental Policy on Oil and Gas* was also developed by the

Ministry. This will ensure coordination among stakeholders and institutions of national and sub-national entities for management of environmental impact of Oil and Gas.

Table 1.1: Performance of MESTI from 2014 - 2017

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Management & Administration	General Administration	Finalise National Environment Policy	Draft National Environment Policy	National Environment Policy to be finalised and operationalized	<ul style="list-style-type: none"> Launched the National Environment Policy to guide the implementation of various activities that impact on the environment Mainstreamed environment into the national development planning process Trained all MDAs and MMDAs to help all actors adequately deal with environmental concerns that might come up while implementing various activities, projects plans and policies Generated a budget code for environment for fiscal compliance by MDAs 	Fully Implemented
			Mainstream environment into the national development planning process	0% of MDAs/MMDAs	35% of MDAs/MMDAs to be covered for mainstreaming	40% of MDAs/MMDAs	On-going
		Finance	Prepare and submit 2013 Annual financial statement to Ministry of Finance and CAGD	2012 Financial Statement	2013 Annual financial statement to be submitted to Ministry of Finance and CAGD	Consolidated 2013 Accounts submitted to MoF and CAGD	Fully Implemented
		Human Resource	Undertake midyear/Annual Performance Report for the Sector	One APR compiled and submit to Office of the Head of Civil Service	Annual Performance Report (APR) compiled	One APR submitted to OHCS	Fully Implemented
			Undertake Scheme of Service Training programme for all categories of staff	One (1) officer attended various SoS trainings	Nine (9) officers to attend various SoS trainings	Nine (9) officers participated in SoS trainings	Fully Implemented
			Organise Promotion and Recruitment Interviews	10 Promotion Interviews conducted	10 Officers to be promoted to various grades	10 officers were interviewed and promoted to various grades	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Participation in local and international training conference	Forty-one (41) officers to participate in both local and international training conferences	19 Officers to participate in various local and international courses	19 Officers participated	Fully Implemented
		Statistics, Research, Information and Public Relations	Hold Annual Environmental Days celebrations	Four (4) Environment days celebrated	Four (4) Environment days to be celebrated	Celebrated all the four (4) Environmental Days successfully. <ul style="list-style-type: none"> • International Biodiversity Day (IBD) • World Environment Day (WED) • World Day to Combat Drought and Desertification (WDCDD) • African Scientific Renaissance Day (ASRD) 	Fully Implemented
	Environmental Protection & Management	Environmental Compliance & Enforcement	Assess the number of sectors with climate change mitigation and adaptation strategy priorities integrated	4 sectors	5 sectors	5 sectors	Fully Implemented
			Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	2,644	3,390	3,422	Fully Implemented
			Monitor and determine percentage of sectors covered by EA: - oil and gas exploration	100% compliance	100% compliance	100% compliance	Fully Implemented
			Carry out annual compliance monitoring events: Accra Other Regions	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4events (1 Manufacturing ,1 Mining, 1 Built environment and 1 Oil and gas)	Fully Implemented
			Update of the pesticide register to show list of pesticide approved for use, banned and those	Pesticide register Updated	Pesticide register to be updated for 2014.	Pesticide register updated for 2014.	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			for experimental purposes				
			Sample and analyse level of pollution of effluent quality from industries and hotels	Effluent quality monitored for 20 hotels in the Ashanti and Western Regions and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm respectively for most industries	60 industries across the country to be monitored for effluent quality	54 industries in the Greater Accra Region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm	On-going.
			Monitor selected sites for air quality and pollutants, including PM10, CO, NO2, SO2	8 sites monitored for air quality and pollutant with pollution values higher than the EPA recommended levels	14 sites to be monitored	11 sites monitored with pollution values higher than the EPA recommended levels	On-going
			Develop National Oil Spill Contingency Plan (NOSCP)	Oil spill risk assessment carried out and contingency plan developed but yet to be subjected to stakeholders review	To have NOSCP finalized	The NOSCP was finalized	Fully Implemented
			Train Regional and District level Staff to deal with environmental assessment issues	119 EPA officers and industry representatives from three regions trained	150 Officers to be trained	108 EPA Officers trained on environmental Assessment Administration	On-going
			Environmental issues covered in national media	3839	4000	4223	Fully Implemented
			Monitor to assess the number of mining companies operating in line with environmental legislations (AKOBEN Rating)	16 mining companies participated in the AKOBEN rating programme.	19 mining companies to participate in the AKOBEN rating programme.	19 mining companies participated in the AKOBEN rating programme.	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2015	Management & Administration	General Administration	Mainstream environment into the national development planning process	40% of MDAs/MMDAs	55% of MDAs/MMDAs to be covered	65% of MDAs/MMDAs	Fully Implemented
			Reforest a total of 400 ha of the Kulpawn and Ambalara forest reserves	None	A total of 400ha of the Ambalara and Kulpawn forest Reserves to be reforested	Reforested 420 ha of Ambalara and Kulpawn Forest	Fully Implemented
			Develop an Ecotourism strategy for the Western Wildlife Corridor	No strategy	Ecotourism strategy to promote tourism in the Western Wildlife Corridor to be developed	Developed Strategy	Fully Implemented
			Provide inputs (fertilizer, seeds, tree seedlings) to farmers for implementation of sustainable land and water management technologies in 72 communities	28 communities provided with inputs	72 communities inputs to be provided	Provided 72 communities with inputs for farmers to adopt Sustainable Land and Water Management (SLWM) technologies	Fully Implemented
			Undertake a feasibility study of sustaining SLM activities	No feasibility study	Feasibility study of sustaining SLM activities through the Payment for Environmental Service (PES) mechanism to be undertaken	Undertook feasibility study	Fully Implemented
			Engage a contractor to construct 2 waterholes within the Gbele Resource Reserve (GRR)	No water holes	Contractor to be engaged for the construction of Two (2) waterholes within the Gbele Resource Reserve.	Awarded contract for the construction of the two (2)waterholes	Fully Implemented
			Audit 2014 Sustainable Land and Water Management Project (SLWMP accounts and	2013 audited project account	2014 audited SLWMP account and annual report to be submitted to the World Bank	Submitted 2014 audited SLWMP account and annual report to the World Bank	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			submit report to the World Bank				
		Finance	Prepare and submit 2014 Annual financial statement to Ministry of Finance and CAGD	2013 Financial Statement	2014 Annual financial statement to be submitted to Ministry of Finance and CAGD	Consolidated 2014 Accounts submitted to MoF and CAGD	Fully Implemented
		Human Resource	Undertake midyear/Annual Performance Report for the Sector	APR compiled and submitted to OHCS	Draft APR compiled	Final APR compiled and submitted to OHCS	Fully Implemented
			Undertake Scheme of Service Training programme for all categories of staff	One (1) officer	Nine (9) officers to undertake SoS training	9 officers undertook SoS training	Fully Implemented
			Organise Training/workshop on Performance Management for staff of the Ministry	N/A	One (1) Performance Management workshop to be conducted	One (1) Performance Management workshop conducted	Fully Implemented
			Organise Promotion and Recruitment Interviews	Ten (10) Promotion Interviews Conducted	Sixteen (16) officers to be promoted to various grades	Twelve (12) officers interviewed and promoted to various grades	On-going
			Organise HR Forum/ workshop with sector Agencies/Depts to discuss HR issues	N/A	Two (2) Performance Management workshop to be conducted	Two (2) Performance Management workshop organized	Fully Implemented
			Participation in local and international training conference	Forty-one (41) officers to participate in both local and international training conferences	Ten (10) officers participated in various training courses	Six (6) officers participated in various training courses	On-going
		Statistics, Research, Information and Public Relations	Hold Annual Environmental Days celebrations	Four (4) Environment days celebrated	Four (4) Environment days to be celebrated	Celebrated all the four (4) Environmental Days successfully. <ul style="list-style-type: none"> • International Biodiversity Day (IBD) • World Environment Day (WED) • World Day to Combat Drought and Desertification (WDCDD) 	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
						<ul style="list-style-type: none"> African Scientific Renaissance Day (ASRD) 	
	Environmental Protection & Management	Environmental Compliance & Enforcement	Assess the No. of sectors with climate change mitigation and adaptation strategy priorities integrated	5 sectors	6 sectors	6 sectors	Fully Implemented
			Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	3422	4600	4784	Fully Implemented
			Monitor and determine percentage of sectors covered by EA: - oil and gas exploration	100% compliance	100% compliance	95% compliance	on-going
			Carry out annual compliance monitoring events: Accra Other Regions	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing ,1 Mining, 1 Built environment and 1 Oil and gas)	Fully Implemented
			Update of the pesticide register to show list of pesticide approved for use, banned and those for experimental purposes	Updated	to be updated	updated	Fully Implemented
			Sample and analyse level of pollution of effluent quality from industries and hotels	54 industries in the Greater Accra Region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm	55 industries to be monitored for effluent quality	47 industries in the Greater Accra Region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm 47 industries monitored	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	11 sites monitored for air quality and pollutant with pollution values higher than the EPA recommended levels	14 sites to be monitored	14 sites monitored with pollution values higher than the EPA recommended levels	Fully Implemented
			Publish and distributed National Oil Spill and Contingency Plan (NOSCP) to key stakeholders	The Plan was finalized	NOSCP published and disseminated	NOSCP published and disseminated for signing in 2016	Fully Implemented
			Train Regional and District level Staff to deal with environmental assessment issues	108 EPA Officers trained on environmental Assessment Administration	200 Officers to be trained	893 Officers trained on environmental Assessment Administration	Fully Implemented
			Environmental issues covered in national or local media	4,223	4,500	4645	Fully Implemented
	Biotechnology Development	Biosafety Regulation	Organize workshops to train Board members, NBA staff, Technical Advisory Committee members on risk assessment of GMOs	None	2 workshop to trained 13 Board members, 3 NBA staff, 8 Technical Advisory Committee members to be held	Held 2 workshops Trained 13 Board members, 3 NBA staff, 8 Technical Advisory Committee members	Fully Implemented
			Organize workshops to train Principal Investigators and Institutional Biosafety Committee members on risk assessment of GMOs	None	1 workshop to train 6 Principal Investigators and 7 Institutional Biosafety Committee members to be held	Held 1 workshop Trained 6 Principal Investigators and 7 Institutional Biosafety Committee members	Fully Implemented
			Organize workshops to train Inspectors on Biosafety issues	None	None	2 workshops to train 6 Inspectors on Biosafety issues held	Fully Implemented
			Train Journalists on biosafety issues	None	3 workshops to train 10 Journalists on biosafety issues to be held	Held 3 workshops Trained 10 Journalists on biosafety issues	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Procure equipment to establish a Genetically Modified Organisms (GMOs) detection laboratory	None	GMOs detection laboratory equipment to be procured.	Procured laboratory equipment	Target achieved
			Prepare MoUs with the 7 Regulatory Agencies specified in the Biosafety Act	None	7 MoUs to be prepared with Regulatory Agencies	7 Draft MoUs prepared	Target achieved
2016	Management & Administration	General Administration	Reforest 400ha in total of the Kulpawn and Ambalara forest reserves	420ha of the Kulpawn and Ambalara forest reserves	A total of 400ha of ha Ambalara and Kulpawn forest Reserves to be reforested	Reforested 420ha in total of the Ambalara and Kulpawn forest	Fully Implemented
			Provide inputs (fertilizer, seeds, tree seedlings) to 10,500 farmers for implementation of sustainable land and water management technologies in 118 communities	3,000 farmers in 28 communities provided with inputs	10,500 farmers with inputs in 118 communities to be provided	Provided 14,109 farmers with inputs in 118 communities	Fully Implemented
			Construct two (2) waterholes within the Gbele Resource Reserve	Contractor engaged	Two (2) waterholes be constructed within the Gbele Resource Reserve to	Constructed One (1) waterhole	On-going
			Undertake auditing of 2015 SLWMP accounts	2014 audited project account	2015 project account to be audited	Undertook audit of 2015 SLWMP account	Fully Implemented
			Finalise the Spatial Development Framework for Northern Savannah Zone (NSZ)	No Spatial Development Framework for the northern Savannah Zone	Spatial Framework for Northern Savannah Zone (NSZ) to be developed	Developed and Published NSZ Spatial development framework	Fully Implemented
			Develop four (4) forest management plans for Pudo Hills, Sissili North, Sisslli Central and Bepona forest reserves	Absence of a management plan for the 4 Forest Reserves	Four (4) forest management plans for Pudo Hills, Sissili North, Sisslli Central and Bepona forest	Developed four (4) Management plans for Pudo Hills, Sissili North, Sisslli Central and Bepona forest reserves and published	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					reserves to be developed		
			Undertake baseline study for impact evaluation of the SLWMP	No baseline	Baseline study to be undertaken	Undertook Baseline study and prepared report	Fully Implemented
			Engage a consultant for the design of two community dugouts	No design	A consultant to design community dugout to be engaged	Engaged the services of a consultant to design 2 community dugouts	On-going
			Renovate existing 20 rooms block at GRR	Existing old 20 rooms block at GRR	Existing GRR block to be renovated	Renovated Facility	Fully Implemented
			Organize stakeholders' quarterly meetings to review national implementation of the Chemical Weapon Convention (CWC)	2015 Quarterly review meetings	National implementation of Chemical Weapon Convention (CWC) to be reviewed	<ul style="list-style-type: none"> Held 4 review meetings Drafted Legislation for CWC by Attorney General's Dep't. 	On-going
			Undertake Implementation Review Exercise for Chile, Mexico, USA, Canada and Ghana in Accra	2014 review report	BWC activities to be undertaken in Ghana	Submitted a review report as a working document to the 8 th Review Conference held in December 2016	Fully Implemented
			Sponsor two (2) members of staff to attend annual meetings of CWC in June/July, 2016	Participation in 2015 annual meeting	2 members of staff to be sponsored to participate in Annual CWC meeting	Sponsored one member of staff	On-going
			Pay annual subscription fee and outstanding fee to the Technical Secretariat of the CWC by the end of the 1 st quarter	2014 payment	Annual CWC subscription fees to be paid	Paid CWC annual subscription fees up to 2014	On-going
		Finance	Prepare and submit 2015 Annual financial statement to Ministry of Finance and CAGD	2014 Financial Statement	2015 Annual financial statement to be submitted to Ministry of Finance and CAGD	Consolidated 2015 Accounts submitted to MoF and CAGD	Fully Implemented
		Human Resource	Undertake midyear/Annual	One (1) APR compiled and submitted to OHCS	One (1) report to be compiled and submitted	One (1) APR report compiled and submitted to OHCS	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Performance Report for the Sector				
			Undertake Scheme of Service Training programme for all categories of staff	One (1) officer attended various SoS trainings	Thirty-five (35) officers to undertake SoS training	Thirty-five (35) officers undertake SoS training	Fully Implemented
			Organise Training/workshop on Performance Management for staff of the Ministry	N/A	Two (2) Performance Management Workshop to be organized	Two (2) Performance Management workshop organized	Fully Implemented
			Organise Promotion and Recruitment Interviews	Ten (10) Promotion Interviews Conducted	12 officers to be promoted	7 officers promoted to various grades	On-going
			Participation in local and international training conference	Forty-one (41) officers to participate in both local and international training conferences	20 officers to participate in various courses	15 officers participated	On-going
		Statistics, Research, Information and Public Relations	Hold Annual Environmental Days celebrations	Four (4) Environment days celebrated	Four (4) Environment days to be celebrated	Celebrated all the four (4) Environmental Days successfully. <ul style="list-style-type: none"> • International Biodiversity Day (IBD) • World Environment Day (WED) • World Day to Combat Drought and Desertification (WDCDD) • African Scientific Renaissance Day (ASRD) 	Fully Implemented
	Environmental Protection & Management	Environmental Compliance & Enforcement	Assess the number of sectors with climate change mitigation and adaptation strategy priorities integrated	6	7	6	On-going
			Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	4784	4,800	2,614	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Monitor and determine percentage of sectors covered by EA: - oil and gas exploration	100% compliance	100% compliance	100% compliance	Fully Implemented
			Carry out annual compliance monitoring events: Accra Other Regions	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing ,1 Mining, 1 Built environment and 1 Oil and gas)	Fully Implemented
			Update of the pesticide register to show list of pesticide approved for use, banned and those for experimental purposes	updated	To be updated	Updated	Fully Implemented
			Sample and analyse level of pollution of effluent quality from industries and hotels	47 industries in the Greater Accra Region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm	70 industries to be monitored for effluent quality	80 industries in the Accra/Tema region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm	Fully Implemented
			Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	14 sites monitored	14 sites to be monitored	14 sites monitored with pollution values higher than the EPA recommended levels	Fully Implemented
			Operationalizing National Oil Spill and Contingency Plan (NOSCP) by key stakeholders	NOSCP published and distributed to stakeholders	MoU of NOSCP endorsed by stakeholders and simulation exercise undertaken	Memorandum of Understanding for operationalizing the National Oil Spill Plan endorsed by non-contributors and simulation exercise undertaken by key stakeholders	Fully Implemented
			Train Regional and District level Staff to deal with environmental assessment issues	893 EPA Officers and other key stakeholder representatives trained on environmental Assessment Administration	250 Officers to be trained	263 Officers trained on environmental Assessment Administration	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Environmental issues covered in national or local media	4,645 articles by 28 media outlets	5,000 articles by 28 media outlets	5,111 articles by 28 media outlets	Fully Implemented
		Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Develop draft regulatory framework for the control of ionizing radiation and radiation devices available.	None	5 regulatory framework for the control of ionizing radiation and radiation devices to be drafted: a. Discharges b. Waste management c. Naturally occurring radioactive material d. Fees for nuclear authorization e. Transport regulations	Drafted 4 regulations a. Discharges b. Waste management c. Naturally occurring radioactive material d. Transport regulations	On-going
			Verify compliance by users of radiation sources and devices	None	200 (Non-ionizing facilities to be verified for compliance)	None	Not implemented
					150 (ionizing facilities)	125 (ionizing facilities verified)	On-going
			Resolve non-compliance issues when it occurs	None	10	5	On-going
			Recruit Scientist and technologist for regulatory inspections and other professional support in various disciplines engaged and at post to fulfill the mandate of NRA	None	15	0	Not Implemented
			Train management staff of NRA at GIMPA in	None	17	0	Not Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			area of General Administration				
			Purchase 5 cross country and 3 saloon vehicles for regulatory inspections and other official duties	2	8	0	Not implemented
			Purchase assorted Laboratory and monitoring equipment for regulatory work.	None	10	0	Not Implemented
			Purchase equipment for International Relations and Public Affairs (IRPA)	None	6	0	Not Implemented
			Educate the general public and users of radiation sources.	None	2	1	On-going
			Establish and maintain Website	None	1	1	Fully Implemented
	Biotechnology Development	Biosafety Regulation	Organize workshops to train Board members, NBA staff, Technical Advisory Committee members on risk management of GMOs	None	3 workshops to trained 13 Board members, 3 NBA staff, 8 Technical Advisory Committee members to be held	Held 3 workshops Trained 13 Board members, 3 NBA staff, 8 Technical Advisory Committee members	fully Implemented
			Organize workshop to train Principal Investigators and Institutional Biosafety Committee members on risk management of GMOs	None	1 workshop to train 6 Principal Investigators and 7 Institutional Biosafety Committee members to be held	Held 1 workshop Trained 6 Principal Investigators and 7 Institutional Biosafety Committee members	Fully Implemented
			Organize workshops to train Inspectors on risk management of GMOs	None	4 workshops to train 6 Inspectors on Biosafety issues to be held	Held 4 workshops Trained 6 Inspectors on risk management of GMOs	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Produce guidelines on the General release of GMOs	None	Guidelines on the general release of GMOs to be produced	Produced, signed and issued guidelines	Fully Implemented
			Collaborate with the Attorney Generals' Department to Draft Regulations on GMOs	None	NBA to collaborate with the Attorney Generals' Department to Draft Regulations on GMOs	Collaborated with the Attorney Generals' Department and drafted Regulations on GMOs	Fully Implemented
			Prepare application forms for general release of GMOs for approval by the NBA Board	None	Application forms for general release of GMOs to be prepared and approved by the NBA Board	Application forms prepared and approved by the NBA Board	Fully Implemented
			Acquire Genetically Modified Organisms (GMOs) detection laboratory space	None	GMOs detection laboratory space to be acquired	Acquired GMOs detection laboratory space at Ghana Standards Authority	Fully Implemented
			Stakeholder consultations on MoUs with the seven (7) Regulatory Agencies specified in the Biosafety Act	None	Stakeholder consultations on MoUs with the seven (7) Regulatory Agencies specified in the Biosafety Act to be held	Held Stakeholder consultations	Fully Implemented
			Select members for the Appeals Tribunal by the NBA's Board	None	6 Members for the NBA's Appeals Tribunal to be selected	6 Members for the NBA's Appeals Tribunal selected by the Board and recommended to the sector Minister	Fully Implemented
2017	Management & Administration	General Administration	Upscale integrated watershed planning to 12 districts and 172 communities	Watershed planning in 10 districts and 28 communities	Watershed planning to be upscaled to 12 districts and 172 communities	Upscaled watershed planning to 12 districts and 174 communities	Fully Implemented
			Develop 4 CREMA management plans	No existing CREMA management plan	CREMA management plans to be developed and implemented	Developed 2 CREMA management plans that are being implemented	On-going
			Monitor SLWMP implementation	2016 SLWMP monitoring report	At least 2 monitoring exercises to be conducted in SLWMP areas	Conducted 1 monitoring exercise in SLWMP areas	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Conduct Reconnaissance Studies for (2) new large-scale multipurpose water storage investments	No reconnaissance studies	Reconnaissance Studies for (2) new large-scale multipurpose water storage investments to be conducted	<ul style="list-style-type: none"> Drafted Terms of Reference for engaging a consultant for the reconnaissance study Submitted draft ToR to World Bank for comments 	On-going
			Sponsor two (2) members of staff to attend the 8 th Review Conference	2015 Participation	2 members of staff to be sponsored to participate in 8 th review conference in July, 2017	Not done	Not Implemented
			Sponsor two (2) members of staff to participate the Meetings of States Parties (MSP) in November	2015 Participation	2 members of staff to be sponsored to participate the meeting of state parties in November, 2017	Not done	On-going
			Pay annual subscription fee and outstanding fee to the BWC-ISU by the end of the 1 st quarter, 2017	2012 subscription paid	Annual BWC-ISU subscription fees to be paid	Not done	On-going
		Finance	Prepare and submit 2016 Annual financial statement to Ministry of Finance and CAGD	2015 Financial Statement	2016 Annual financial statement to be submitted to Ministry of Finance and CAGD	Consolidated 2016 Accounts submitted to MoF and CAGD	Fully Implemented
		Human Resource	Organise Promotion and Recruitment Interviews	Ten (10) Promotion Interviews Conducted	Fifteen (15) officers to be interviewed and promoted	15 officers promoted	Fully Implemented
			Participation in local and international training conference	Forty-one (41) officers to participate in both local and international training conferences	Fifty (50) officers to participate in both local and international training conferences	25 officers attended various training conferences	On-going
			Organise HR Forum/workshop with sector Agencies/Depts to discuss HR issues	N/A	Organize One (1) HR Forum for 20 HR officers	Not done	Not Implemented
			Organise workshop on Civil Service Rules and Regulations	N/A	Organize two (2) workshops for Senior and Junior Staff	Not done	Not Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
		Statistics, Research, Information and Public Relations	Hold Annual Environmental Days celebrations	Four (4) Environment days celebrated	Four (4) Environment days to be celebrated	Celebrated all the four (4) Environmental Days successfully. <ul style="list-style-type: none"> • International Biodiversity Day (IBD) • World Environment Day (WED) • World Day to Combat Drought and Desertification (WDCDD) • African Scientific Renaissance Day (ASRD) 	Fully Implemented
	Environmental Protection & Management	Environmental Compliance & Enforcement	Assess the number of sectors with climate change mitigation and adaptation strategy priorities integrated	6	7	6	on-going
			Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	4784	4,800	2,961	ON-GOING
			Monitor and determine percentage of sectors covered by EA: - oil and gas exploration	100% compliance	100% compliance	100% compliance	Fully Implemented
			Carry out annual compliance monitoring events: Accra Other Regions	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing, 1 Mining, 1 Built environment and 1 Oil and gas)	4 events (1 Manufacturing ,1 Mining, 1 Built environment and 1 Oil and gas)	Fully Implemented
			Update of the pesticide register to show list of pesticide approved for use, banned and those for experimental purposes	updated	To be updated	Updated	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Sample and analyse level of pollution of effluent quality from industries and hotels	47 industries in the Greater Accra Region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm	70 industries to be monitored for effluent quality	80 industries in the Accra/Tema region were monitored for effluent quality and the results were higher than the EPA recommended guideline levels 50mg/l, 75NTU and 1500 µS/Cm	Fully Implemented
			Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	14 sites monitored	14 sites to be monitored	14 sites monitored with pollution values higher than the EPA recommended levels	Fully Implemented
			Operationalizing National Oil Spill and Contingency Plan (NOSCP) by key stakeholders	NOSCP published and distributed to stakeholders	MoU of NOSCP endorsed by stakeholders and simulation exercise undertaken	Memorandum of Understanding for operationalizing the National Oil Spill Plan endorsed by non-contributors and simulation exercise undertaken by key stakeholders	Fully Implemented
			Train Regional and District level Staff staff to deal with environmental assessment issues	893 EPA Officers and other key stakeholder representatives trained on environmental Assessment Administration	250 Officers to be trained	263 Officers trained on environmental Assessment Administration	Fully Implemented
			Environmental issues covered in national or local media	4,645 articles by 28 media outlets	5,000 articles by 28 media outlets	5,111 articles by 28 media outlets	Fully Implemented
			Monitor to assess the number of mining companies operating in line with environmental legislations (AKOBEN Rating)	19 mining companies operating in line with environmental legislations (AKOBEN Rating)	22 mining companies operating in line with environmental legislations (AKOBEN Rating)	22 mining companies operating in line with environmental legislations (AKOBEN Rating)	Fully Implemented
		Enforcement and Compliance of	Develop regulatory framework for the	4	9	5 Draft regulations	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
		Ionizing and Non-Ionizing Radiation	control of ionizing radiation and radiation devices available				
			Verify compliance by users of radiation sources and devices	0	500 (Non-ionizing facilities)	0	Not Implemented
				125	200 (ionizing facilities)	200	Fully Implemented
			Resolve non-compliance issues	5	20	0	Not Implemented
			Recruit Scientist and technologist for regulatory inspections and other professional support in various disciplines engaged and at post to fulfil the mandate of NRA	0	15	0	Not Implemented
			Train management staff of NRA at GIMPA in area of General Administration	0	17	0	Not Implemented
			Purchase 5 cross country and 3 saloon vehicles for regulatory inspections and other official duties	2	8	0	Not Implemented
			Purchase assorted Laboratory and monitoring equipment for regulatory work.	0	10	0	Not Implemented
			Purchase of Equipment for International Relations and Public Affairs (IRPA)	0	6	0	Lack of funds
			Educate the general public and users of radiation sources.	0	2	3	Fully Implemented
			Update and maintain Website	1	1	1	fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen institutional and regulatory frameworks for sustainable natural resource management						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
	Biotechnology Development	Biosafety Regulation	Organize workshops to train Board members, NBA staff, Technical Advisory Committee, veterinary officers and NADMO officers on emergency response situations	None	8 workshops to be held. 13 Board members, 9 NBA staff, 8 Technical Advisory Committee members, 3 veterinary officers and 2 NADMO officers to be trained on emergency response situations	Held 4 workshops Trained 13 Board members, 9 NBA staff, 8 Technical Advisory Committee members, 3 veterinary officers and 2 NADMO officers	Ongoing
			Organize workshop to train Principal Investigators and Institutional Biosafety Committee members on emergency response situations	None	2 Workshops to train 6 Principal Investigators and 7 Institutional Biosafety Committee members to be organized	Held 1 workshop 6 Principal Investigators and 7 Institutional Biosafety Committee members trained	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Reduce Loss of Biodiversity						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Management & Administration	General Administration	Develop National Biodiversity Strategy and Action Plan (NBSAP)	2002 version of NBSAP	Draft NBSAP to be developed and submitted to the Convention on Biological Diversity (CBD)	Developed draft NBSAP	Fully Implemented
2015			2014 NBSAP		NBSAP to be revised	<ul style="list-style-type: none"> Revised NBSAP submitted to the CBD Secretariat CBD Secretariat accepted and approved the NBSAP 	Fully Implemented
2016			National Biodiversity Policy (NBP) Framework		Zero Draft National Biodiversity Policy to be prepared	Prepared Zero Draft NBP available for technical review	Fully Implemented
2017			Organise 2 technical review workshops to develop draft NBP		2 Technical Review workshops to be organised	Organized two technical review workshop	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Reduce Loss of Biodiversity						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Organise 3 national stakeholders validation workshops on draft NBP	Zero draft NBP	3 National Stakeholder validation workshops on NBP to be organised	4 workshops on NBP organised	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote Green Economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Management & Administration	General Administration	Mainstream Green Economy (GE) into National Planning and Budgeting Processes	<ul style="list-style-type: none"> SEA for MMDAs Green Economy Scoping report 	The framework for training MDAs/MMDAs to mainstream GE into the planning process to be developed	Developed Green Economy inclusive guidelines for training	Fully Implemented
	Environmental Protection & Management	Environmental Compliance & Enforcement	Mainstream Green Economy (GE) into National Planning and Budgeting Processes	SEA for MMDAs	Get GE issues integrated into MMDA Development Plans	-GE was inputted into the Medium-Term Plans -Capacity building of MMDAs in GE issues	Fully Implemented
2015	Management & Administration	General Administration	Integrate Green Economy into District Development plans and educate key staff of 216 MMDAS in Green Economy	Green Economy scoping report, Green Economy inclusive guidelines	GE issues to be integrated into MMDA Development Plans	<ul style="list-style-type: none"> Developed GE training manual for MMDAs Educated 432 key staff of 216 MMDAs 	Fully Implemented
			Prepare Green Economy Assessment and Action Plan	Manual on GE for MMDAs	GE assessment report and Action Plan for national decision making to be prepared	<ul style="list-style-type: none"> Prepared assessment report for national decision making Developed Draft Action Plan 	Fully Implemented
	Environmental Protection & Management	Environmental Compliance & Enforcement	Mainstream Green Economy in District Development plans Training of Key staff of 216 MMDAS in Green Economy	MTDP on GE	Get GE issues integrated into MMDA Development Plans	-Development manual on GE for MMDAs -Key officials educated on GE	Fully Implemented
2016	Management & Administration	General Administration	Conduct technical follow-ups and review of 216 MMDA MTDPs for	Draft GE Action Plan	MMDA MTDPs to be reviewed	Conducted technical follow ups and reviews of 216 MMDA MTDPs	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote Green Economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			transition to Green Economy				
			Develop Action Plans in 5 key sectors	National climate change Policy and Master plan	Climate smart-Action Plans to be developed by 5 key MDAs	Five (5) key MDAs (MESTI, Energy, MOFA, MLNR, MOH) developed sector actions plans for climate change	Fully Implemented
			Develop climate change communications plan and materials for national and sub-national stakeholders	National climate change Policy and Master plan	Climate change communications plan and materials to be developed for use by the NCCSC and relevant sectors	Developed climate change communications plan and materials for various stakeholders	Fully Implemented
	Environmental Protection & Management	Environmental Compliance & Enforcement	Conduct Technical follow-ups and review of MMDA MTDP for transition to Green Economy	Draft GE Action Plan	Get GE issues integrated into MMDA Development Plans	Technical follow ups carried out	Fully Implemented
2017	Environmental Protection & Management	Environmental Compliance & Enforcement	Conduct technical follow-ups and review the MMDAs MTDP for transition to Green Economy	Draft GE Action Plan	Technical follow-ups and review of all MMDAs MTDPs to be conducted for mainstreaming of GE into District Medium term plans	Conducted technical follow-ups and reviews of 216 MMDA MTDPs	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Enhance Capacity to adapt to climate change impacts						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Management & Administration	General Administration	Mainstream Climate Change into the planning processes	Limited capacity at the MMDAs to mainstream CC into the planning process	<ul style="list-style-type: none"> The framework for training MMDAs to mainstream CC into the planning process to be developed MMDAs to mainstream Climate 	<ul style="list-style-type: none"> Developed climate change inclusive guidelines for training Orientation of 432 key officials on CC issues in 216 MMDAs 	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Enhance Capacity to adapt to climate change impacts						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					Change issues into the development agenda to be trained		
	Environmental Protection & Management	Environmental Compliance & Enforcement	Develop National Climate Change Policy (NCCP)	Final NCCP	Development of the NCCP Master plan	NCCP launched	On-going
			Mainstream Climate Change issues into the development agenda of all sector economies and activities of MDAs/MMDAs	No framework for mainstreaming CC into the development agenda	Develop framework for training MDAs and MMDAs	Development of climate change inclusive guidelines Orientation of key officials on CC issues in the MMDAs	Fully Implemented
2015	Management & Administration	General Administration	Prepare and submit Ghana's INDCs, Third National Communication, Biennial Update Report and Green House Gases (GHG) Inventory Report to the UNFCCC	NCCP	Completed INDC document to be submitted	Submitted Ghana's INDC, Third National Communication, Biennial Update Report and Green House Gases (GHG) Inventory Report to the UNFCCC	Fully Implemented
			Initiate the Green Climate Funds (GCF) Readiness Programme to enable Ghana access international climate funds <ul style="list-style-type: none"> Identify National Designated Authority (NDA) Establish Technical Advisory Committee Prepare operational documents 	No GCF readiness programme	Capacity building and creation of the enabling environment to access the GCF to be initiated	<ul style="list-style-type: none"> Identified Ministry of Finance (MoF) as NDA Established the Technical Advisory Committee Prepared operational documents (manual, checklist, prioritization tool) 	Fully Implemented
			Set up and operationalize the National Climate Change Steering Committee (NCCPSC)	NCCP	NCCPSC to be set up to oversee the implementation of the NCCP	<ul style="list-style-type: none"> NCCSC set up NCCSC made inputs into Ghana's position towards the Paris Agreement 	Fully Implemented
			Seek approval for implementation of Adaptation Fund Project in the 3 Northern Regions	Proposal submitted to the Adaptation Fund	Approval to be sought for the implementation of the Adaptation fund	Approval received for implementation of the Adaptation Fund Project	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Enhance Capacity to adapt to climate change impacts						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					project to be undertaken in the 3 Northern Regions		
			Undertake pre-implementation of Adaptation Fund Project (AFP) in the 3 Northern Regions	Proposal awaiting approval from the Adaptation Fund	Pre-implementation activities of the Adaptation fund project to be undertaken in the 3 Northern Regions	<ul style="list-style-type: none"> Organised several meetings with various stakeholders (UNDP, EPA, GIDA) Revised the implementation structure of the AFP Mainstreamed MESTI and EPA into the project structure Revised and resubmitted AFP proposal for approval 	Fully Implemented
2016	Management & Administration	General Administration	Seek approval for revised AFP proposal for implementation in the 3 Northern Regions	Revised Proposal submitted to the Adaptation Fund	Approval to be sought for revised AFP proposal to be undertaken in the 3 Northern Regions	Approval received for implementation of the Adaptation Fund Project to start in May	Fully Implemented
			Prepare Action Plan for Implementation of the INDCs	NCCP	INDC Action Plan to be prepared	Prepared and submitted INDC Action Plan to UNFCCC	Fully Implemented
			Implement activities identified under the GCF Readiness Programme <ul style="list-style-type: none"> Establish National Designated Authority (NDA) secretariat Develop Pipeline projects Select National Implementing Entities (NIEs) Build capacity of private sector to promote investment in climate change programmes Develop tracking tool for climate finance Develop NDA operational documents 	NCCP	Activities under the GCF Readiness Programme to be implemented	<ul style="list-style-type: none"> Established NDA secretariat Developed Pipeline projects for funding Selected two National Implementing Entities (NIEs) Built capacity of private sector to promote investment in climate change programmes Developed the tracking tool for climate finance and development of NDA operational documents 	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Enhance Capacity to adapt to climate change impacts						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Coordinate the implementation of National Climate Change Policy Master Plan in the 5 priority Sectors (Agriculture and Food Security, Disaster Preparedness and Response, Natural Resource Management, Equitable Social Development and Energy and Infrastructure Development)	NCCP	Implementation of the NCCP master plan priority sectors activities to be coordinated	<ul style="list-style-type: none"> Organised 2 of coordination meetings Developed climate change data hub for ease of assessing on-line information 	Fully Implemented
			Implement first year activities of Adaptation Fund Project in the 3 northern regions of Ghana <ul style="list-style-type: none"> Organise inception workshop Establish sub-national (regional and districts) structures Select beneficiary communities Undertake field verification 	NCCP and National Climate Change Master Plan	Year one activities of Adaptation Fund Project to be implemented	<ul style="list-style-type: none"> Organized inception workshop Established all the sub-national (regional and districts) structures Selected beneficiary communities Undertook and completed field verification 	Fully Implemented
			Develop Action Plan for the implementation of Ghana's Nationally Determined Contributions (NDCs) to the UNFCCC	NCCP National Climate Change Master Plan	The Action Plan to the UNFCCC to be developed and submitted	Action Plan submitted to the secretariat of UNFCCC	Fully Implemented
			Reconstitute the NCCSC to enhance coordination on climate planning and budgeting process	NCCP National Climate Change Master Plan and Action Plan	Coordination of climate planning and budgeting process to be enhanced by the newly constituted NCCSC	Constituted new NCCSC	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Enhance Capacity to adapt to climate change impacts						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Develop national adaptation and low carbon development strategies (identify gaps and incremental needs)	NCCP National Climate Change Master Plan and Action Plan	Low Carbon Development Strategy to be developed	Developed low carbon development strategy	Fully Implemented
2017	Management and Administration	General Administration	Implementation of activities identified under the Green Climate Fund (GCF) Readiness Programme	NCCP National Climate Change Master Plan and Action Plan	Develop the tracking tool for climate finance and development of NDA operational documents	Tracking tool for climate finance completed and disseminated to stakeholders	Fully Implemented
			Build capacity of private sector to promote investment in climate change programmes	NCCP National Climate Change Master Plan and Action Plan	Private Sector capacity built to leverage finances for climate change activities to facilitate by PEF.	Private Sector platform established	Fully Implemented
			Preparation of Intended Nationally Determined Contributions (INDCs) Action Plan for Implementation	NCCP	Develop Draft GH-NDC implementation and investment plan	Draft GH-NDC implementation and investment plan developed for finalisation in 2018	On-going
			Design climate smart water management plans for the Black Volta and Oti River basins	None	Develop/review community/district based water management plans to include tributaries	The assessment of existing water resources and vulnerabilities has been conducted	On-going
			Establishment and strengthening of National, Regional, District and Community based Climate Change Adaptation Monitoring Committees	None	Organise community entry and mapping exercises	Project Management Unit (PMU) organized community entry meetings in the 50 project beneficiary communities.	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Management & Administration	General Administration	Implement the Better Ghana ICT Project	35,000 laptops distributed to schools	15,000 laptops to be distributed to Secondary and tertiary institutions Schools	Distributed 1,000 laptops	On-going.
			<ul style="list-style-type: none"> Organize a National STI fair for about 1,000 scientists, government official, policy makers, students and the public consisting of: A 3-day conference attended by at least 500 participants daily. An exhibition showcasing about 300 exhibits from about 50 institutions. An award ceremony to give prizes to 30 scientists and technologists 	None	Organize 3-day biennial National Science Congress consisting of 3 main events a. A Conference b. An Exhibition c. An Award Ceremony	8 Planning Committee meetings held to plan the organization of a one-day STI fair for 5 R & D institutions	On-going.
			Implement the 3-year Ghana-South Africa Science & Technology (S & T) Plan of Action with researchers from both Countries.	A 2-day bilateral symposium. 10 projects	2-day bilateral symposium to be organized. 5 Joint R & D projects to be developed.	None	Not Implemented
			Establish Technology Transfer Centres	No Objection granted by the World Bank on the concept paper for the establishment of Technology Transfer Centers in 5 R & D institutions	5 Technology Transfer Centres to be established	Contracts signed with 5 R & D selected Institutions for the establishment of the Technology Transfer Centres. They are: University of Ghana, Kumasi Polytechnic, Ghana Atomic Energy Commission, Council for Scientific and Industrial Research and Ghana Technology University College.	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Provide training for staff of the STI Directorate	None	2 Staff of the STI Directorate to be trained.	None	not Implemented
			Construct and launch the STI Office complex	No Objection given by the World Bank to engage a company to provide the Bill of Quantity (BoQ) and designs for the office complex	STI Office complex to be constructed and launched.	<ul style="list-style-type: none"> Prepared Bill of Quantity Developed Architectural Designs 	On-going
			National STI Database	None	Management Information System on STI to manage and process data to assist policy formulation and R&D developed	None	Not Implemented
			Implement the pilot project of the Ghana - South Africa TV White Space Project to community schools.	Joint Project agreed between GTUC-Ghana and Meraka Institute-SA.	MOU to be signed	MOU developed and signed	Fully Implemented
			Implement the Action Plan of the Policy on the use of local Building materials in the construction industry.	Phase II activities initiated by 8 implementing institutions	Phase II & III activities of the Local Building Materials to be implemented.	None	Not Implemented
			Implement the Mathematics, Science and Technology Scholarship Scheme (MASTESS)	None	4,000 scholarships awarded to be beneficiaries nationwide.	None	Not Implemented
			National Science and Technology Theme Park	None	2 National Science and Technology Theme Park to be established	None	Not Implemented
			Establish the National STI Fund	None	<ul style="list-style-type: none"> LI to be developed Series of fund raising activities 	Constituted Technical committee to draft the LI.	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					for the STI Fund to be organized. <ul style="list-style-type: none"> The STI Fund to be launched and operationalized National STI Fund Board meetings to be organized. 		
			Organize Annual Regional Technology Fairs.	None	A one-day Regional Technology Fair to exhibit adopted technologies by R&D institutions and Innovators to be organized.	None	Not Implemented
	Research & Development	Scientific & Industrial Research	Promote improved technologies for the cultivation of high yielding local rice	8 improved technologies for rice production.	12 improved technologies for rice production promoted	Promoted 10 improved technologies for rice production.	On-going
			Develop Rice production guides for commercial rice producers	500 production guides were produced	600 copies of rice production guides to be produced	Produced 600 copies of Rice production guides	Fully Implemented
			Promote the use of water management structures (SAWAH technology) for rice production	150 farmers adopted the SAWAH technology	300 farmers to adopt the SAWAH Technology	300 farmers adopted the SAWAH Technology	Fully Implemented
			Provide grafted mango seedlings and certified planting materials to farmers	450 farmers provided with grafted mango seedlings	650 farmers to be provided with grafted mango seedlings for planting	600 farmers provided with grafted mango seedlings for planting	Fully Implemented
			Train commercial farmers, Agricultural Extension Agents (AEAs) and NGOs on good agricultural practices for increased productivity in mango production	40 persons and AEAs trained in GAPs in mango production	60 persons from target groups to be trained in GAPs in mango production.	50 persons from target groups trained in GAPs in mango production.	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Promote Agro-processing and production of fruit juice.	70 Entrepreneurs were supported through training	100 enterprises/ Entrepreneurs to be supported through training.	85 enterprises/ entrepreneurs supported through training	On-going
			Promote solar and/or Cabinet drying of mango fruits for local consumption and exports.	2 fruit processors using technology	2 fruit processors to adopt technology	3 fruit processors adopted the technology	Fully Implemented
			Develop high yielding disease and pest tolerant varieties of pepper and eggplant for local and export markets.	2 varieties of high yielding pepper and 1 eggplant developed and released	4 of varieties pepper and 2 varieties of eggplant to be developed and released	Developed and released 2 varieties of pepper. No variety of eggplant was developed	On-going
			Develop improved planting materials (seed and seedlings) of Oil Palm and Coconut for farmers	200 and 85 farmers had access to improved Oil Palm and Coconut seedlings respectively	220 and 120 farmers to be supplied with improved seedlings of Oil Palm and Coconut respectively.	Supplied 234 and 100 farmers with improved seedlings of Oil Palm and Coconut respectively.	Fully Implemented
			Promote technologies for increasing meat and egg production output and nutrition.	4 technologies promoted to increase meat and egg production output for better nutrition	5 technologies to be promoted for poultry and livestock farmers to increase meat and egg production	Promoted 5 technologies to increase meat and egg production output for better nutrition	Fully Implemented
			<ul style="list-style-type: none"> Promote Sustainable Fishery Management of capture fishery (marine and fresh water) and enhance fish production and preservation. Management of post-harvest losses. Intensify the promotion of improved oven for smoking fish called FRISMO 	<ul style="list-style-type: none"> 10 technologies on sustainable fishery management promoted. 500 persons trained on the FRISMO technologies 	<ul style="list-style-type: none"> 12 technologies on sustainable fishery management practices promoted. 800 fish processors trained on FRISMO technologies. 	<ul style="list-style-type: none"> 10 technologies on sustainable fishery management promoted. 700 fish processors trained on the FRISMO technology. 	On-going
			Promoted Rain Water Harvesting (RWH)	20 households in small communities and 2	18 households in small communities and 2 schools to	RWH technology adopted by 18 households in small communities and 2 schools.	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			technology for schools and small communities	schools adopted the RWH technology	adopt the RWH technology.		
			Drill boreholes for rural communities	50 communities benefitted from boreholes drilled.	60 communities to benefit from the borehole drilling	55 communities benefitted from boreholes drilled	On-going
			Provide Bio-sanitation toilets for schools and communities	2 schools and 5 communities adopted the bio-sanitation toilets technology	6 schools and 10 communities to adopt the bio-sanitation toilets technology.	5 schools and 8 communities adopted the bio-sanitation toilets technology	On-going
			Investigate Road materials in the five major cities in Ghana.	Information not readily available from the BRRI.	Information not readily available BRRI.	Information not readily available BRRI.	Not Implemented
		Nuclear & Space Science Technology	Establish Nuclear Regulatory Authority (NRA)	Two (2) houses identified at GAEC for renovation	Renovation of houses as office space for NRA	Contract awarded for renovation of houses. 10% completed	On-going
				None	Nuclear Regulatory Authority bill drafted and submitted to Parliament.	Submitted draft Nuclear Regulatory Authority Bill (NRA) to Parliament	Fully Implemented
				None	Purchase of equipment and Vehicles for the NRA	Not yet purchased	Not implemented
			Integrate nuclear power into the country's energy mix	Public sensitization programmes drawn.	Sensitize five (5) stakeholder groups on Nuclear Power generation.	First media forum held for 5 stakeholder groups. <ul style="list-style-type: none"> The military The media Engineers Scientists The public 	Fully Implemented
				None	Purchase 1No. Vehicle for field visits	Vehicle not purchased	Not implemented
			Promote Crop Production	Cultures established for all six (6) crops (cassava, plantain,	Multiplication of planting materials six (6) crops	Established Plantain suckers for micro propagation on the field.	Not Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
				banana, yam, cocoyam and pineapple)	selected for in vitro culture		
			Construct Protein bait factory	Field trial for protein baits conducted	Establish a factory for the commercial production of Protein baits	Produced prototype baits for demonstration	On-going
			Reduce postharvest through the application of GIF	None	Ten 10 stakeholder sensitizations on the benefits of the GIF in reducing postharvest losses undertaken.	Five (5) stakeholders in the food sector and fifteen (15) stakeholders in the medical sector already contacted to consider using the GIF	On-going
			Reduce postharvest through the application of GIF	None	Upgrade the GIF to 500 kCi	Not done	Not Implemented
				None	Construct Irrigation Facility	Not done	Not implemented
			Assess safety of radiation workers	Assess safety of 1200No radiation worker	1500No. Radiation exposed workers monitored (mines, hospitals, research institutions)	Monitored 1,593 occupationally exposed workers in the mining industry in Ghana.	Fully Implemented
			Inspect irradiating devices, radiation sources and radioactive materials in designated facilities	None	Inspect and authorize 120 Radiation devices and radiation sources.	Inspected and authorized 152 radiation devices and sources.	Fully Implemented
			Hazard Assessment of Electromagnetic Radiation from Mobile phones operators and Radio Stations done across the country	400 sites assessed. 800sites for FM stations and mobile phones companies assessed.	Assess 400 Base Stations to across the country. Monitor 800 Radio Frequency sites for FM Stations and Mobile Phone companies.	Assessed 333 base station sites. Monitored 727 RF and FM sites.	On-going
			Improve analytical services through acquisition of logistics	One (1) High purity germanium detector available	Procure One (1) additional High purity germanium detector to be purchased.	Not purchased	Not implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
				None	Purchase one (1) Electrode Position System.	Not purchased	Not Implemented
				None	Purchase four (4) Field Vehicles.	Acquired One Navara Pickup to facilitate field operations	On-going
			Train and retain human resources in nuclear related fields	Six (6) national training courses organized	Organize 6 National Training Courses	6 National Training Courses organized for end user Institutions for their specific applications	Fully implemented
			Train professionals in nuclear applications	None	Five (5) Key staff of Nuclear and Medical Imaging Centre to be trained.	Identified and submitted list of professionals to undergo training to the IAEA. One Medical Doctor and one Medical Physicist are under training in South Africa.	Not fully implemented
			Acquire and use an Unmanned Aerial Vehicle project (UAV)	NONE	Procure one (1) UAV	Not procured	Not implemented
			Conversion of 32m dish communication antenna to a radio telescope	Existing satellite dish at Kuntunse	Level of conversion	Trained Scientist, engineers and technologist Completed Assessment of antenna	On going
			Construct State of the Art Nuclear Medical Imaging Centre to research into treatment of various cancers	None	Identify PPP for the project	IAEA experts undertook two technical visits	On-going
			Procure an electrical plant	None	Purchase an electrical plant to power major sophisticated equipment	Not purchased	Not Implemented
			Construct fence to secure GAEC land	None	Complete part of construction (2km)	Not done	Not Implemented
			Rehabilitation of GAEC library block	Existing Library Block.	GAEC Library Block re-habilitated.	Not done	Not Implemented
2015	Management & Administration	General Administration	Implement the Agenda for Transformation ICT Project	1,000 laptops distributed to schools	15,000 laptops to be distributed to Secondary and tertiary institutions Schools	Procured 7,183 Laptops.	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			<ul style="list-style-type: none"> Organize a National STI fair for about 1,000 scientists, government official, policy makers, students and the public consisting of: A 3-day conference attended by at least 500 participants daily. An exhibition showcasing about 300 exhibits from about 50 institutions. An award ceremony to give prizes to 30 scientists and technologists 	8 Planning Committee meetings held to plan the organization of a one-day STI fair for 5 R & D institutions	A 3-day National STI fair to be organized consisting of <ul style="list-style-type: none"> a. A conference b. An Exhibition c. An Award Ceremony 	Organized a one-day STI fair for 5 institutions namely; GAEC, CSIR, University of Ghana, Kumasi Polytechnic, GTUC showcasing 50 exhibits	Fully Implemented
			Implement the 3-year Ghana-South Africa Science & Technology (S & T) Plan of Action with researchers from both Countries.	None	<ul style="list-style-type: none"> 2-day bilateral symposium to be organized. 5 Joint R & D projects to be developed 	None	Not Implemented
			Establish Technology Transfer Centres	Contracts signed with 5 R & D selected Institutions for the establishment of the Technology Transfer Centres. They are: <ul style="list-style-type: none"> University of Ghana Kumasi Polytechnic GAEC CSIR GTUC. 	<ul style="list-style-type: none"> 5 TTCs to be launched 200 existing technology products and services to be profiled. 200 Scientists on Technology Transfer processes to be trained. 100 Senior Management staff to be trained on R & D Marketing 	Launched 3 TTCs Profiled 50 Existing Technologies Trained 350 Scientist in Technology Transfer processes Trained 80 Senior Management of R & D institutions Organized 6 Research-Industry workshops	On-going On-going Fully Implemented On-going On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					and Management of TCC. • 10 Research-Industry Seminars to be organized • 5 TTC websites to be launched		
			Provide training for staff of the STI Directorate	None	Staff of the STI Directorate to be trained	None	Not Implemented
			Construct and launch the STI Office complex	Bill of Quantity was prepared. Architectural Designs	STI Office complex to be constructed and launched.	None Carried out Environmental and Social Impact Assessment (ESIA)	Started but abandoned
			National STI Baseline Survey	None	The National STI Baseline survey to be conducted	None	Not Implemented
			Implement the pilot project of the Ghana - South Africa TV White Space Project to community schools.	MESTI in collaboration with the DST of SA monitored the implementation of the TV white Space Project by GTUC-Ghana and Meraka Institute-SA.	Tv. White Space facility to be installed in 8 SHS schools. Data for the project to be collected.	Installed TV. White facility in 5 SHS in Accra. Collected Data for the project	Fully Implemented
			Implement the Action Plan of the policy on the use of local materials in the construction industry.	None	Phase II & III activities of the Local Building Materials to be Implemented.	None	Not Implemented
			Implement the Mathematics, Science and Technology Scholarship Scheme (MASTESS)	No activity was undertaken	4,000 scholarships awarded to be beneficiaries nationwide.	Developed a new Mastess website Awarded 3,861 scholarships	On-going
			National Science and Technology Theme Park	No activity was undertaken	2 National Science and Technology Theme Park to be established	Arrangement made with the Ministry of Foreign Affairs to plan a Ministerial study tour to South Korea's Science and Technology Park facilities.	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Establish the National STI Fund	A technical committee was constituted to draft the LI	<ul style="list-style-type: none"> • A Consultant to draft the STI fund manual to be engaged • Series of meetings to review and finalize STI Fund manual to be organized • LI for STI Fund to be developed • Series of fund raising activities for the STI Fund to be organized • National STI Fund Board meetings to be organized 	Organized 4 Technical committees meetings on the establishment of the STI Fund was to develop the LI	On-going
			Organize Annual Regional Technology Fairs	None	A one-day Regional Technology fair to exhibit adopted technologies by R&D institutions and Innovators to be organized	None	Not Implemented
	Research & Development	Scientific & Industrial Research Research	Promote improved technologies for the cultivation of high yielding local rice	Baseline (2014) 10 improved technologies for rice production promoted	15 improved technologies for rice production promoted	Promoted 15 improved technologies for improved rice production.	Fully Implemented
			Develop Rice production guides for commercial rice producers	Baseline (2014) 600 copies of production guides produced	700 copies of rice production guides to be produced	Produced 700 copies of production guides	Fully Implemented
			Promote the use of water management structures (SAWAH technology) for rice production	Baseline (2014) 300 farmers adopted the SAWAH Technology	600 farmers to adopt the SAWAH Technology	455 farmers adopted the SAWAH Technology	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Provide grafted mango seedlings and certified planting materials to farmers	Baseline (2014) 600 farmers provided with grafted mango seedlings for planting	800 farmers to be provided with grafted mango seedlings	750 farmers provided with grafted mango seedlings for planting	On-going
			Train commercial farmers, Agricultural Extension Agents (AEAs) and NGOs on good agricultural practices for increased productivity in mango production	Baseline (2014) 50 persons from target groups trained in GAPs in mango production.	80 persons from target groups to be trained in GAPs in mango production.	75 persons from target groups trained in GAPs in mango production.	On-going
			Promote Agro-processing and production of fruit juice.	Baseline (2014) 85 enterprises/ entrepreneurs supported through training	120 enterprises/ entrepreneurs to be supported through training	105 enterprises/ entrepreneurs supported through training	On-going
			Promote solar and/or Cabinet drying of mango fruits for local consumption and exports.	Baseline (2014) 3 fruit processors adopted technology	2 fruit processors to adopt technology	4 fruit processors adopted technology	Fully Implemented
			Develop high yielding disease and pest tolerant varieties of pepper and eggplant for local and export markets.	Baseline (2014) 2 varieties of pepper and no variety of eggplant developed and released	4 varieties of pepper and 2 varieties of eggplant to be developed and released	No variety of pepper and no variety of eggplant developed and released	On-going
			Develop improved planting materials (seed and seedlings) of Oil Palm and Coconut for farmers	• Baseline (2014) • 234 and 100 farmers supplied with improved seedlings of oil palm and coconut respectively	• 250 and 120 farmers to be supplied with improved seedlings of Oil Palm and Coconut respectively.	Supplied 240 and 105 farmers with improved seedlings of oil palm and coconut respectively. (The seed production is no more under CSIR-OPRI but under the control of the partner)	On-going
			Promote technologies for increasing meat and egg production output and nutrition.	• 5 technologies promoted to increase meat and egg production output for nutrition	• 7 technologies to be promoted for poultry and livestock farmers to increase meat and egg production	Promoted 5 technologies to increase meat and egg production output for nutrition	On-going
			Promote Sustainable Fishery Management of capture fishery (marine and fresh water) and	• 10 technologies on sustainable fishery management promoted.	• 15 technologies on sustainable fishery management	• 12 technologies on sustainable fishery management promoted. • 1000 fish processors trained on the FRISMO technology	On-going

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	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			enhance fish production and preservation. Management of post-harvest loses. Intensify the promotion of improved oven for smoking fish called FRISMO	<ul style="list-style-type: none"> 700 persons trained on the FRISMO technology 	<ul style="list-style-type: none"> practices to be promoted. 1200 persons to be trained on the FRISMO technology. 		On-going
			Promoted Rain Water Harvesting (RWH) technology for schools and small communities	900 households in small communities and schools adopted the RWH technology	1300 households in small communities and schools to adopt the RWH technology	RWH technology adopted by 1200 households in small, communities and schools.	On-going
			Drill boreholes for rural communities	55 communities benefitted from boreholes drilled	70 communities to benefit from the borehole drilling	68 communities benefitted from boreholes drilled	On-going
			Provide Bio-sanitation toilets for schools and communities	5 schools and 8 communities adopted the bio-sanitation toilets technology	10 schools and 15 communities to adopt the bio-sanitation toilet technology	7 schools and 13 communities adopted the bio-sanitation toilets technology.	On-going
		Nuclear & Space Science Technology	Assess hazards of Occupational Exposure in the Mining Industry	Visited and carried out 3 mines and safety assessments.	Carry out Safety assessment at 2 mines.	Carried out safety assessments in 2 mines.	Fully implemented
			Assess Electromagnetic Radiation Hazards from Telcos and Radio Stations	400 base station sites assessed. 800sites for FM stations and mobile phones companies assessed.	Assess 400 Base Stations to across the country. Monitor 800 Radio Frequency sites for FM Stations and Mobile Phone companies.	Assessed 333 base station sites. Monitored 727 RF and FM sites.	On-going On-going
			Sensitize Stakeholders and public on adoption and introduction of nuclear energy	Meetings and forums held for all stakeholders	Undertake public perception of nuclear power program survey.	Developed various questionnaires.	On-going

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	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Integrate nuclear power into the country's energy mix.	Road map for feasibility studies towards siting of a nuclear power plant prepared.	Conduct activities leading to the determination of candidate areas for the Nuclear Power project determined.	Undertaken preliminary feasibility studies leading to the determination for siting of Nuclear Power plant.	On-going
			Establishment of The Nuclear Regulatory Authority (NRA).	<ul style="list-style-type: none"> Renovation of two houses into offices about 90% completed. Draft Bill submitted to Parliament. 	<ul style="list-style-type: none"> Renovate two buildings for use by Nuclear Regulatory Authority. Bill Passed into Law. 	<ul style="list-style-type: none"> Completed the renovation of two houses into offices. Bill passed and gazetted. 	Fully Implemented
			Organize Post Graduate Education Course (PGEC) in Radiation Protection for radiological professionals.	National Training Courses in radiation protection for 16 end user Institutions organized.	Organize and train 18 professionals in Radiation Protection.	Organized Post-Graduate Education Course (PGEC) in Radiation Protection for 18 professionals in the sub-region.	Fully Implemented
			Integrate Isotope Hydrology Technique into Ground Water Resource assessment in Ghana	Ascertain water quality in some major rivers in the 3 Northern regions assessed.	Complete the assessment of Water quality of major rivers in the three Northern Regions as well as coastal, Central Region and the Densu Basin completed.	Assessed water quality of major rivers in the Northern regions and the coastal Central Region including the Densu Basin. Submitted Draft report on assessment to Water Resources Commission	Fully Implemented
			Scientific assessment of the environmental and human health impact of e-waste management in Ghana	Research into e-waste management planned	MOU with Zoom lion Ghana signed for collaboration on e-waste management research.	Signed MOU with Zoom lion Ghana for collaboration	Fully Implemented
			<ul style="list-style-type: none"> Use NDT to detect leakages in gas storage tanks Establish NDT training centre 	150 NONE	<ul style="list-style-type: none"> 165 NDT services to be rendered to industry, thus ensuring safety of fuel storage tanks. Initiate activities for the establishment of the 	<ul style="list-style-type: none"> Rendered Seventy-five (75) NDT services to industry. Submitted a draft proposal for the establishment of the NDT training centre. 	On-going Fully Implemented

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	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					NDT training centre.		
2016	Management & Administration	General Administration	Implement the Agenda for Transformation ICT Project	7,183 Laptops have been procured.	15,000 laptops to be distributed to Secondary and tertiary institutions Schools	None	Not Implemented
			Organize the 3-day biennial National Science Congress consisting of 3 main events a. A conference b. An Exhibition c. An award ceremony	A one day STI fair was organized for 5 institutions namely; GAEC, CSIR, University of Ghana, Kumasi Polytechnic, GTUC showcasing 50 exhibits	A 3-day National to be organized STI Fair.	Organized a 3-day National STI Fair from 14-16, September 2016, with the 5 Technology Transfer Centres which consisted of the following activities; - Exhibition - Symposium	Fully Implemented
			Implement the 3-year Ghana-South Africa Science & Technology (S & T) Plan of Action with researchers from both Countries.	None	<ul style="list-style-type: none"> 2nd Phase of the 3-Year Plan of Action between Ghana and South Africa on S & T to be prepared 2-day bilateral symposium to be organized. 10 joint R & D projects to be developed 	<ul style="list-style-type: none"> Organized a 2-day Ghana-South Africa bilateral to develop a 3 year Plan of Action Organized a 2-day bilateral symposium. Developed 15 R & D projects Jointly 	Fully Implemented
			Establish Technology Transfer Centres	<ul style="list-style-type: none"> 3 TTCs Launched 50 Existing Technologies profiled 350 Scientist Trained in Technology Transfer processes 80 Senior Management of R & D institutions trained. 6 Research-Industry workshops organized 	<ul style="list-style-type: none"> 16 technology grants to be awarded to researchers 50 researchers and Marketing officers to be trained communication materials to be developed 3 R&D Business Seminars in collaboration with 	<ul style="list-style-type: none"> Awarded 17 technology grants to researchers. Trained 63 researchers and marketing officers Developed and disseminated Communications materials such as video documentary, artwork, website, leaflets have on Technology Transfer. Organized 3 R&D Business Seminars with industry players Prepared 5 sustainability plan by the Technology Centres. 	Fully Implemented

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	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					Industry Players to be organized • 5 sustainability plan for the Technology Centres to be prepared		
			Provide training for staff of the STI Directorate	None	10 staff of the STI Directorate to be trained.	Trained 10 staff in the STI Directorate in the following areas; • Civil Service Administrative Writing Skills • Science and Technology Park Training Programme • Strategic Management for Senior Managers • Managing Intellectual Property Rights and Access to Research Results. • Management Development for Executive Secretaries and Personal Assistants.	Fully Implemented
			Construct and launch the STI Office complex	• No Objection given to BoQ and Designs • Environmental and Social Impact Assessment (ESIA) carried out	STI offices and Ministry building to be renovated.	• Renovated 15 offices and the Ministry building. • Constructed a canteen for the food vendors who were squatters on the Ministry's land	On-going Fully Implemented
			Conduct the National STI Baseline Survey	None	National STI Baseline survey to be conducted.	• Conducted a national STI Baseline to manage STI data, report on national trends for R&D and to monitor and evaluate system for public research. • Participated in the surveying about 38 private/public universities, R&D institutions and media organizations. • Constituted a Technical Committee to review the report	Fully Implemented

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	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
						<ul style="list-style-type: none"> Prepared a baseline survey report 	
			National STI Database	None	The Management Information System on STI to manage and process data to assist policy formulation and R&D to be developed.	Developed a request sent to COTVET-PSU to procure the services of a consultant to the database.	On-going
			Implement the pilot project of the Ghana - South Africa TV White Space Project to community schools	<ul style="list-style-type: none"> TV. White facility installed in 5 SHS in Accra. Data collected for the project 	Laptops for the Pilot project to be provided.	Provided 80 laptops to implement the Pilot project.	On-going
			Implement the Action Plan of the policy on the use of local materials in the construction industry.	None	Phase II & III activities of the Local Building Materials to be implemented.	None	Not Implemented
			Implementation of the Mathematics, Science and Technology Scholarship Scheme (MASTESS)	3,861 scholarships awarded.	4,000 scholarships awarded to be beneficiaries nationwide.	<ul style="list-style-type: none"> Submitted request for funds to GETFUND Submitted reports to Scholarship Technical Review Committee constituted by the Ministry of Education. 	Not Implemented
			National Science and Technology Theme Park	A letter was sent the Ministry of Foreign Affairs to plan a Ministerial study tour to South Korea's Science and Technology Park facilities.	2 National Science and Technology Theme Park to be established	None	Not Implemented
			Establish the National STI Fund	4 Technical committees meetings on the establishment of the STI Fund was organized to develop the LI	<ul style="list-style-type: none"> An LI to be developed Series of fund raising activities for the STI Fund 	<ul style="list-style-type: none"> Prepared a draft Legislative Scheme Prepared a draft cabinet Memo. Organized a Stakeholder consultation with the Ministry of 	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					<ul style="list-style-type: none"> The STI Fund to be launched and operationalized National STI Fund Board meetings to be organized 	Finance on “Sustainable Sources of Funding”	
			Organize Annual Regional Technology Fairs	None	A one-day Regional Technology Fair to exhibit adopted technologies by R&D institutions and Innovators to be organized	None	Not Implemented
			Implement the Agenda for Transformation ICT Project	2,500 laptops distributed to schools	15,000 laptops to be distributed to Secondary and tertiary institutions Schools	On-going	On-going
	Research & Development	Scientific & Industrial Research	Promote improved technologies for the cultivation of high yielding local rice	15 improved technologies for improved rice production promoted	20 improved technologies for improved rice production promoted.	Promoted 20 improved technologies for improved rice production.	Fully Implemented
			Develop Rice production guides for commercial rice producers	700 copies of production guides produced	800 copies of rice production guides to be produced	Produced 800 copies of production guides	Fully Implemented
			Promote the use of water management structures (SAWAH technology) for rice production	455 farmers adopted the SAWAH Technology	1000 farmers to adopt the SAWAH Technology	1006 farmers adopted the SAWAH Technology in the catchment areas	Fully Implemented
			Provide grafted mango seedlings and certified planting materials to farmers	750 farmers provided with grafted mango seedlings for planting	950 farmers to be provided with grafted mango seedlings for planting	900 farmers provided with grafted mango seedlings for planting	On-going
			Train commercial farmers, Agricultural Extension Agents (AEAs) and NGOs on good	70 persons from target groups trained in GAPs in mango production.	100 persons from target groups to be trained in GAPs in mango production.	82 persons trained from target groups in GAPs in mango production.	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			agricultural practices for increased productivity in mango production				
			Promote Agro-processing and production of fruit juice.	105 enterprises/ entrepreneurs supported through training	135 enterprises/ entrepreneurs to be supported through training	130 enterprises/ entrepreneurs supported through training	On-going
			Promote solar and/or Cabinet drying of mango fruits for local consumption and exports.	4 fruit processors adopted technology	3 fruit processors to adopt technology	5 fruit processors adopted technology	Fully Implemented
			Develop high yielding disease and pest tolerant varieties of pepper and eggplant for local and export markets.	4 lines of pepper and 2 lines of Eggplant developed but not released	4 lines of pepper and 2 lines of eggplant to be released	No variety of both pepper and eggplant were developed and released	On-going.
			Develop improved planting materials (seed and seedlings) of Oil Palm and Coconut for farmers	240 and 105 farmers supplied with improved seedlings of oil palm and coconut respectively.	250 and 120 farmers to be supplied with improved seedlings of Oil Palm and Coconut respectively.	Supplied 195 and 85 farmers with improved seedlings of Oil Palm and Coconut respectively.	On-going
			Promote technologies for increasing meat and egg production output and nutrition.	5 technologies promoted to increase meat and egg production output for nutrition	10 technologies to be promoted for poultry and livestock farmers to increase meat and egg production	Promoted 8 technologies to increase meat and egg production output for nutrition	On-going
			Promote Sustainable Fishery Management of capture fishery (marine and fresh water) and enhance fish production and preservation. Management of post-harvest losses. Intensify the promotion of improved oven for	12 technologies on sustainable fishery management promoted. 1000 processors trained on the FRISMO technology	<ul style="list-style-type: none"> 15 technologies on sustainable fishery management practices to be promoted. 1500 fish processors to be trained on the FRISMO technologies. 	<ul style="list-style-type: none"> 12 technologies on sustainable fishery management promoted. 1450 processors trained on the FRISMO technologies 	

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			smoking fish called FRISMO				
			Promoted Rain Water Harvesting (RWH) technology for schools and small communities	1200 households in small, communities and schools adopted the RWH technology	1500 households in small communities & schools to adopt the RWH technology	RWH technology adopted by 1500 households in small communities and schools adopted	Fully Implemented
			Drill boreholes for rural communities	68 communities benefitted from boreholes drilled	80 communities to benefit from the borehole drilling	75 communities benefitted from boreholes drilled	On-going
			Provide Bio-sanitation toilets for schools and communities	7 schools and 13 communities adopted the use of bio-sanitation toilets technology	15 schools and 20 communities to adopt bio-sanitation toilet technology.	10 schools and 16 communities adopted the bio-sanitation toilets technology.	On-going
		Nuclear & Space Science Technology	Use irradiation for processing food, medical and other products	<ul style="list-style-type: none"> • Irradiated 30 tote boxes of medical items • None • Irradiated 10 tonnes of food items. • None 	<ul style="list-style-type: none"> • Irradiate 50 tote boxes (15 m3) of medical items. • Irradiate and sterilize 10 tonnes of peat. • Irradiate 6 tonnes of food items. • Improve the quality of miscellaneous products through irradiation 	<ul style="list-style-type: none"> • Irradiated 80 tote boxes (15 m3) of medical items. • Sterilized 10 tonnes of peat using the Gamma Irradiation facility for IITA, Nigeria. • Irradiated 6 tonnes of food items using the Gamma Irradiation Facility. • Irradiated 100 tote boxes of peat pellets and miscellaneous items. 	<p>Fully implemented</p> <p>Implemented but not in the MTDP</p>
			Protein Bait Project	Infrastructure not in place	Construct a factory.	Completed 75% of the factory at GAEC.	On-going
			Formulate and produce Organic compost from domestic waste	None	Produce 20,000kg of organic compost for farmers and institutions	Produced 30,000 kg of organic compost.	Fully implemented
			Collaborate with national and international organizations dealing with organic waste management and compost production	None	Produce 30,000 kg of compost in collaboration with the International Water Management Institute (IWMI), Accra	Produced 30,000 kg of organic compost produced in collaboration with the International Water Management.	Fully implemented

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	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					<ul style="list-style-type: none"> • Develop HR document. • Develop radioactive waste management document. • Conduct preliminary assessment of NP grid 		<p>Fully implemented</p> <p>Fully implemented</p> <p>On going</p>
			Conversion of the 32m antenna to a Radio Telescope at Kuntunse	Scientist, engineers and technologist trained. Assessment of antenna completed.	Completion of the project	Completed 80% of the project. (Massive renovation of the telescope done Quadlegs fabricated for the station)	On-going
			Integration of Isotope Hydrology Technique into Water Resources Assessment in Ghana	Water quality of major rivers in the Northern regions and the coastal Central Region including the Densu Basin has been assessed.	<ul style="list-style-type: none"> • Estimate recharge of aquifers using conventional and isotopic technique • Analysis of N-15 and water quality to evaluate in detail nitrate sources 	<ul style="list-style-type: none"> • Rainfall sampling in Ada, Amedzofe, Abetifi, Kumasi, Tamale and Navrongo. • N-15 sampling being carried out in the Lower Volta Basin. 	Not implemented
			Scientific assessment of the environmental and human health impact of e-waste management in Ghana	Interview producers of IT equipment to assess their views on the applicability of Extended Producer Responsibility for e-waste management	<ul style="list-style-type: none"> • Field survey and mapping of e-wastes sites in Accra, Kumasi, Cape Coast and Takoradi for sampling. • Development of methodology for analysis. 	<ul style="list-style-type: none"> • Mapping has been done and geographical map developed for the sources of e-waste. (Achieved for Accra, Kumasi, Cape Coast and Takoradi yet to be done) • Developed laboratory trial analysis of the samples using the method. 	<p>On going</p> <p>Not implemented</p>
			Applying Nuclear Analytical Techniques to Support Harmful Algal Bloom Management in the Context of climate and Environmental Change,	None	Develop and implement a national sea food safety monitoring system through the application of	Conducted sampling of water from the marine environment. Conducted sampling of planktons from marine environment. Such physico-chemical properties like pH, temperature, conductivity,	On going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Phase II" in the Field of Marine, Terrestrial and Coastal Environments.		Nuclear and allied analytical techniques in order to sustain marine resources, food security and social-economic benefits.	salinity, phosphates, nitrates, and carbonates on the water samples were done.	
			Research on optimization of patient protection in Mammography	None	Complete quality control assessment of mammography equipment nationwide.	Evaluated equipment assembly. Performed radiological test. Performed image quality and dosimetry on mammography systems.	On-going
			Optimization of Pediatric dosimetry and risk assessment in diagnostic radiology	None	Completion of all relevant sub projects	CT Head and body phantom have been delivered by IAEA. Some facilities have been identified to participate in the study. Conducted background work on ethical clearance.	On-going
2017	Management & Administration	General Administration	Provide training for staff of the STI Directorate	Training provided to 10 various staff in the STI Directorate	7 staff of the STI Directorate to be trained.	None	Not Implemented
			Implement the Mathematics, Science and Technology Scholarship Scheme (MASTESS)	<ul style="list-style-type: none"> Request for funds submitted to GETFUND Reports submitted to Scholarship Technical Review Committee constituted by the Ministry of Education 	4,000 scholarships awarded to be beneficiaries nationwide.	None	Not Implemented
			Establish 2 National Science and Technology Theme Park	None	None	Arrangements made with the Embassy of Republic of Colombia for Collaboration with Ruta-N Medellin to assist the Ministry to develop the framework, carry out feasibility studies and develop Business Plans in establishing Technology Incubation Centres	On-going
			Establish the National STI Fund	<ul style="list-style-type: none"> A Stakeholder consultation was 	<ul style="list-style-type: none"> Series of fund raising activities 	Not done	Not Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
				organized with the Ministry of Finance on “Sustainable Sources of Funding” <ul style="list-style-type: none"> • A draft Legislative Scheme prepared. • A draft cabinet Memo prepared. 	for the STI Fund to be organized. <ul style="list-style-type: none"> • National STI Fund Board meetings to be organized 		
			Organize Annual Regional Technology Fairs	None	A one-day Regional Technology Fair to exhibit adopted technologies by R&D institutions and Innovators to be organized.	Not done	Not Implemented
	Research & Development	Scientific & Industrial Research	Promote improved technologies for the cultivation of high yielding local rice	None	25 improved technologies for rice production to be promoted.	7 varieties	On-going.
			Develop Rice production guides for commercial rice producers	800 copies of production guides produced	1000 copies of production guides to be produced	None	On-going
			Promote the use of water management structures (SAWAH technology) for rice production	1006 farmers adopted the SAWAH Technology	1200 farmers to adopt the SAWAH Technology	None	On-going
			Provide grafted mango seedlings and certified planting materials to farmers	900 farmers provided with grafted mango seedlings for planting	1200 farmers to be provided with grafted mango seedlings for planting	None	On-going
			Train commercial farmers, Agricultural Extension Agents (AEAs) and NGOs on good agricultural practices for increased productivity in mango production	82 persons trained from target groups in GAPs in mango production.	120 persons from target groups to be trained in GAPs in mango production.	None	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Promote Agro-processing and production of fruit juice.	130 Enterprises/ entrepreneurs supported through training	150 enterprises/ Entrepreneurs to be supported through training	None	On-going
			Promote solar and/or Cabinet drying of mango fruits for local consumption and exports.	5 fruit processors adopted technology	5 fruit processors to adopt technology	A processor had already adopted one in 2017	On-going
			Develop high yielding disease and pest tolerant varieties of pepper and eggplant for local and export markets.	4 lines of pepper and 2 lines of eggplant developed but yet to be released	4 lines of pepper and 2 lines of eggplant developed to be released after screening.	None	On-going
			Develop improved planting materials (seed and seedlings) of Oil Palm and Coconut for farmers	195 and 85 farmers supplied with improved seedlings of oil palm and coconut	250 and 150 famers to be supplied with improved seedlings of Oil palm and Coconut respectively.	None	On-going
			Promote technologies for increasing meat and egg production output and nutrition.	8 technologies promoted to increase meat and egg production output for nutrition	10 technologies to be promoted for poultry and livestock farmers to increase meat and egg production	None	On-going
			<ul style="list-style-type: none"> Promote Sustainable Fishery Management of capture fishery (marine and fresh water) and enhance fish production and preservation. Management of post-harvest loses. Intensify the promotion of improved oven for smoking fish called FRISMO 	<ul style="list-style-type: none"> 12 technologies on sustainable fishery management promoted. 1450 persons trained on the FRISMO technologies 	<ul style="list-style-type: none"> 15 technology on sustainable fishery management practices to be promoted. 2000 persons to be trained 2000 adopt 1500 processors trained on the FRISMO technologies. 	None	On-going
			Promoted Rain Water Harvesting (RWH)	1500 individuals in households and small communities and	1800 households and small communities and	None	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			technology for schools and small communities	schools adopted the RWH technology	schools to adopt RWH technology		
			Drill boreholes for rural communities	75 communities benefitted from boreholes drilled	100 communities to benefit from the borehole drilling	None	On-going
			Provide Bio-sanitation toilets for schools and communities	10 schools and 16 communities adopted the bio-sanitation toilets technology.	18 schools and 25 communities to adopt the bio-sanitation toilet technology.	None	On-going
		Nuclear and Space Science Technology	Establishment of a P3 Facility for the improvement of Tuberculosis diagnosis and quality assurance in the Ga East Municipality	Construction of Laboratory started	Finalize protocols and working documents. Complete construction works.	<ul style="list-style-type: none"> Development of proposals of all working documents. Engaging stakeholders for input, acceptance and approval of the proposal and working document 	On going
			Completion of Offices and Labs for RAMSRI	Laboratory structure constructed and roofed	Construct RAMSRI facility	Constructed 60% of facility	On going
			Toxicological studies on herbal preparations and the risks associated with their use	None	Develop a well-established process for identifying herbal preparations with carcinogenic risks	Identified and collected candidate samples for herbal preparations.	Ongoing
			Determination of individual sensitivity to radiation for a selected population	None	Develop a predictive test for individual radiosensitivity	Adoption of protocol on Comet assay for determining DNA damages; gathering consumables and reagents to run trials and optimize the Comet assay.	On-going
			Post graduate Education Course (PGE) in Radiation Protection organised	National Training Courses in radiation protection for 20 end user Institutions organized.	Organize and train 23 professionals in Radiation Protection.	Project is on going	On-going
			Developing Ghana Space Policy	None	Develop draft national space policy	Drafting committee formed	On-going
			Conduct prior safety assessments on mobile	400 base stations assessed	400 Mobile base stations to be assessed	378 Mobile base stations prior safety assessment were done.	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			base stations before installation		1000 Mobile phone cell sites to be assessed	775 Mobile Phone cell sites were monitored	
			Use of Gamma Irradiation Facility for the management of postharvest losses and enhancing health care delivery.	Three (3) tonnes of agricultural products preserved by irradiation.	30 tonnes	15 tonnes	On-going
			Provision of Welding and NDT Training facility for Asset Integrity Management	None	Commence the establishment of facility	Decisions for relocation of the training facility made Prospecting for clients ongoing Mobilising funds for the training of the trainers	Lack of funding to complete project
Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen the institutional framework to promote the development of research and its application;						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Research & Development	Scientific & Industrial Research	Promote lesser known wood species in wooden bridges construction.	50 lesser known wood species were promoted	70 lesser known wood species to be promoted	Promoted 65 lesser known wood species.	On-going
			Promote the use of local building materials and fast track construction techniques for affordable housing delivery	500 affordable houses built with local building material and fast track construction technologies	1000 affordable houses to be built with local building material and fast track construction technologies.	1500 affordable houses built with local building material or fast track construction technologies.	Fully Implemented
			Facilitate STI policy research for National Development	3 STI policies formulated for National Development	5 STI policies to be formulated for National Development	Formulated 4 STI policies for National Development	On-going
			Package & disseminate scientific publications to end users	150 scientific publications disseminated to end users	250 scientific publications to be disseminated to end users	Disseminated 200 scientific publications to end users	On-going
			Protect and distribute nationwide the characterization and	500 plant genetic resources characterized and conserved nationwide	700 plant genetic resources to be characterized, protected and	characterized, protected and conserved 650 plant genetic resources nationwide	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			conservation of plant genetic resources.		conserved nationwide		
2015	Research & Development	Scientific & Industrial Research	Promote lesser known wood species in wooden bridges construction.	65 lesser known wood species promoted	80 lesser known wood species to be promoted	Promoted 80 lesser known wood species	Fully Implemented
			Promote the use of local building materials and fast track construction techniques for affordable housing delivery	1500 affordable houses built with local building material or fast track construction technologies.	2000 affordable houses built with local building material and fast track construction technologies	2500 affordable houses built with local building material and fast track construction technologies.	Fully Implemented
			Facilitate STI policy research for National Development	4 STI policies formulated for National Development	5 STI policies to be formulated for national development	Formulated 5 STI policies for National Development	Fully Implemented
			Package & disseminate scientific publications to end users	200 scientific publications disseminated to end users	350 scientific publications to be disseminated to end users	Disseminated 300 scientific publications to end users	On-going
			Protect and distribute nationwide the characterization and conservation of plant genetic resources.	650 plant genetic resources characterized, protected and conserved nationwide	800 plant genetic resources to be characterized, protected and conserved nationwide	characterized protected and conserved 750 plant genetic resources nationwide	On-going
2016	Research & Development	Scientific & Industrial Research	Promote lesser known wood species in wooden bridges construction.	80 lesser known wood species promoted	100 lesser known wood species to be promoted	Promoted 105 lesser known wood species	Fully Implemented
			Promote the use of local building materials and fast track construction techniques for affordable housing delivery	2500 affordable houses built with local building material and fast track construction technologies	3500 affordable houses to be built with local building material and fast track construction technologies	3800 affordable houses built with local building material and fast track construction technologies	Fully Implemented
			Facilitate STI policy research for National Development	5 STI policies formulated for National Development	7 STI policies to be formulated for National Development	5 STI policies formulated d for National Development	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote the Application of Science, Technology and Innovation in all sectors of the economy						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Package & disseminate scientific publications to end users	300 scientific publications disseminated to end users	500 scientific publications to be disseminated to end users	Disseminated 445 scientific publications to end users	On-going
			Protect and distribute nationwide the characterization and conservation of plant genetic resources.	750 plant genetic resources characterized protected and conserved nationwide	1200 plant genetic resources to be characterized, protected and conserved nationwide	Characterized, protected and conserved 1000 plant genetic resources nationwide	On-going
2017	Research & Development	Scientific & Industrial Research	Promote lesser known wood species in wooden bridges construction.	105 lesser known wood species promoted	125 lesser known wood species to be promoted	None	On-going
			Promote the use of local building materials and fast track construction techniques for affordable housing delivery	3800 affordable houses built with local building material and fast track construction technologies	5000 affordable houses to be built with local building material or fast track construction techniques	None	On-going
			Facilitate STI policy research for National Development	5 STI policies formulated for National Development	10 STI policies to be formulated for National Development	None	On-going
			Package & disseminate scientific publications to end users	445 scientific publications disseminated to end users	650 scientific publication disseminated to be end users	None	On-going
			Protect and distribute nationwide the characterization and conservation of plant genetic resources.	1000 plant genetic resources characterized and conserved nationwide	1200 plant genetic resources to be characterized, protected and conserved nationwide	None	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen policy formulation, development planning, and M&E processes for equitable and balanced spatial and socio- economic development						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014		Planning, Budgeting,	Prepare and submit MESTI 2013 Annual	2012 Annual Performance Report	2013 Annual Performance Report	2013 Annual Performance Report submitted to OHCS	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen policy formulation, development planning, and M&E processes for equitable and balanced spatial and socio- economic development						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
	Management & Administration	Monitoring and Evaluation	Performance Report (APR) to the Office of the Head of the Civil Service (OHCS)		to be submitted to OHCS		
			Prepare MESTI 2014 Annual Action Plan (AAP)	2013 AAP	Finalise sector 2014 AAP	MESTI 2014 AAP finalised	Fully Implemented
			Prepare and submit MESTI 2013 Annual Progress Report (APR) to the National Development Planning Commission (NDPC)	2012 Annual Progress Report	2013 Annual Progress Report to be submitted to NDPC	2013 Annual Progress Report submitted to NDPC	Fully Implemented
			Collate 2014 Sector Annual Budget and submit to Parliament for approval	2013 Sector Budget	2014 Sector Annual Budget to be submitted to Parliament for approval	2014 Sector Annual Budget approved by Parliament	Fully Implemented
			Coordinate the preparation of 2014 – 2017 SMTDP	2010-2013 SMTDP	2014–2017 SMTDP to be finalised and submitted to NDPC	2014 – 2017 SMTDP finalised and submitted to NDPC	Fully Implemented
			Submit inputs into 2014 state of the Nation Address (SONA)	2013 SONA	MESTI's input into SONA to be submitted to the Office of the President (OoP)	Submitted MESTI input into SONA to OoP	Fully Implemented
			Provide inputs into 2014 Budget and Economic Statement	Input into 2013 budget statement	MESTI's input into the 2014 budget statement to be submitted to the Ministry of Finance	Submitted MESTI's input into the 2014 budget statement to the Ministry of Finance	Fully Implemented
			Monitor two (2) projects each of MESTI Agencies	2 projects monitored	Two (2) projects each of MESTI Agencies to be monitored	Not done	Not implemented
2015	Management & Administration	Planning, Budgeting, Monitoring and Evaluation	Prepare and submit MESTI 2014 Annual Performance Report (APR) to the Office of the	2013 Annual Performance Report	2014 Annual Performance Report to be submitted to OHCS	2014 Annual Performance Report submitted to OHCS	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen policy formulation, development planning, and M&E processes for equitable and balanced spatial and socio- economic development						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Head of the Civil Service (OHCS)				
			Prepare MESTI 2015 Annual Action Plan (AAP)	2014 AAP	Finalise sector 2015 AAP	MESTI 2015 AAP finalised	Fully Implemented
			Prepare and submit MESTI 2014 Annual Progress Report (APR) to the National Development Planning Commission (NDPC)	2013 Annual Progress Report	2014 Annual Progress Report to be submitted to NDPC	2014 Annual Progress Report submitted to NDPC	Fully Implemented
			Collate 2015 Sector Annual Budget and submit to Parliament for approval	2014 Sector Budget	2015 Sector Annual Budget to be submitted to Parliament for approval	2015 Sector Annual Budget approved by Parliament	Fully Implemented
			Submit inputs into 2015 state of the Nation Address (SONA)	2014 SONA	MESTI's input into SONA to be submitted to the Office of the President (OoP)	Submitted MESTI input into SONA to OoP	Fully Implemented
			Provide inputs into 2015 Budget and Economic Statement	Input into 2014 budget statement	MESTI's input into the 2015 budget statement to be submitted to the Ministry of Finance	Submitted MESTI's input into the 2015 budget statement to the Ministry of Finance	Fully Implemented
			Monitor two (2) projects each of MESTI Agencies	2 projects monitored	Two (2) projects each of MESTI Agencies to be monitored	Not done	Not implemented
2016	Management & Administration	Planning, Budgeting, Monitoring and Evaluation	Prepare and submit MESTI 2015 Annual Performance Report (APR) to the Office of the Head of the Civil Service (OHCS)	2014 Annual Performance Report	2015 Annual Performance Report to be submitted to OHCS	2015 Annual Performance Report submitted to OHCS	Fully Implemented
			Prepare MESTI 2016 Annual Action Plan (AAP)	2015 AAP	Finalise sector 2016 AAP	MESTI 2016 AAP finalised	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen policy formulation, development planning, and M&E processes for equitable and balanced spatial and socio- economic development						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Prepare and submit MESTI 2015 Annual Progress Report (APR) to the National Development Planning Commission (NDPC)	2014 Annual Progress Report	2015 Annual Progress Report to be submitted to NDPC	2015 Annual Progress Report submitted to NDPC	Fully Implemented
			Collate 2016 Sector Annual Budget and submit to Parliament for approval	2015 Sector Budget	2016 Sector Annual Budget to be submitted to Parliament for approval	2016 Sector Annual Budget approved by Parliament	Fully Implemented
			Submit inputs into 2015 state of the Nation Address (SONA)	2014 SONA	MESTI's input into SONA to be submitted to the Office of the President (OoP)	Submitted MESTI input into SONA to OoP	Fully Implemented
			Provide inputs into 2016 Budget and Economic Statement	Input into 2015 budget statement	MESTI's input into the 2016 budget statement to be submitted to the Ministry of Finance	Submitted MESTI's input into the 2016 budget statement to the Ministry of Finance	Fully Implemented
			Monitor two (2) projects each of MESTI Agencies	2 projects monitored	Two (2) projects each of MESTI Agencies to be monitored	Not done	Not implemented
			Finalise Financial and Separate agreements on E-waste recycling project with KFW/GIZ	None	Agreements to be finalised for signature by MESTI and KFW/GIZ	Financial and Separate agreements on E-waste recycling project with KFW/GIZ finalised for signature	Fully Implemented
2017	Management & Administration	Planning, Budgeting, Monitoring and Evaluation	Prepare and submit MESTI 2016 Annual Performance Report (APR) to the Office of the Head of the Civil Service (OHCS)	2015 Annual Performance Report	2016 Annual Performance Report to be submitted to OHCS	2016 Annual Performance Report submitted to OHCS	Fully Implemented
			Prepare MESTI 2017 Annual Action Plan (AAP)	2016 AAP	Finalise sector 2017 AAP	MESTI 2017 AAP finalised	Fully Implemented
			Prepare and submit MESTI 2016 Annual	2015 Annual Progress Report	2016 Annual Progress Report to	2016 Annual Progress Report submitted to NDPC	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Strengthen policy formulation, development planning, and M&E processes for equitable and balanced spatial and socio- economic development						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Progress Report (APR) to the National Development Planning Commission (NDPC)		be submitted to NDPC		
			Collate 2017 Sector Annual Budget and submit to Parliament for approval	2016 Sector Budget	2016 Sector Annual Budget to be submitted to Parliament for approval	2016 Sector Annual Budget submitted to Parliament	Fully Implemented
			Provide inputs into 2017 Budget and Economic Statement	Input into 2016 budget statement	Inputs into 2017 Budget and Economic Statement submitted to MoF	Duly submitted input into Budget and Economic Statement	Fully Implemented
			Monitor two (2) projects each of MESTI Agencies	2 projects monitored	Two (2) projects each of MESTI Agencies to be monitored	Monitored two projects of MESTI	Fully Implemented
			Sign Financial and Separate agreements on E-waste recycling project with KFW/GIZ	Financial and separate agreements	Agreements to be signed by MESTI and KFW/GIZ	Financial and Separate agreements on E-waste recycling project with KFW/GIZ signed	Fully Implemented
			Identification of Handing Over Center (HOC) for E-waste project	None	Land to be acquired for siting of HOC	Search at Lands Commission on-going	On-going
			Hiring of Project Consultant	None	Consultant to be hired for E-waste project	Adverts placed for expression of interest for Project Consultant	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote a sustainable, spatially integrated and orderly development of human settlements						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
2014	Spatial Planning and Human Settlement	Human Settlements and Land Use Research and Policy	Procure orthophotos for all regions in Ghana	8 % nationwide coverage	35% nation-wide coverage	12% of national coverage	On-going
			Distribute published guidelines on zoning regulations and planning standards	100 copies distributed	150 copies of zoning guidelines and planning standards to be distributed	80% distributed (120 copies distributed)	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote a sustainable, spatially integrated and orderly development of human settlements						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Distribute spatial planning manuals	100	150 copies of spatial planning manuals to be distributed	80% distributed (120 copies distributed)	On-going
			Prepare and distribute human settlement policy	None	Human settlement policy to be distributed to 216 MMDAs	Not done	Not Implemented
			Sensitize stakeholders on human settlement Policy guidelines	None	Organize 3 zonal sensitization workshops.	Not done	On-going
			Facilitate the passage of the Land Use and Spatial Planning Bill into Law	Draft bill of Land Use and Spatial Planning available	Land use and Spatial Planning Bill passed into law	Draft bill completed and subjected to stakeholder consultation	On-going
			Prepare scheme of service and Business Plan for the Authority	None	Scheme of Service and Business Plan for Authority completed	Not done	On-going
			Appoint additional staff for the Authority	None	Staff of LUSPA appointed	Not done	On-going
		Geographic Information Systems Development	Deploy Basic version of LUPMIS in all MMDAs	50% of MMDAs have Basic version of LUPMIS	100% of MMDAs to have Basic version of LUPMIS	Basic version of LUPMIS deployed to all MMDAs (100% Coverage)	Fully Implemented
			Upgrade the Basic LUPMIS version	Basic LUPMIS version 40% upgraded	Basic LUPMIS version 60% Upgraded	Basic LUPMIS version 60% upgraded	Fully Implemented
			Integrate tax applications into LUPMIS	None	Tax applications fully integrated into LUPMIS	100% completion of tax applications component into LUPMIS	Fully Implemented
			Train stakeholders in all MMDAs in GIS and LUPMIS	None	Stakeholders in all 216 MMDAs' trained	Stakeholders in all 216 MMDAs trained (100% nationwide coverage)	Fully Implemented
		Spatial Plan Preparation	Prepare National Spatial Development Framework (NSDF)	None	NSDF 50% completed	NSDF preparation 50 % completed	Fully Implemented
2015	Spatial Planning and Land Use	Human Settlements and Land Use	Procure ortho-photos for preparation of spatial plans	12% nation-wide coverage	35% nation-wide coverage	18% nation-wide coverage	Fully Implemented

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote a sustainable, spatially integrated and orderly development of human settlements						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
	Human Settlement	Research and Policy	Distribute guidelines on zoning regulations and planning standards	120 copies of zoning guidelines and planning standards	150 copies of zoning guidelines and planning standards to be distributed	100 copies distributed (67% distributed)	On-going
			Distribute spatial planning manuals	120 copies spatial planning manuals	150 copies of spatial planning manuals to be distributed	100 copies distributed (67% distributed)	Fully Implemented
			Prepare human settlement Policy	None	Human settlement policy to be completed	Study for the Human settlement policy conducted	Fully Implemented
			Facilitate the passage of the Land Use and Spatial Planning bill by parliament	Draft bill of Land Use and Spatial Planning bill available	Land use and Spatial Planning Bill to be passed into law	Draft bill was discussed in parliament	On-going
			Prepare scheme of service for LUSPA	None	scheme of service for LUSPA to be prepared	Not done	Not Implemented
			Prepare business plan for LUSPA	None	Business plan for LUSPA to be prepared	60% draft business plan completed	On-going
			Recruit staff for LUSPA	Staff of TCPD available	Staff for LUSPA to be appointed	Not done	On-going
		Geographic Information Systems Development	Upgrade the basic version of LUPMIS	60% upgraded	Basic version of LUPMIS to be upgraded to 80%	Basic version of LUPMIS upgraded to 80%.	Fully Implemented
			Organize training of trainers (TOT) on the upgraded version of LUPMIS	Regional representatives had basic knowledge of LUPMIS	10 regional representatives to be trained on the upgraded version of LUPMIS	All 10 TOTs trained on the upgraded version of LUPMIS	Fully Implemented
		Spatial Plan Preparation	Prepare National Spatial Development Framework (NSDF)	50% rate of completion of the NSDF	National Spatial Development Framework (NSDF) completed	NSDF completed	Fully Implemented
2016	Spatial Planning and	Human Settlements and Land Use	Procure orthophotos for preparation of spatial plans	18% orthophotos nation-wide coverage	35% nation-wide coverage to be achieved	18% nation-wide coverage (no change in coverage)	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote a sustainable, spatially integrated and orderly development of human settlements						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
	Human Settlement	Research and Policy	Distribute guidelines on zoning regulations and planning standards	100 copies distributed	100 guidelines on zoning regulations and planning standards to be distributed	100 copies of zoning regulations and planning standards were distributed	Fully Implemented
			Distribute spatial planning manuals	100 copies distributed	100 spatial planning manuals to be distributed	100 copies of spatial planning manuals were distributed	Fully Implemented
			Prepare human settlement policy	Human settlement study available	Human settlement policy to be prepared	Not done	On-going
			Facilitate the passage of Land Use and Spatial Planning bill	Draft bill available	Land use and spatial planning bill to be passed	Land Use and Spatial Planning Bill passed into Act (Act 925,2016)	Fully Implemented
			Prepare scheme of service for LUSPA	None	Scheme of service to be completed	Not achieved	On-going
			Prepare business plan for LUSPA	Draft business plan 60% complete	Business plan for LUSPA to be 80 % completed	80% of Business plan completed	On-going
			Recruit staff for LUSPA	Staff of TCPD available	Number of staff recruited for LUSPA	10 New staff were recruited for LUSPA	On-going
		Geographic Information Systems Development	Develop the Full upgraded version of Land Use Planning and Management System (LUPMIS)	80% upgraded	Full upgraded version of LUPMIS available (100%)	100% upgraded version of LUPMIS achieved	Fully Implemented
			Organize training for trainers on the upgraded version of LUPMIS	Regional representatives had knowledge of previous upgraded LUPMIS version	All 10 regional representatives to be trained on the upgraded version of LUPMIS	All trainers were trained on the upgraded version of LUPMIS	Fully Implemented
		Spatial Plan Preparation	Distribute NSDF to MDAs and RCCs nationwide	None	250 NSDFs reports to be distributed	200 NSDF reports distributed	On-going
			Publicize the NSDF via radio, television and websites	None	10 radio and television programmes to be organized and	NSDF publicized on TCPD website but television and radio programmes were not organized	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote a sustainable, spatially integrated and orderly development of human settlements						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
					availability of NSDF on a website		
			Prepare sub-national SDF for the Northern Savannah Ecological zone	None	Sub-national SDF for the Northern Savannah Ecological zone to be completed	SDF for Northern Savannah Ecological zone completed	Fully Implemented
			Commence the preparation of Regional SDFs for Ashanti and Greater Accra Region	None	2 Regional SDFs commenced	SDF for Ashanti and Greater Accra commenced	Fully Implemented
			Commence the preparation of District Spatial Development Frameworks (SDFs) for MMDAs	None	216 District SDFs commenced	District SDF for Tamale commenced	On-going
			Commence the preparation of local plans for MMDAs	None	10 local plans commenced	Local Plan for Buipei commenced	On-going
2017	Spatial Planning and Human Settlement	Human Settlements and Land Use Research and Policy	Procure orthophotos for preparation of spatial plans	18% orthophotos nation-wide coverage	35% nation-wide coverage	18% nation-wide coverage	On-going
			Distribute guidelines on zoning regulations and planning standards	100 copies distributed	50 guidelines on zoning regulations and planning standards to be distributed	50 copies of guidelines on zoning regulations and planning standards distributed	Fully Implemented
			Distribute spatial planning manuals	100 copies distributed	100 spatial planning manuals to be distributed	100 copies of spatial planning manuals were distributed	Fully Implemented
			Prepare human settlement policy	Human settlement study available	Human settlement policy to be completed	Not done	On-going
			Facilitate the formation of the Board for LUSPA	Officials nominated for the formation of the Board	Board of LUSPA fully formulated and operational	Nominees for the LUSPA board sent to Office of the President for confirmation and inauguration.	On-going
			Prepare the scheme of service and complete the Business Plan for the Authority	Draft business plan 80% complete	Scheme of service and business plan to be completed	90% Draft business plan complete	On-going

Period	Thematic Area: Accelerated Agricultural Modernisation and Sustainable Natural Resource Management						
	Policy Objective: Promote a sustainable, spatially integrated and orderly development of human settlements						
	Programmes	Sub-Programme	Broad Projects/ Activities	Indicators			Remarks
				Baseline (2013)	Target	Achievement	
			Recruit staff for LUSPA and Physical Planning Department for 100 more MMDAs	10 New staff were recruited for LUSPA	No. of staff recruited for LUSPA and MMDAs	Not done	On-going
		Geographic Information Systems Development	Deploy the full upgraded version of LUPMIS to all MMDAs	Basic versions of LUPMIS available in all MMDAs	Full upgraded version of LUPMIS to be deployed into all MMDAs	Full upgraded version of LUPMIS deployed to 17 MMDAs completed	Fully Implemented
			Organize training on the fully upgraded version of LUPMIS for the trainers in all the ten regions	Regional representatives already have good knowledge of the upgraded LUPMIS	Regional representatives to be trained	Activities yet to be undertaken	On-going
		Spatial Plan Preparation	Complete the preparation of Regional SDFs for Ashanti and Greater Accra Regions	Regional SDFs for Ashanti and Greater Accra 60% completed	Regional SDFs for Ashanti and Greater Accra to be completed	SDF for Ashanti and Greater Accra Regions 90% completed.	Fully Implemented
			Commence the preparation of District SDFs for MMDAs under the new three tier spatial planning system	District SDF for Tamale Metropolis commenced (60% complete)	Number of District SDFs commenced	SDF for Tamale Metropolis to be completed by the close of the year	Fully Implemented
			Prepare local plans for MMDAs	Local Plan for Buipei commenced	Number of local plans prepared	Local plan for Buipei to be completed by the end of the 2017	On-going
			Distribute the SDF for the Northern Savannah Ecological Zone to RCCS, MDAs and MMDAs	None	100 SDF report for the NSEZ distributed	No action taking yet	On-going
			Publicize the NSDF via radio, television and websites	None	10 radio and television programmes to be organized and availability of NSDF on a website	NSDF available on TCPD website but television and radio programmes have not been organized	On-going

1.6.2. Income and Expenditure Performance (2014–2017)

The Ministry over the period (2014 – 2017) was allocated an amount of one billion, one hundred and twelve million, seven hundred and twenty-two thousand, four hundred and thirty-five (**GH¢1,112,722,435**). Out of this amount, six hundred and forty-two million, three hundred and seventy-nine thousand, four hundred and twenty-three Ghana Cedis (**GH¢642,379,423**) was allocated for paying Compensation of Employees. Two hundred and forty-one million, eight hundred and four thousand, two hundred and thirty-eight Ghana Cedis (**GH¢241,804,238**) was allocated for Goods and Services. Two hundred and twenty-eight million, five hundred and thirty-eight thousand, seven hundred and seventy-six Ghana Cedis (**GH¢228,538,776**) was allocated for Capital Expenditure.

Total receipts/expenditure as at 2017 stood at One Billion, Ninety-One Million, Nine Hundred and Eighteen Thousand, Four Hundred and Thirty-Three Ghana Cedis, Ninety-Six Pesewas (**GH¢1,091,918,433.96**). The above information is presented in the tables below, as well as a graphical presentations.

Table 1.2: Total releases from Government of Ghana

PERSONNEL EMOLUMENTS (wages and salaries)							
Year	Requested As planned	Approved As per ceiling	Released	Deviations		Actual Expenditure	Variance
	A	B	C	A-B	B-C	D	C-D
2014	146,422,250.00	147,319,619.00	148,695,354.00	-897,369.00	-1,375,735.00	148,695,354.00	0.00
2015	179,963,859.00	140,000,000.00	144,088,479.90	39,963,859.00	-4,088,479.90	144,088,479.90	0.00
2016	207,962,615.50	164,516,725.00	137,221,361.00	43,445,890.50	27,295,364.00	137,221,361.00	0.00
2017	190,754,353.00	177,765,586.00	154,350,825.16	12,988,767.00	23,414,760.84	154,356,825.16	0.00
CAPITAL EXPENDITURES/ ASSETS							
2014	68,743,890.00	2,194,795.00	0	66,549,095.00	2,194,795.00	0	0.00
2015	31,355,117.00	1,850,000.00	1,198,758.45	29,505,117.00	651,241.55	1,198,758.45	0.00
2016	83,185,046.20	0	0	83,185,046.20	0.00	0	0.00
2017	72,201,820.00	6,000,000.00	0.00	66,201,820.00	6,000,000.00	0	0.00
GOODS AND SERVICES							
2014	67,452,627.00	12,501,300.00	7,817,436.00	54,951,327.00	4,683,864.00	7,817,436.00	0.00
2015	42,986,849.00	6,250,650.00	5,374,347.07	36,736,199.00	876,302.93	5,374,347.07	0.00
2016	124,777,569.30	3,125,325.00	699,486.65	121,652,244.30	2,425,838.35	699,486.65	0.00
2017	41,872,908.45	11,200,390.00	3,886,848.79	30,672,518.45	7,313,541.21	3,886,848.79	0.00

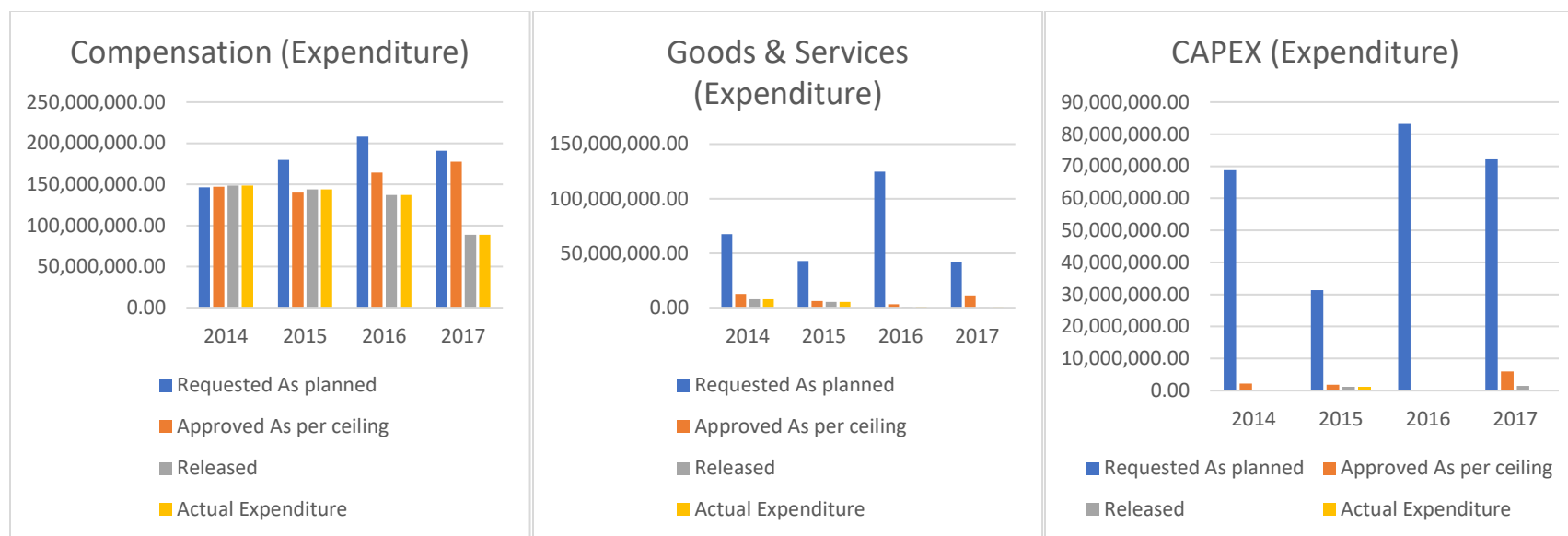


Figure.1: GoG releases for 2014-20017

Table 1.3: All Sources of Financial resources for MESTI

Source	2014			2015			2016			2017		
	Planned	Actual received	Variance	Planned	Actual received	Variance	Planned	Actual received	Variance	Planned	Actual received	Variance
GOG	162,015,300.00	156,512,790.00	5,502,510.00	146,900,650.00	150,661,585.42	-3,760,935.42	167,642,050.00	139,720,847.65	27,921,202.35	194,965,976.00	158,237,673.95	43,574,596.67
IGF	43,141,720.00	42,241,828.38	899,891.62	65,523,052.00	45,821,939.60	19,701,112.40	85,648,279.00	85,648,279.00	0.00	56,688,121.00	87,803,343.08	-2,385,627.72
NREG	4,651,893.00	0.00	4,651,893.00	0.00	1,198,758.45	-1,198,758.45	0.00	1,800,000.00	-1,800,000.00	0.00	0.00	0.00
DPs	36,145,980.00	13,131,002.35	23,014,977.65	30,976,132.00	61,824,555.64	30,848,423.64	20,924,824.00	79,062,241.94	58,137,417.94	97,498,045.00	68,253,588.50	59,350,983.06
Total	245,954,893.00	211,885,620.73	34,069,272.27	243,399,834.00	259,506,839.11	16,107,005.11	274,215,153.00	306,231,368.59	32,016,215.59	349,152,142.00	314,294,605.53	100,539,952.01

1.7.Key Problems

The under-listed are the key problems and challenges which were encountered during the 2014-2017 Sector Medium-Term Development Plan:

- Poor socio-cultural practices in waste management
- Lack of awareness of the link between the state of the environment and the impact on human health and development
- Apathy and lack of commitment by the general citizenry to address environmental and sanitation/waste management issues.
- Lack of general understanding and appreciation of STI and its impact on accelerated development and poverty reduction.
- Lack of sustainable investments over the years in ST&I
- Inadequate Research Funding
- Inadequate and obsolete research equipment and infrastructure
- Encroachment and litigation on Institutional lands
- Inability to undertake recruitment and replacement of competent staff on a regular basis
- Inadequate/irregular inflow of funds for implementation of programmes
- Public misconception about biosafety issues
- Poor appreciation of the significance of spatial planning towards achieving environmental quality, economic growth and productivity as well as the general well-being of the citizenry

1.8. Lessons Learnt 2014-2017

A number of useful lessons can be drawn from the implementation of the Sector's 2014-2017 MTDP. The lessons that stand out are the need to:

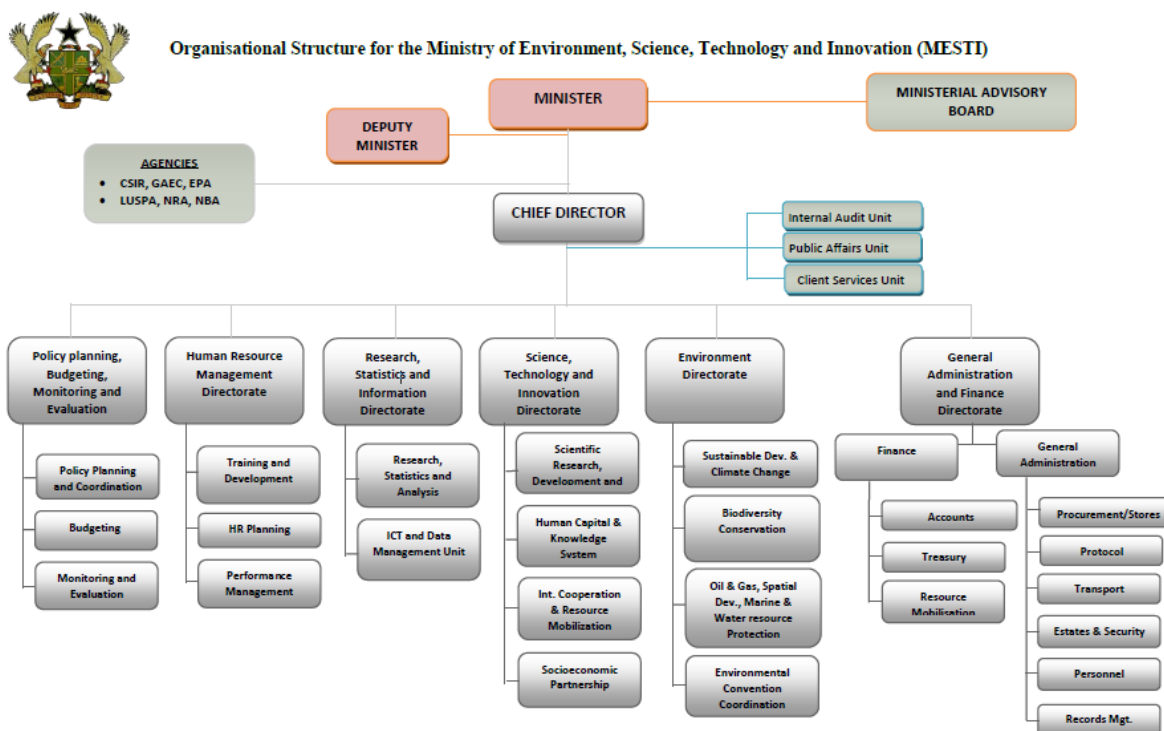
- Devote resources for public education on attitudinal change towards the environment and create greater awareness on the link between the impoverishment of the environment and the impoverishment of a people
- Foster closer collaboration among key actors in the Environment, Science, Technology and Innovation sector
- Enhance capacity through training, for effective implementation of projects and programmes; and
- Ensure timely release of adequate resources, since it is imperative for the efficient delivery of the sector's mandate

1.9. Analysis of Existing Situation/Compilation of the Profile of the MDA

This section provides a brief description of the current state of affairs of the Environment, Science, Technology and Innovation sector and their development implications for the future. This analysis includes the nature of current development issues facing the sector,

1.9.1. Institutional Capacity Needs

i. Organogram



The Ministry of Environment, Science, Technology and Innovation (MESTI) is a Central Government Agency established to promote sustainable development by deepening and strengthening market driven Research and Development (R&D) for sound Environmental Governance, Science, Technology and Innovation through intensive awareness creation, collaboration and partnership.

MINISTERIAL ADVISORY BOARD

According to Section 39 of the Civil Service Law 1993 PNDC Law 327, every Ministry is required to establish a Ministerial Advisory Board (MAB). In this regard, the Ministry has an advisory board which is responsible for advising the Ministry at the highest level in a manner calculated to facilitate the effective performance for decision making, co-ordination, monitoring and evaluation. Specifically, its functions as provided under Section 40 of the Civil Service Law 1993 PNDC Law 327 is to:

- Promote constant interaction between the Ministry and the users of its services; and
- Advise the sector Minister on adjustments in policy direction, planning objectives and operational strategies.

LEADERSHIP

The Ministry is headed by a Minister, who is supported by a Deputy Minister. The Minister has oversight responsibility for ensuring that all policies in the Environment, Science, Technology and Innovation Sector are implemented based on the overall Government Agenda. There is a Chief

Director who is the administrative head, and is supported by six (6) Directors heading each of the directorates. Out of the six (6) Directorates, there are four (4) line Directorates specified by the Civil Service Law, 1933 (PNDCL 327); namely Finance and Administration Directorate (F&A), Human Resource Management Directorate (HR), Policy, Planning, Monitoring and Evaluation Directorate (PPME), and Research, Statistics and Information Management Directorate (RSIM) and then two (2) technical directorates- the Environment Directorate and the Science, Technology and Innovation (STI) Directorates.

The Chief Director is responsible for the day-to-day administration of the Ministry. The Chief Director reports to the Minister and acts as chief advisor.

MESTI exercises ministerial responsibility over the following Agencies: Environmental Protection Agency, Ghana Atomic Energy Commission (GAEC), Council for Scientific and Industrial Research (CSIR), Town and Country Planning Department (TCPD), The Nuclear Regulatory Authority (NRA) and National Biosafety Authority (NBA).

DIRECTORATES AND UNITS UNDER THE MINISTRY

Section 12 of the Civil Service Law (PNDCL 327, 1993) provides among other things, that each Ministry shall make provision for a Four (4) Line Directorate to provide administrative support, as well as coordinate and monitor programmes of the Ministry. Ministries can also seek approval for the creation of additional Directorates which are technical in nature.

In accordance with this statutory requirement, the organizational structure depicts the four (4) line Directorates as stipulated in the law, and two additional (2) Technical Directorates.

1. Policy Planning, Budgeting, Monitoring and Evaluation Directorate (PPMED)

The Directorate is responsible for the development of comprehensive and sustainable policies, legislations, plans, programmes and resource flow to the sector in collaboration with relevant stakeholders. The PPMED is the nerve centre of the Ministry.

It caters for the design and application of monitoring and evaluation systems for purposes of assessing the operational effectiveness of the Ministry, its implementing departments and agencies as well as the activities of other key stakeholders in meeting the sector's short, medium and long-term objectives and targets.

It facilitates the development and periodic review of comprehensive and sustainable policies, plans, programmes and budgets for all the sector's activities.

- It is responsible for the coordination of the annual work programmes.
- It designs and ensures the application of monitoring and evaluation systems for purposes of assessing the sector's operational effectiveness.

- It monitors the targets of policies programmes and projects in line the sector's goals and objectives.

2. Human Resource Management Directorate

This Directorate develops sector-wide policy on HR Planning, Succession Planning, Training and Development and Performance Management. It also ensures that there is in place an effective and stable management framework consistent with the overall manpower needs of the Sector.

The Directorate also facilitates the process of recruitment and placement, employee orientation and induction, retraining, motivation and staff development on a continuing basis for the efficient discharge of their duties. Moreover, it ensures that there is in place an effective and stable HR policy and management framework consistent with the overall manpower needs of the Sector.

3. Research, Statistics and Information Management (RSIM) Directorate

The Directorate is responsible for the design, use, maintenance and development of research and statistics as input into a central database for service-wide use. It coordinates all activities relating to information gathering, processing and dissemination for all the Ministry's organizations and stakeholders.

Specifically, its functions are:

- To protect the good image of the sector, within and outside the country, by disseminating sectoral information on its policies, activities and procedures;
- To create favourable atmosphere for the effective functioning of the sector by promoting and maintaining cordial working relationships with the other directorates in the sector and with its clients and stakeholders;
- To provide a system of feedback to stake-holders, and clients of the sector;
- To create and maintain a data bank of information on the sector for decision-making; and
- To conduct research into sectoral activities with a view to remove bottle-necks and enhancing its service delivery standards.

4. Environment Directorate

The Environment Directorate provides technical support for policy formulation, programmes and projects as well as necessary legislative reforms to ensure effective environmental governance and natural resource management for enhanced national development.

Units under this Directorate includes;

- Sustainable Development and Climate Change Unit
- Biodiversity and Biosafety Conservation Unit
- Oil & Gas, Spatial Development, Marine and Water Resource Protection Unit
- Environmental Convention Coordination Unit
- Environmental Governance Management Unit

5. Science, Technology and Innovation (STI) Directorate

The STI Directorate provides technical assistance and promotes the application of Science, Technology and Innovation in all sectors of the economy. The Directorate collaborates with the PPME Directorate to formulate STI policies, communicate, coordinate and monitor programmes and activities of Agencies and Departments of the Ministry at various levels of implementation specifically that of Ghana Atomic Energy Commission (GAEC) and Council for Scientific and Industrial Research (CSIR).

The Directorate has Four (4) Units namely:

- Research, Development and Innovation
- Human Capital and Knowledge System
- International Cooperation and Resource Mobilisation
- Socioeconomic Partnership

6. General Administration and Finance Directorate

This Directorate handles the administrative business of the Ministry by ensuring that services and facilities necessary to support the efficient performance of the functions of the Ministry are available. It also ensures the provision of an effective and efficient system of internal checks and the practice of proper and accountable administration. It is made up of two (2) units namely;

- **General Administration Unit**

This Division ensures that approved personnel policies in the Ministry on employment, personnel records, training, and wages and salaries administration are translated into good management practices and effectively carried out.

- Procurement and Stores
- Protocol
- Estates & Security
- Records
- Personnel
- Transport

- **Finance Unit:** The Unit safeguards the interest of the Ministry in all financial transactions relating to revenue and expenditure management, ensures proper allocation and use of the Ministry's budget. It also ensures effective financial transactions relating to revenue and expenditure management and reporting of the Ministry and its project accounts. It also ensures the provision of an effective and efficient system of internal controls (checks and balances) and the practice of proper and accountable administration. The Finance Unit is made up of three (3) Sub-Units namely;
 - Accounts:
 - Treasury
 - Resource Mobilization

7. Strategic Units

Strategic Units under the Ministry include;

- **Internal Audit Unit:** The primary function of the Internal Audit Unit is to provide an independent objective assurance and consulting service to add value and improve the Ministry's operations. The Unit properly manages and evaluates activities of the Ministry to ensure that the system of internal controls, effectiveness of risk management and governance processes are applicable to financial programmes and projects to achieve the objectives of the Ministry.
- **Public Affairs Unit:** The Unit develops implements and reviews communication strategies to market and communicate the Ministry's policies, programs, projects and activities to the public and also receive and manage client responses and enquiries. In other words, the unit projects the good image of the Sector both within and outside the country by disseminating information on the Ministry policies, activities and procedures as well as providing a mechanism for receiving feedback on Government's policies and activities.
- **Clients Services:** The Unit is responsible for the identification and updating of relevant information for policy formulation and decision making. It acts as a focal point for information about the Ministry and provides a system for feedback to stakeholders and clients. This Unit is positioned strategically in staffing position to the Chief Director who shall ensure accuracy of information disseminated to stakeholders

AGENCIES AND DEPARTMENTS UNDER THE MINISTRY

The Ministry of Environment, Science, Technology and Innovation (MESTI) has oversight responsibility over six (6) Departments and Agencies:

- The Council for Science and Industrial Research (CSIR);
- The Ghana Atomic Energy Commission (GAEC);

- The Environmental Protection Agency (EPA);
- Land Use and Spatial Planning Authority (LUSPA);
- Nuclear Regulatory Authority (NRA)
- National Bio-safety Authority (NBA)

1. COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR)

The council for Scientific and Industrial Research (CSIR) has its origin in the National Research Council which was established in 1958. In its current form, the CSIR has been established by the Council for Scientific and Industrial Research (CSIR) Act of 1996 (521). The council is mandated to coordinate scientific and industrial research activities of its institutes in support of the national economy, especially in food and agriculture (for ensuring food security), industry (especially intermediate technologies for small and medium enterprises) and in frontier technologies such as biotechnology and non-sciences. Currently, CSIR oversees the activities of thirteen institutes. They are:

- Animal Research Institute
- Building and Road Research Institute
- Crops Research Institute
- Food Research Institute
- Forestry Research Institute of Ghana
- Institute of Industrial Research
- Institute of Scientific and Technological Information
- Oil Palm Research Institute
- Plant Genetic Resources Research Institute
- Soil Research Institute
- Science and Technology Policy Research Institute (STEPRI)
- Water Research Institute and
- Savannah Agriculture Research Institute (SARI)

2. GHANA ATOMIC ENERGY COMMISSION (GAEC)

The Ghana Atomic Energy Commission was established by an Act of Parliament, Act 204 of 1963 but currently functions under Ghana Atomic Energy Commission Act of 2000 (Act 588). The Commission is mandated to:

- Advise Government on the peaceful uses of nuclear energy for development;
- Promote the commercialisation of research and development results.

Currently, GAEC has seven (7) Institutes, namely:

- National Nuclear Research Institute (NNRI);
- Biotechnology and Nuclear Agriculture Research Institute (BNARI);
- Radiation Protection Institute (RPI);
- Radiological and Medical Sciences Research Institute (RAMSRI)
- Ghana Space Science Technology Institute (GSSTI)
- School of Nuclear and Allied Sciences (SNAS)
- Nuclear Power Institute (NPI)

3. ENVIRONMENTAL PROTECTION AGENCY (EPA)

The Environmental protection Agency (EPA) was established by the Environmental Protection Act, 1994 (Act 490) to oversee, coordinate and regulate all issues bordering on the environment. The Environmental Protection Agency is mandated to:

- Advise Government on all matters of the environment;
- Evolve regulation for the management to the national and built environment including chemical control and management, environment impact assessment and all ordinate and regulate all issues bordering on the environment;
- Charge fees which should be paid into the Environmental Fund.
- The Environmental Protection agency has ten (10) regional and three (3) District offices.

4. LAND USE AND SPATIAL PLANNING AUTHORITY (LUSPA)

The Land Use and Spatial Planning Authority (LUSPA) is charged with the responsibility of planning and management of growth and development of cities, towns and villages in the country. It therefore seeks to promote sustainable human settlements development based on principles of efficiency, orderliness, safety and healthy growth of communities.

It plans, manages and promotes harmonious, sustainable and cost effective development of human settlements in the country and in accordance with sound environmental and planning principles. The Department performs the following key functions:

- Planning and management of physical development and growth of human settlements in the country.
- Preparation of spatial and land use plans and administration of controls to ensure that human settlements function as healthy places for residence, work and recreation.
- Provision of various forms of planning services to public institutions as well as private individuals and organizations.

The organization was previously known as the Town and Country Planning Department and was operating at three levels, namely: the national, regional and district levels. The regional and district offices have been devolved to the local government service and have been integrated into the various MMDA's and the Regional Coordinating Councils.

The national office is now known as the Land Use and Spatial Planning Authority of the Ministry of Environment, Science, Technology and Innovation.

5. NUCLEAR REGULATORY AUTHORITY

The Nuclear Regulatory Authority (NRA) was established by the NRA Act 2015, Act 895. With the mandate to:

- Regulate and manage activities and practices for the peaceful use of nuclear energy and radiation under the jurisdiction and control of Ghana, including the production, possession, use, import, export, transportation, transfer, handling and management of radioactive material as well as decommissioning or other related activities or practices identified by the Authority.
- Manage radioactive waste resulting from civilian applications in the Country
- Manage spent fuel resulting from the operation of civilian nuclear reactors in the Country.

The functions of the NRA as spelt out in the NRA Act 895 are as follows:

- a. Facilitate the development of national policies on the regulation and management of activities and practices with respect to:
 - i. Nuclear safety and research
 - ii. Security of nuclear and radioactive materials
 - iii. Radiation
 - iv. Implementation of safeguards specified under the Act.
- b. Regulate the introduction of radiation sources, nuclear materials, equipment or practices that expose workers, patients, the public and the environment to radiation.
- c. Issue, modify, suspend or revoke authorization and determine conditions for authorization.
- d. Regulate research on radiation and nuclear safety and security, and of radioactive waste matters.
- e. Regulate the use of radioactive materials in the exploration, exploitation and extraction of oil and gas, and the mining and milling of radioactive ores and other ores associated with radioactive and nuclear materials.
- f. Define the detailed obligations to be placed on persons who possess radiation sources and nuclear materials, including financial conditions.
- g. Establish and maintain a national register of radiation sources and of persons authorized to carry out any activity or practice related to a source of radiation.

- h. Collect information, documents and views from private and public organizations or persons as may be necessary and appropriate for the discharge of its functions.
- i. Collaborate with agencies responsible for emergency to establish plans and procedures for coping with any radiological emergency and abnormal occurrence involving a nuclear material, radiation source or any other radioactive source.
- j. Ensure that the operators provide training, information and guidance on nuclear safety, security and safeguards and radiation protection of the public.
- k. Educate the public on nuclear and radiation matters.
- l. Establish regional and other offices as it may consider necessary for the proper performance of its functions.
- m. Facilitate the conduct of inspections by designated inspectors of the International Atomic Energy Agency to verify design information, inspections and complementary access as provided for in the safeguards agreement and the additional protocols.
- n. Collect, collate and provide information to the International Atomic Energy Agency in accordance with the safeguards agreement and any additional protocols to the agreement.
- o. Exchange information and co-operate with regulatory authorities of other countries and relevant international organizations on matters of nuclear safety, nuclear security and safeguards.
- p. Collaborate with the Environmental Protection Agency to identify activities and practices that may require Environmental Impact Assessment and develop environmental guidelines for those activities and practices.
- q. Ensure that the polluter pays principle is applied in the management of nuclear and radioactive waste in the country.
- r. Review nuclear safety assessment and safety analysis reports from authorized persons; and
- s. Perform other functions that may be assigned to the authority under any other enactment.

6. NATIONAL BIOSAFETY AUTHORITY

Ghana became a Party to the Cartagena Protocol on Biosafety after ratifying it in May 2004 with the aim of ensuring the safe use, transfer and handling of Genetically Modified Organisms (GMOs) in the country. This objective draws its strength from the 1992 constitution which identifies science and technology as one of the modes to be employed to drive the socioeconomic development of Ghana.

Based upon this, a comprehensive biosafety framework was developed which proposed the Biosafety Bill and was eventually passed into law in December, 2011. The Biosafety Act, 2011 (Act 831) established the National Biosafety Authority (NBA)

- To receive, process, respond to and make decisions on applications under the Act.

- To establish an administrative mechanism to ensure the appropriate handling and storage of documents and data in connection with applications and other matters covered under the Act.
- To act as the National Focal Point responsible for liaising with any other agencies or international organizations concerned with biotechnology and biosafety.
- To promote public awareness, participation and education concerning the activities of the Authority under the Act.

To ensure an integrated approach to the regulation of modern biotechnology and its products, the Act enjoins the Authority to operate in conjunction with other regulatory agencies such as the Food and Drugs Authority (FDA), Ghana Standards Authority (GSA), Customs Division of the Ghana Revenue Authority, the Environmental Protection Agency (EPA), Veterinary Division, the Plant Protection and Regulatory Services Division (PPRSD) and the Ministry of Local Government and Rural Development.

In addition, the Authority is represented by certified Institutional Biosafety Committees (IBCs) in research and academic institutions conducting research on Genetically Modified Organisms (GMOs) in Ghana. The Act has also established a Technical Advisory Committee to support the Authority in conducting risk assessment and management of GMOs and also to provide scientific advice to the Authority on issues under the Act. Furthermore, the Authority is supported by an Appeals Tribunal which deals with concerns of aggrieved persons on issues regarding applications and other matters under the Act.

The Act focuses on ensuring protection from Genetically Modified Organisms resulting from modern biotechnology that may have adverse effect on health and the environment.

Therefore to ensure accountability, the performance of the Authority is reported through the sector Minister to Parliament through quarterly and annual reports. The Authority also contributes to the environmental protection and management program of the sector Ministry's budget statement and its performance and financial statements are part of the Ministry's annual report.

ii. Human Resource

Table 1.4: Staff Strength Analysis

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
MINISTRY HEADQUARTERS						
Chief Director (Acting)	1	0	1	0	1	55 - 60
Chief Planning Officer	1	0	1	1	0	55-60
Director	6	2	1	3	3	45-55
Deputy Director	12	2	2	4	8	40-55

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Chief Accountant	1	1		1	0	40-45
Chief Internal Auditor	1	1		1	0	45-50
Assistant Director I	3		2	2	1	30-35
Assistant Director IIA	9	5	0	5	4	30-35
Assistant Director IIB	3	2	0	2	1	20-35
Development Planning Officer	2	2	1	3	-1	30-40
Assistant Development Planning Officer	2	2	1	3	-1	30-40
Assistant Programme Officer		1	3	4	-4	25-40
Protocol Officer	1	0	0	0	1	
Assistant Protocol Officer	1	1	0	1	0	30-35
Information Officer	2	1	0	1	1	40-45
Principal Internal Auditor	1	0	0	0	1	
Senior Internal Auditor	1	0	1	1	0	40-45
Assistant Internal Auditor	1	0	1	1	0	30-35
Principal Supply Officer	1	1	0	1	0	40-45
Senior Supply Officer					0	
Supply Officer	1	1	0	1	0	30-35
Principal Storekeeper	1	1	0	1	0	50-55
Principal Accountant	2	2	0	2	0	30-50
Accountant	2	2	1	3	-1	45-55
Principal Account Technician	2	0	1	1	1	25-30
System Analyst	1	0	0	0	1	
Assistant Systems Analyst	1	1	0	1	0	30-35
Assistant Programmer	0	1	0	1	-1	30-35
Chief Records Supervisor	1	0	1	1	0	55-60
Assistant Records Officer	2	0	1	1	1	30-35
Records Supervisor	1	1	0	1	0	50-55
Senior Records Assistant	2	0	0	0	2	
Principal Executive Officer	1	0	1	1	0	35-40
Higher Executive Officer	1	0	1	1	0	30-35
Senior Private Secretary	2	0	4	4	-2	50-55
Private Secretary	2	0	2	2	0	35-45
Stenographer Secretary	6	0	2	2	4	35-45
Stenographer Secretary Gd. I		0	1	1	-1	40-45
Stenographer Secretary Gd. II		0	2	2	-2	30-40
Senior Telephonist	1	0	1	1	0	45-50
Yard Foreman	3	4	0	4	-1	50-60
Heavy Duty Driver	2	2	0	2	0	50-55
Driver Gd. I	0	0	0	0	0	
Driver Gd. II	1	2	0	2	-1	40-45
Driver Gd. III	1	2	0	2	-1	40-55
Head Watchman	1	1	0	1	0	50-53
Headman	1	1	0	1	0	50-53
Total	87	42	32	73	14	

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
LAND USE AND SPATIAL PLANNING AUTHORITY						
Director	1	1	0	1	0	50 - 60
Deputy Director (DD)	16	5	0	5	11	45 - 55
Principal Town Planning Officer (PTPO)	216	14	4	18	19 8	30 - 50
Senior Town Planning Officer (STPO)	432	3	1	4	428	30 - 50
Town Planning Officer (TPO)	432	62	16	78	354	30 - 50
Assistant Town Planning Officer (ATPO)	432	25	7	32	400	30 - 50
Total	1,529	110	28	138	1, 391	30 - 50
NUCLEAR REGULATORY AUTHORITY						
Director-General	1	-	-	0	1	-
Deputy Director General	1	-	-	0	1	-
Research Scientist	100	30	6	36	67	30 - 55
Technologist	30	3	0	3	27	30 – 50
Administrative Officer	4	0	2	2	2	40 - 50
Legal Officer	4	1	0	1	3	50 – 60
Internal Auditor	1	0	1	1	0	30 - 40
Public Relations Officer	1	0	1	1	0	30 - 40
Accountant	2	1	0	1	1	50 - 60
Administrative Assistant	10	1	2	3	7	50 - 60
Accounting Assistant	3	1	0	1	2	40 - 50
Audit Assistant	2	-	-	0	2	-
Stores Officer	1	-	-	0	1	-
Driver	7	2	-	2	5	40 - 50
Department Assistant	1	1	0	1	0	40 – 50
Clerk	-	-	1	1	1	30 - 40
Gardener	2	1	0	1	1	40 - 50
Security Officer	3	-	-	0	3	-

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
TOTAL	173	41	13	54	124	
GHANA ATOMIC ENERGY COMMISSION						
Deputy Director-General GAEC	3	1	0	1	2	50 - 60
Director, Finance GAEC	1	1	0	1	0	50 - 60
Director GAEC	7	6	1	7	0	50 - 60
Director-General GAEC	1	1	0	1	0	50 - 60
Director of Administration GAEC	1	1	0	1	0	50 - 60
Director Of Internal Audit	1	1	0	1	0	30 - 50
CSO(Contract)GAEC	8	6	2	8	0	30 - 50
Chief Research Scientist/Principal	1	1	0	1	0	30 - 50
Chief Research Scientist (PHD)GAEC	9	6	3	9	0	30 - 50
Assistant Research Scientist GAEC	93	65	28	93	0	30 - 50
Assistant Scientific Officer GAEC	10	0	0	0	10	30 - 50
Chief Research Scientist GAEC	11	6	3	9	2	30 - 50
Principal Research Scientist(PHD) GAEC	24	16	7	23	1	30 - 50
Principal Scientific Officer (Non-PHD) GAEC	3	2	1	3	0	30 - 50
Principal Research Scientist(PHD)	1	1	0	1	0	30 - 50
Research Scientist (PHD) GAEC	47	26	11	37	10	30 - 50
Scientific Officer (MPhil)GAEC	73	51	22	73	0	30 - 50
Senior Research Scientist (Non-PHD) GAEC	9	6	3	9	0	30 - 50
Senior Research Scientist (PHD) GAEC	23	16	7	23	0	30 - 50
Research Scientist (Non-PHD) GAEC	0	0	0	0	0	30 - 50
Administrative Officer GAEC	36	22	10	32	4	30 - 50
Assistant Administrative Officer GAEC	0	0	0	0	0	30 - 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Legal Officer GAEC	3	1	1	2	1	30 - 50
Principal Legal Officer GAEC	1	0	0	0	1	30 - 50
Senior Administrative Officer GAEC	6	4	2	6	0	30 - 50
Senior ICT Officer GAEC	0	0	0	0	0	30 - 50
Chief Legal Officer GAEC	1	1	0	1	0	30 - 50
Principal Administrative Officer	12	6	2	8	4	30 - 50
Chief Administrative Officer	0	0	0	0	0	30 - 50
Senior Librarian (Non-PhD) GAEC	1	1	0	1	0	30 - 50
Private Secretary	1	1	0	1	0	30 - 50
Procurement Officer	2	1	0	1	1	30 - 50
Chief ICT Officer GAEC	1	1	0	1	0	30 - 50
Public Relation Officer GAEC	0	0	0	0	0	30 - 50
Chief Accountant	0	0	0	0	0	30 - 50
Principal Accountant	2	1	1	2	0	30 - 50
Accountant GAEC	9	6	2	8	1	30 - 50
Internal Auditor GAEC	6	3	1	4	2	30 - 50
Senior Accountant GAEC	8	6	2	8	0	30 - 50
Senior Internal Auditor GAEC	3	2	1	3	0	30 - 50
Principal Internal Auditor GAEC	2	1	1	2	0	30 - 50
Chief Internal Auditor GAEC	0	0	0	0	0	30 - 50
Assistant Technician GAEC	5	3	1	4	1	30 - 50
Chief Technician GAEC	9	6	3	9	0	30 - 50
Chief Technologist (1 st Degree) GAEC	3	2	1	3	0	30 - 50
Chief Technologist(Masters)GAEC	4	3	1	4	0	30 - 50
Principal Technician GAEC	18	12	5	17	1	30 - 50
Principal Technologist (1 st Degree) GAEC	8	6	2	8	0	30 - 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Principal Technologist (Masters)GAEC	28	20	8	28	0	30 - 50
Senior Technician GAEC	5	3	1	4	1	30 - 50
Senior Technologist GAEC	30	21	9	30	0	30 - 50
Senior Technician/ Dispensing Technician	3	1	1	2	1	30 - 50
Technician GAEC	12	8	3	11	1	30 - 50
Auto Technician	2	1	0	1	1	30 - 50
Technologist GAEC	60	38	16	54	6	30 - 50
Chief Nursing Officer GAEC	2	1	1	2	0	30 - 50
Dispensing Assistant GAEC	7	4	2	6	1	30 - 50
Health Assistant GAEC	6	4	2	5	1	30 - 50
Hospitality Assistant GAEC	3	2	1	3	0	30 - 50
Hospital Laboratory Assistant GAEC	3	2	1	3	0	30 - 50
Midwifery Superintendent GAEC	2	1	1	2	0	30 - 50
Nursing Officer GAEC	10	7	3	10	0	30 - 50
Pharmacist GAEC	2	1	1	2	0	30 - 50
Principal Dispensing Technician GAEC	2	1	1	2	0	30 - 50
Principal Medical Officer GAEC	1	1	0	1	0	30 - 50
Principal Nursing Officer GAEC	2	1	1	2	0	30 - 50
Senior Midwife	1	1	0	1	0	30 - 50
Senior Medical Officer GAEC	1	1	0	1	0	30 - 50
Senior Nurse /Midwife GAEC	2	1	1	2	0	30 - 50
Senior Nursing Officer GAEC	3	2	1	3	0	30 - 50
Senior Ward Assistant GAEC	4	2	1	3	1	30 - 50
Snr Dispensing Technician GAEC	1	1	0	1	0	30 - 50
Specialist (Medical) GAEC	2	1	1	2	0	30 - 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Staff Nurse (SRN&SCM&SC)GAEC	2	1	1	2	0	30 - 50
Technician/Dispensing Technician GAEC	1	1	0	1	0	30 - 50
Ward Assistant GAEC	9	6	3	9	0	30 - 50
Medical Officer GAEC	3	2	1	3	0	30 - 50
Chief Teacher GAEC	28	20	8	28	0	30 - 50
Head, Basic Schools GAEC	1	1	0	1	0	30 - 50
Assistant Head Teacher(Masters)GAEC	2	0	0	0	2	30 - 50
Principal Teacher GAEC	11	8	3	11	0	30 - 50
Nursery Asst/ Nursery Attendant GAEC	5	4	2	5	0	30 - 50
Principal Nursery Attendant GAEC	3	1	1	2	1	30 - 50
Senior Teacher GAEC	3	2	1	3	0	30 - 50
Teacher GAEC	11	4	2	6	5	30 - 50
Accounting Assistant GAEC	5	4	2	5	0	30 - 50
Administrative Assistant GAEC	25	17	7	24	1	30 - 50
Artisan GAEC	1	1	0	1	0	30 - 50
Assistant Farm Supervisor GAEC	1	1	0	1	0	30 - 50
Associate IT/IM Specialist	2	1	0	1	1	30 - 50
Assistant Overseer GAEC	1	1	0	1	0	30 – 50
AssistantSecurityOfficerGAEC	1	1	0	1	0	30 – 50
AccountsClerk	2	1	1	2	0	30 – 50
CampusGuardIGAEC	14	10	4	14	0	30 – 50
CampusGuardIIGAEC	15	11	5	15	0	30 – 50
CampusGuardIII	5	1	1	2	3	30 – 50
CateringAssistantGAEC	3	2	1	3	0	30 – 50
CateringOfficerGAEC	2	1	1	2	0	30 – 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
ChiefAccountingAssistantGAEC	18	7	3	10	8	30 – 50
ChiefAdministrativeAssistantGAEC	32	16	7	23	9	30 – 50
ChiefMarketingAssistant	2	1	0	1	1	30 – 50
ChiefCook/BakerGAEC	1	1	0	1	0	30 – 50
ChiefCookGAEC	2	1	1	2	0	30 – 50
ChiefDriverGAEC	2	1	0	1	1	30 – 50
ChiefProcurementAssistantGAEC	2	1	1	2	0	30 – 50
CleanerGAEC	15	9	4	13	2	30 – 50
ClerkGAEC	4	2	1	3	1	30 – 50
ClerkIIGAEC	5	4	2	5	0	30 – 50
ConservancyLabourerIIGAEC	2	1	1	2	0	30 – 50
CookGAEC	5	3	1	4	1	30 – 50
DepartmentalAssistantGAEC	3	2	1	3	0	30 – 50
DepartmentAssistantIGAEC	6	4	2	6	0	30 – 50
DepartmentAssistant	5	3	1	4	1	30 – 50
DepartmentAssistantIIGAEC	10	7	3	10	0	30 – 50
DepartmentAssistantIIIGAEC	9	6	3	9	0	30 – 50
DriverIGAEC	5	4	2	5	0	30 – 50
DriverIIGAEC	2	1	1	2	0	30 – 50
EnvironmentalAssistantGAEC	1	1	0	1	0	30 – 50
FarmHandGAEC	19	13	6	19	0	30 – 50
FarmOverseer	6	4	2	6	0	30 – 50
ForemanGAEC	9	6	3	9	0	30 – 50
GardenerGAEC	24	15	7	22	2	30 – 50
HeadmanGAEC	4	2	1	3	1	30 – 50
HeadSecurityServicesGAEC	1	1	0	1	0	30 – 50
IT/IMSpecialist	3	2	1	3	0	30 – 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
LabourerGAEC	30	21	9	30	0	30 – 50
LibraryAssistantGAEC	1	1	0	1	0	30 – 50
OverseerGAEC	10	5	2	7	3	30 – 50
PrincipalAccountingAssistantGAEC	15	11	5	15	0	30 – 50
PrincipalAdministrativeAssistantGAEC	25	18	8	25	0	30 – 50
PrincipalAuditAssistantGAEC	6	3	1	4	2	30 – 50
PrincipalCateringOfficerGAEC	15	11	5	15	0	30 – 50
PrinCampusGuard	23	16	7	23	0	30 – 50
PrincipalEnvironmentalAssistantGAEC	1	1	0	1	0	30 – 50
PrincipalIT/IMSpecialistGAEC	2	1	1	2	0	30 – 50
PrincipalLibraryAssistantGAEC	2	1	1	2	0	30 – 50
PrincipalMarketingAssistantGAEC	3	2	1	3	0	30 – 50
PrincipalProcurementAssistantGAEC	2	1	1	2	0	30 – 50
PrincipalCampusGuard	13	9	4	13	0	30 – 50
PrincipalForeman	1	1	0	1	0	30 – 50
PrincipalHealthAssistant	2	1	0	1	1	30 – 50
PrincipalSecurityOfficer	2	1	0	1	1	30 – 50
PrincipalStoresOfficer	1	1	0	1	0	30 – 50
ProductionAsstIGAEC	2	1	1	2	0	30 – 50
ProductionAssistantI	2	1	1	2	0	30 – 50
SanitaryLabourerGAEC	5	4	2	5	0	30 – 50
SecurityOfficerGAEC	15	8	3	11	4	30 – 50
SeniorAccountingAssistantGAEC	5	4	2	5	0	30 – 50
SeniorAccountsClerkGAEC	3	2	1	3	0	30 – 50
SeniorAdministrativeAssistantGAEC	22	14	6	20	2	30 – 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
SeniorAuditAssistantGAEC	6	3	1	4	2	30 – 50
SeniorAuditClerkGAEC	1	1	0	1	0	30 – 50
SeniorCampusGuardGAEC	37	21	9	30	7	30 – 50
SeniorCateringAssistantGAEC	4	1	1	2	2	30 – 50
SeniorCateringOfficerGAEC	5	4	2	5	0	30 – 50
SeniorClerkGAEC	11	8	3	11	0	30 – 50
SeniorCook/SeniorStewardGAEC	4	3	1	4	0	30 – 50
SeniorCookGAEC	4	3	1	4	0	30 – 50
SeniorConservancyLabourer	5	4	2	5	0	30 – 50
SeniorDepartmentAssistantGAEC	7	4	2	5	2	30 – 50
SeniorDispensingTechnicianGAEC	4	2	1	3	1	30 – 50
SeniorDriverGAEC	13	9	4	13	0	30 – 50
SeniorEnvironmentalAssistantGAEC	1	1	0	1	0	30 – 50
SeniorFarmSupervisorGAEC	2	1	1	2	0	30 – 50
SeniorForemanGAEC	5	4	2	5	0	30 – 50
SeniorGardenerGAEC	6	4	2	6	0	30 – 50
SeniorHeadmanGAEC	0	0	0	0	0	30 – 50
SeniorMarketingAssistantGAEC	2	1	1	2	0	30 – 50
SeniorOverseerGAEC	2	0	0	0	2	30 – 50
SeniorPurchasingAssistantGAEC	2	1	1	2	0	30 – 50
SeniorLibraryAssistant	2	1	1	2	0	30 – 50
SeniorSanitaryLabourerGAEC	1	1	0	1	0	30 – 50
SeniorSecurityOfficerGAEC	8	5	2	7	1	30 – 50
SeniorStoresOfficerGAEC	1	1	0	1	0	30 – 50
SeniorSteward	2	1	0	1	1	30 – 50
StenographerIGAEC	1	1	0	1	0	30 – 50
StenographerSecretaryGAEC	2	1	1	2	0	30 – 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
StewardGAEC	2	1	0	1	1	30 – 50
TechnicalAssistantGAEC	5	4	2	5	0	30 – 50
TechnicalAssistantIIGAEC	3	2	1	3	0	30 – 50
TradesmanGAEC	2	1	0	1	1	30 – 50
TractorOperatorIGAEC	6	4	2	5	1	30 – 50
PrincipalworkSuperintendent	1	1	0	1	0	30 – 50
TractorOperatorIIGAEC	1	1	0	1	0	30 – 50
TOTAL	1380	879	373	1252	128	30 - 60
NATIONAL BIOSAFETY AUTHORITY						
Chief Executive Officer	1	1	0	1	0	40-60
Biosafety Officers	12	0	3	3	9	30-60
Legal Officers	2	0	0	0	2	
ICT Officers	1	0	0	0	1	
Administrative Officers	6	0	0	0	6	
Accountant	2	1	0	1	1	30-60
Auditor (s)	1	0	0	0	1	
Public Relations Officer	1	0	1	1	1	30-60
Procurement Officer	1	1	0	1	1	30-60
Records Officer	2	0	1	1	1	30-60
Drivers	3	2	0	2	1	30-60
TOTAL	32	5	5	10	22	
COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH						
.Director-General.. CSIR	1	1	0	1	0	55 - 60
Deputy.Director-General.. CSIR	1	0	1	1	0	55 - 60
.Director (Scientific)..CSIR	14	8	2	10	4	45 - 60
.Director of Administration..CSIR	3	1	0	1	2	55 - 60
.Director Of Finance..CSIR	3	1	0	1	2	55 - 60
.Director Of Internal Audit.. CSIR	3	0	1	1	2	50 - 55

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Chief. Research Scientist (PHD). ..CSIR	18	12	4	16	2	45 - 75
Principal. Research Scientist (PHD)..CSIR	32	21	9	30	2	45 - 65
Principal.Research Scientist (Non PHD)..CSIR	6	3	1	4	2	50 - 60
Senior.Research Scientist (PHD)..CSIR	45	32	11	43	2	35 - 60
Senior.Research Scientist (Non PHD)..CSIR	44	31	11	42	2	30 - 60
Senior.Scientific Information Officer..CSIR	4	1	1	2	2	55 - 60
Senior.Scientific Secretary (Non PhD)..CSIR	8	4	1	6	2	40 - 60
.Scientific Information Officer (PhD)..CSIR	3	1	0	1	2	45 - 50
.Scientific Secretary (Non PhD)..CSIR	6	3	1	4	2	30 - 50
.Scientific Secretary (PhD)..CSIR	0	0	0	0	0	
.Research Scientist (Non PHD)..CSIR	174	129	43	172	2	30 - 60
.Research Scientist (PHD)..CSIR	64	47	15	62	2	30 - 55
.Scientific Information Officer (Non PhD)..CSIR	9	5	2	7	2	35 - 60
Assistant.Research Scientist..CSIR	6	3	1	4	2	50 - 60
Principal.Accountant..CSIR	6	3	1	4	2	45 - 60
Senior.Accountant..CSIR	7	4	1	5	2	45 - 60
.Accountant..CSIR	25	17	6	23	2	30 - 60
Chief.Technologist..CSIR	11	7	2	9	2	25 - 60
Principal.Technologist..CSIR	340	254	85	338	2	25 - 60
Senior.Technologist..CSIR	46	33	11	44	2	30 - 60
Assistant.Technologist..CSIR	3	1	0	1	2	30 - 35

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
.Technologist..CSIR	13	8	3	11	2	30 - 60
.Laboratory Technologist.II.CSIR	3	1	0	1	2	40 - 45
Chief.Technical Officer..CSIR	12	8	2	10	2	35 - 55
.Administrative Officer..CSIR	22	15	5	20	2	30 - 55
.Front Desk Officer..CSIR	7	4	1	5	2	40 - 60
.Legal Officer..CSIR	3	1	0	1	2	30 - 35
.Marketing Officer..CSIR	13	8	3	11	2	30 - 60
.Public Relations Officer..CSIR	0	0	0	0	0	
Senior.Public Relations Officer..CSIR	3	1	0	1	2	50 - 55
.Security Officer..CSIR	45	32	11	43	2	40 - 60
.Technical Officer..CSIR	48	34	12	46	2	25 - 60
Assistant.Administrative Officer..CSIR	4	1	1	2	2	50 - 60
Assistant.Transport Officer..CSIR	32	22	8	30	2	45 - 60
Principal.Administrative Officer..CSIR	5	2	1	3	2	50 - 60
Principal.Procurement Officer..CSIR	3	1	0	1	2	45 - 55
Principal.Security Officer..CSIR	4	2	0	2	2	45 - 55
Principal.Technical Officer..CSIR	146	108	36	144	2	25 - 60
Senior Assistant.Transport Officer..CSIR	39	28	9	37	2	45 - 60
Senior.Administrative Officer..CSIR	9	5	2	7	2	40 - 60
Senior.Legal Officer..CSIR	3	1	0	1	2	45 - 50
Senior.Security Officer..CSIR	33	23	8	31	2	35 - 60
Senior.Technical Officer..CSIR	118	87	29	116	2	25 - 60
.Accounting Assistant..CSIR	11	7	2	9	2	30 - 55
.Accounts Clerk.I.CSIR	4	1	1	2	2	30 - 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
.Accounts Clerk.II.CSIR	4	2	0	2	2	25 - 60
.Administrative Assistant..CSIR	25	17	6	23	2	30 - 60
.Artisan/Supervisor Tradesman..CSIR	25	17	6	23	2	30 - 60
.Catering Assistant..CSIR	4	0	2	2	2	35 - 45
.Cleaner..CSIR	6	2	2	4	2	25 - 50
.Clerk/Stenographer.I.CSIR	10	6	2	8	2	30 - 50
.Clerk/Stenographer.II.CSIR	4	0	2	2	2	25 -30
.Conservancy Headman..CSIR	4	2	0	2	2	45 - 55
.Conservancy Labourer..CSIR	4	2	0	2	2	30 - 50
.Draughtsman..CSIR	4	2	0	2	2	40 - 45
.Driver Inspector..CSIR	12	10	0	10	2	35 - 55
.Driver.I.CSIR	17	15	0	15	2	30 -55
.Driver.II.CSIR	10	8	0	8	2	25 - 55
.Fish Assistant.I.CSIR	6	3	1	4	2	30 - 50
.Field Assistant.II.CSIR	8	5	1	6	2	30 -45
.Fisherman..CSIR	0	0	0	0	0	
.Foreman..CSIR	14	9	3	12	2	35 - 60
.Headman..CSIR	7	5	0	5	2	30 - 55
.Internal Auditor..CSIR	6	3	1	4	2	30 - 60
.Labourer..CSIR	10	8	0	8	2	25 - 50
.Librarian (Non-PhD)..CSIR	9	5	2	7	2	45 - 60
.Literate Helper..CSIR	11	7	2	9	2	30 - 40
.Marketing Assistant..CSIR	3	1	0	1	2	25 - 30
.Overseer..CSIR	164	122	40	162	2	40 - 60
.Private Secretary..CSIR	6	4	0	4	2	30 - 45
.Security Assistant.I.CSIR	48	35	11	46	2	35 - 60
.Security Assistant.II.CSIR	46	33	11	44	2	30 - 60

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
.Securityman..CSIR	7	5	0	5	2	35 - 55
.Storekeeper.I.CSIR	3	1	0	1	2	55 - 60
.Supervisor Watchman..CSIR	25	23	0	23	2	40 - 60
.Supervisor.I.CSIR	221	164	55	219	2	30 - 60
.Supervisor.II.CSIR	75	55	18	73	2	30 - 60
.Technical Assistant.I.CSIR	15	10	3	13	2	25 - 55
.Technical Assistant.II.CSIR	10	6	2	8	2	25 - 60
.Telephonist/Receptionist.I.CSIR	3	1	0	1	2	25 - 30
.Tractor Operator..CSIR	8	6	0	6	2	45 - 60
.Tractor Operator.II.CSIR	4	2	0	2	2	50 - 55
.Tradesman.I.CSIR	14	9	3	12	2	35 - 60
.Tradesman.II.CSIR	12	8	2	10	2	30 - 50
.Traffic Supervisor..CSIR	25	17	6	23	2	35 - 60
.Watchman..CSIR	14	9	3	12	2	30 - 50
.Works Superintendent..CSIR	23	16	5	21	2	30 - 60
.Workshop Superintendent..CSIR	4	1	1	2	2	35 - 50
Assistant.Accountant..CSIR	3	1	0	1	2	50 - 55
Assistant.Farm Manager..CSIR	32	23	8	30	2	40 - 60
Assistant.Overseer.I.CSIR	81	59	20	79	2	30 - 60
Assistant.Overseer.II.CSIR	10	6	2	8	2	40 - 60
Chief.Administrative Assistant..CSIR	10	6	2	8	2	35 - 60
Chief.Accounting Assistant..CSIR	5	2	1	3	2	35 - 55
Chief.Auditing Assistant..CSIR	3	1	0	1	2	55 - 60
Chief.Librarian Assistant..CSIR	3	1	0	1	2	45 - 50
Chief.Marketing Assistant..CSIR	3	1	0	1	2	40 - 50
Chief.Caretaker..CSIR	4	1	1	2	2	40 - 55
Chief.Cook..CSIR	3	1	0	1	2	45 - 50

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Chief.Draughtsman..CSIR	3	1	0	1	2	55 - 60
Junior.Draughtsman..CSIR	3	1	0	1	2	30 - 35
Junior.Foreman..CSIR	18	12	4	16	2	35 - 60
Junior.Library Assistant..CSIR	5	1	2	3	2	30 - 45
Principal Assistant.Binder..CSIR	3	1	0	1	2	50 - 55
Principal Assistant.Farm Manager..CSIR	10	6	2	8	2	50 - 60
Principal.Accounting Assistant..CSIR	40	28	10	38	2	30 - 60
Principal.Administrative Assistant..CSIR	38	27	9	36	2	25 - 60
Principal.Auditing Assistant..CSIR	6	3	1	4	2	30 - 45
Principal.Draughtsman..CSIR	6	3	1	4	2	40- 60
Principal.Estate Assistant..CSIR	3	1	0	1	2	45 - 50
Principal.Internal Auditor..CSIR	3	1	0	1	2	50 - 55
Principal.Librarian (Non-PhD)..CSIR	0	0	0	0	0	
Principal.Library Assistant..CSIR	6	3	1	4	2	35 - 50
Principal.Marketing Assistant..CSIR	6	3	1	4	2	35 - 60
Principal.Stores Superintendent..CSIR	7	4	1	5	2	30 - 55
Principal.Technical Assistant..CSIR	3	1	0	1	2	55 - 60
Principal.Telephonist..CSIR	3	1	0	1	2	35 - 40
Principal.Works Superintendent..CSIR	18	12	4	16	2	30 - 60
Principal.Workshop Superintendent..CSIR	3	1	0	1	2	50 - 55
Senior Assistant.Binder..CSIR	3	1	0	1	2	55 - 60
Senior Assistant.Farm Manager..CSIR	22	15	5	20	2	45 - 60
Senior.Accounting Assistant..CSIR	28	20	6	26	2	30 - 60

Grade	Establishment	Number at Post		Total at Post	Variance	Age Distribution
		Male	Female			
Senior.Accounts Clerk..CSIR	5	2	1	3	2	30 - 55
Senior.Administrative Assistant..CSIR	31	22	7	29	2	25 - 60
Senior.Audit Clerk..CSIR	3	1	0	1	2	45 - 50
Senior.Auditing Assistant..CSIR	6	3	1	4	2	30 - 50
Senior.Caretaker..CSIR	5	2	1	3	2	35 - 55
Senior.Catering Assistant..CSIR	8	4	2	6	2	30 - 50
Senior.Clerk/Senior Stenographer..CSIR	19	13	4	17	2	25 - 60
Senior.Conservancy Labourer..CSIR	10	16	2	8	2	35 - 60
Senior.Draughtsman..CSIR	3	1	0	1	2	50 - 55
Senior.Estate Assistant..CSIR	3	1	0	1	2	35 - 40
Senior.Headman..CSIR	87	64	21	85	2	25 - 60
Senior.Internal Auditor..CSIR	4	1	1	2	2	45 - 50
Senior.Labourer..CSIR	96	70	24	94	2	30 - 60
Senior.Librarian (Non-PhD)..CSIR	4	1	1	2	2	55 - 60
Senior.Library Assistant..CSIR	3	1	0	1	2	25 - 30
Senior.Printing Assistant..CSIR	4	1	1	2	2	35 - 55
Senior.Security Assistant..CSIR	68	50	16	66	2	30 - 60
Senior.Stores Superintendent..CSIR	9	5	2	7	2	30 - 55
Senior.Technical Assistant..CSIR	48	35	11	46	2	30 - 60
Senior.Telephonist/Receptionist..CSIR	3	1	0	1	2	35 - 40
Senior.Tractor Operator..CSIR	5	2	1	3	2	50 - 60
Senior.Typist..CSIR	3	1	0	1	2	40 - 45
Senior.Works Superintendent..CSIR	12	7	3	10	2	30 - 60
TOTAL	3225	2230	714.25	2933	292	

The Ministry and its Agencies are currently operating under their staffing capacities, and with most of the technical staff aging and retiring, the Ministry has become challenged in terms of delivering on its mandate. The Environment, Science, Technology and Innovation Sector will need **One Thousand, Nine Hundred and Seventy-One (1,971)** additional staff to deliver on its mandate.

The staffing needs assessment for 2016 revealed that the Town and Country Planning Department was operating with only 9% of its professional staffing capacity at the time the Authority was established. The Institutional Reforms have also introduced the establishment of a number of Divisions, Directorates and Units which are to be staffed with varying categories of professional, technical and auxiliary staff. This has rendered the discharge of the mandate of the Authority and its operatives at the MMDA level more challenging. The woefully inadequate staffing situation has to be addressed with dispatch if the benefits of the LUSPA are to be exploited to the maximum. The prevailing staffing situation, coupled with the inadequate resources/ logistics to work with, makes the preparation of the SDFs, Structure Plans and Local Plans extremely difficult.

The Nuclear Regulatory Authority requires 163 staff to carry out both regulatory and administrative functions during the period 2018 to 2021. It currently has 54 established staff leaving a gap of 124. Some Development Partners have indicated their readiness to provide training for staff in Monitoring and Authorisation of facilities that use radiation and nuclear materials, however the NRA lacks the staff to train.

The National Biosafety Authority (NBA) is currently operating with a staff strength of ten (10). Out of the total, 5 are males and 5 are females. Currently, the NBA is serviced by seconded staff. There is therefore the need to recruit additional categories of staff to make the Authority fully functional:

The CSIR and GAEC have also lost most of its technical staff to retirement and will need to recruit additional staff to replace them. The EPA will also need to recruit new officers to man the new district/zonal offices that have been constructed.

iii. Logistics and Infrastructure

Table 1.5: Equipment Situation

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
MESTI HEADQUARTERS							
Computers and accessories	Desktop	2		43	52	76	24
	Laptops			7	7	50	43
	Printers	10		33	51	74	23
	Scanners	1		9	10	20	10
	Photocopiers			10	13	19	6

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	LCD Projector			1	1	3	2
	Fax machines				0	3	3
	Paper Shredders			8	11	20	9
	Telephones	1		11	12	30	18
	Video Conf. Equip.				0	2	2
	Delegate Mics.				0	5	5
	UPs	2		13	17	37	20
	Voltage Stabilizers (AVR)			1	1	2	1
Electrical	Generator		1		1	1	0
	Air-Conditioners			40	45	50	5
	Refrigerators			30	34	39	5
Vehicles	Saloon cars		1	7	8	9	1
	Cross country 4x4	3	1	10	14	15	1
	Pickup		1	3	5	6	1
	Motor Bike		2	1	3	4	0
	Mini Bus				0	3	3
LAND USE AND SPATIAL PLANNING AUTHORITY							
Computers and accessories	Desktop	5		29	34	40	6
	Laptops			5	5	15	10
	Printers	3		14	17	17	0
	Scanners			6	6	8	2
	A0 Scanner			0	0	1	1
	Photocopiers			2	2	4	2
	LCD Projector			2	2	2	0
	Fax machines				0	2	2
	Paper Shredders		2		2	2	0
	Telephones	1			18	18	0
	Video Conf. Equip.				0	5	5
	Delegate Mics.				0	15	15
	Ups			6	6	15	9
	Voltage Stabilizers (AVR)			3	3	5	2
Electrical	Generator				0	1	1
	Air-Conditioners	8		19	27	35	8
	Refrigerators			12	12	20	8
Vehicles	Saloon cars			1	1	2	1
	Cross country 4x4			3	3	5	2
	Pickup		1	7	8	12	4
	Motor Bike			5	5	7	2
GHANA ATOMIC ENERGY COMMISSION							
Computers and accessories	Desktop	10	37	86	133	300	167
	Laptops			20	20	31	11
	Printers	1		56	57	67	10
	Scanners			3	3	8	5

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Photocopiers			8	8	10	2
	LCD Projector			18	18	20	2
	Fax machines			2	2	-	-
	Paper Shredders			1	1	11	10
	Telephones	1		7	8	10	2
	Video Conf. Equip.					1	1
	Delegate Mics.						
	UPs	5		60	65	300	235
	Voltage Stabilizers (AVR)			10	10		
Electrical	Generator			7	7	24	17
	Air-Conditioners	35	7	429	471	501	30
	Refrigerators	3		33	36		
Vehicles	Saloon cars	-	-	-	-	-	-
	Cross country 4x4		1	1	2	11	9
	Pickup	1	11	8	20	31	11
	Motor Bike	-	-	-	-	2	2
NATIONAL BIOSAFETY AUTHORITY							
Computers and accessories	Desktop			9	9	12	3
	Laptops			3	3	3	0
	Printers						
	Scanners			2	2		
	Photocopiers			2	2		
	LCD Projector			2	2		
	TV			5	5		
	Paper Shredders			1	1		
	Telephones					5	
	Video Conf. Equip.		1		1		
	Delegate Mics.						
	UPs			√	8		
	Voltage Stabilizers (AVR)						
Electrical	Generator						
	Air-Conditioners			11	11		
	Refrigerators			5	5		
Vehicles	Saloon cars						
	Cross country 4x4		2		2		
	Pickup						
	Motor Bike						
Laboratory Equipment	Greiner PCR Tubes (0.2ml), pack of 1000			1		1	
	Greiner PCR Tubes (0.5), pack of 1000			1		1	
	Spectrophotometer			1		1	
	Horizontal electrophoresis system			2		2	

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Power supply			2		2	
	Trans-illuminator,UV			1		1	
	Eppendorf centrifuge(14,000rpm)			1		1	
	Microwave oven			1		1	
	Ice making machine			1		1	
	Top loading balance (0.001g x 1000g)			1		1	
	Fridge freezer upright, -10 to -25°C, 620L			1		1	
	Fridge freezer ultra			1		1	
	Hot air oven model OFA-110-8-55, 110L			1		1	
	Real time PCR ESCO Model SPT 96-8 channel			1		1	
	PCR Thermocycler machine AERIS-B4830			1		1	
	Drying rack 90 Places			1		1	
	Drying rack 72 Places			1		1	
	Digital Rotator S-60rpm,230V			1		1	
Laboratory Equipment	Shaking way bath 30L Maxturdy 30, 230V			1		1	
	Digital timer (Jumbo)			3		3	
	Micropipette variable, volume 10-100µl			1		1	
	Cetyltrimety Lammoniumbromide (CTAB) 100g			1		1	
	Tris (Trizma Base) 500g			1		1	
	Polyvinylprolidone 40,000 (PVP-40T)			1		1	
	Chloroform 2.5L			1		1	
	Iso Propanol 2.5L			1		1	
	Ethanol (Absolute) 2.5L			1		1	
	Boric acid			1		1	
	Boric acid fine powder, 500g			1		1	
	Ethidium Bromide 1g			1		1	
	Sucrose 500g			1		1	
	Sucrose extra pure, 500g			1		1	
	Tween 20, 500ml			1		1	

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Tween 40 500ml			1		1	
	dNTP, Kit, 11			1		1	
	Mineral oil,, 5ml			1		1	
	2- Mercaptoethanol, 10ml						
NUCLEAR REGULATORY AUTHORITY							
Computers and accessories	Desktop	0	0	32	32	50	18
	Laptops	0	0	2	2	10	8
	Printers	1	0	4	5	10	5
	Scanners	0	0	3	3	5	2
	Photocopiers	0	0	1	1	2	1
	LCD Projector	0	0	2	2	2	0
	Fax machines	0	0	0	0	0	0
	Paper Shredders	0	0	0	0	2	2
	Telephones	0	9	10	19	20	1
	Video Conf. Equip.	0	0	0	0	2	2
	Delegate Mics.	0	0	0	0	30	30
	UPS	0	0	55	55	55	0
	Voltage Stabilizers (AVR)	0	0	0	0	0	0
Electrical	Generator	0	0	1	1	2	1
	Air-Conditioners	0	0	21	21	30	9
	Refrigerators	0	1	0	1	6	5
Vehicles	Saloon cars	0	0	0	0	2	2
	Cross country 4x4	0	0	0	0	3	3
	Pickup	1	2	3	6	8	2
	Motor Bike	0	0	0	0	0	0
COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH							
Computers and accessories	Desktop	106	136	196	448	659	297
	Laptops	6	36	58	100	348	256
	Printers	86	48	187	321	447	174
	Scanners	12	14	38	64	126	62
	Photocopiers	42	42	35	123	108	79
	LCD Projector	4	14	32	50	85	35
	Fax machines	2	5	0	7	20	13
	Paper Shredders	1	0	1	2	21	20
	Telephones	38	105	183	326	425	119

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Video Conf. Equip.	0	91	12	103	41	74
	Delegate Mics.	0	6	6	12	41	29
	UPs	106	76	87	265	437	428
	Voltage Stabilizers (AVR)	38	66	11	115	94	115
Electrical	Generator	44	30	107	181	259	96
	Air-Conditioners	88	168	151	407	390	219
	Refrigerators	61	68	65	194	197	102
Vehicles	Saloon cars	38	49	80	167	265	98
	Cross country 4x4	17	8	21	46	64	29
	Pickup	32	20	8	60	52	44
	Motor Bike	5	4	19	28	78	49
Laboratory Equipment	IKA – Analysentechnik / IKA – calorimeter c400 adiabatic	19	29	0	48	14	34
		2	1	3	6	2	4
	Janke and kunkel GMBh and co. KG. IKA – Analysentechnik TYP – C48 nr 554979	0	53	17	70	18	52
	Janke and kunkel GMBH ANDco. Kg. ika – Analysentechnik TYP: C21 Nr: 555046	12	13	3	28	7	21
	Gas chromatography	0	0	0	0	2	2
	Near-infra Red Spectrometer	1	2	1	4	2	2
	Tecator Kjetec Auto Sampler System 1035 Analyzer	7	7	1	15	2	13
	Tecator Digestor 2040	6	63	112	181	250	69
	Foss hotplate 2022	0	26	58	84	130	46
	Foss Fibercap 2021	9	21	61	91	122	31
	Foss Fiber capsules	0	3	25	28	38	10
	Wagtec Magnetic Stirrer hotplate	3	6	17	26	39	13
	Wagtec Teche TE-80 Water bath	3	6	23	32	48	16
	Wagtech Oven	0	3	1	4	14	10
	Gallenkamp Hotbox Oven with fan	1	0	0	1	14	13

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Wagtech Furnace	0	0	56	56	63	7
	CO ₂ Incubator	0	0	3	3	10	7
	Dehydrater	0	0	5	5	6	1
	Autoanalyzer	0	0	1	1	2	1
	Digital Haugh tester	0	6	7	13	14	1
	DSM York color fan	30	16	76	122	183	61
	Egg force reader	0	0	8	8	15	7
	Egg candler	3	6	13	22	23	1
	Egg Analyzer	24	36	63	123	183	60
	Egg shell thickness Gauge	0	3	15	18	21	3
	Digital Weighing Scale	0	0	3	3	5	2
	Automatic feeder	0	3	9	12	19	7
	Automatic drinkers	0	90	94	184	212	28
	Tags and applicators	0	15	58	73	77	4
	Fume Chamber	0	0	4	4	8	4
	Frame Board Chamber	0	0	5	5	8	3
	Conductivity Meter	0	0	9	9	15	6
	Spectrum Photometer	0	1	10	11	15	4
	Frame Photometer	0	0	4	4	8	4
	Capacitor	3	0	2	5	9	4
	Sensitive Scale	0	1	6	7	11	4
	Digital scale	0	0	2	2	15	13
	Vapodest	0	0	8	8	11	3
	Elisa Machine Reader	0	1	4	5	8	3
	Water Distiller	0	0	4	4	8	4
	PCR Power Pack	0	3	7	10	13	3
	Lab. Freezer	0	1	16	17	30	13
	Water Bath (Biobase)	0	0	4	4	8	4
	Sand Bath	0	0	10	10	11	1
	Laminar Flow Carninet	0	0	12	12	22	10
	Incubator	0	0	10	10	17	7
	Auto Clave(Stainless Steel)	0	0	11	11	15	4
	Spectrophometer	0	0	5	5	10	5

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Colony Counter	0	0	4	4	8	4
	Centrifuge Eppendor(5224R)	0	0	5	5	9	4
	Micro Eppendor	0	0	11	11	11	0
	Obital Shakers	0	0	14	14	23	9
	Vorlex Mixers	0	3	13	16	20	4
	Stirilizer	0	2	3	5	9	4
	Thermal Cyler	0	0	7	7	11	4
	Balance	0	5	5	10	14	4
	De-Ioniser	0	4	11	15	20	5
	PCR Plate Spinner	0	0	6	6	7	1
	UV Transilluminator	0	3	3	6	7	1
	Ratator	0	0	4	4	9	5
	Oven	0	2	22	24	27	3
	Distillation Machine	1	4	5	10	14	4
	Magnetic Stairrer	0	1	3	4	8	4
	Heat-Stir	0	0	13	13	18	5
	Microscope	1	2	15	18	22	4
	Prime	0	0	6	6	11	5
	Microwave	0	2	8	10	14	4
	Verderflex Penstatic Pump	0	0	6	6	12	6
	Tyge Multifunctional Plastic film Sealing Machine	0	0	3	3	6	3
	PCR Machine	0	0	6	6	9	3
	Peristaltic Pump	0	0	15	15	15	0
	Electrophoresis Tank	0	0	15	15	15	0
	AAS Machine	0	0	3	3	6	3
	Photometer	0	6	0	6	9	3
Field Equipment/ Accessories	PH Meter	0	0	4	4	8	4
	Rice Thresher	0	8	20	28	32	4
	Rice Reaper	0	16	20	36	44	8
	Gel doc System	0	0	0	0	4	4
	Nano drop	0	0	0	0	4	4
	Stop Watch	0	0	4	4	12	8
	Micropipette	0	8	40	48	60	12

Equipment	Type	Existing			Total No. Existing	Number Required	variance
		Poor	Fair	Good			
	Rice Mill	4	4	8	16	20	4
	Corn Mill	0	4	0	4	8	4
	GPRS	0	0	40	40	48	8
	Field Weighing Scale	4	8	24	36	40	4
	PH Meter Tester	0	0	12	12	20	8
	Precision Balance	0	8	8	16	20	4
	Sysmex XT2000	0	0	0	0	0	0
	Haematology Analyzer	0	0	0	0	0	0

1.9.2. Scientific and Industrial Research

CSIR has over the years built the institutional capacity to facilitate the implementation of its mandate through the research and development (R&D) activities of its research institutes. These activities have largely found expression in the development and dissemination of technologies which have contributed to the country's socio-economic development. While R&D programmes of CSIR institutes can be said to be largely relevant and consistent with institutes' mandates, there is a tendency to deviate from the national policy direction in view of the perennial lack of funding for R&D activities of institutes. In a bid to sustain their activities and keep institutes running, some CSIR institutes may 'yield' to the dictates of donor agencies by accepting to implement programmes, which may be outside their prioritised research areas and inconsistent with national policy framework for R & D.

Furthermore, the public good nature of most R&D programmes of CSIR institutes and its seemingly extensive focus on small and medium-scale enterprises have generally impaired the capacity of CSIR Institutes to commercialise their R & D activities.

All CSIR institutes have a fair measure of the core competence to address the issues raised in their respective mandates. However, the CSIR seems to be deficient in certain specific emerging areas such as material science, nanotechnology, and electronics. This skills gap ought to be address if CSIR is to remain more relevant and responsive to the science and technology needs of the country. There is thus compelling justification for the CSIR to build competencies in these areas to respond to the changing dynamics of science and technology research and the demands of the private sector. CSIR's ability to remain relevant to changing trends will depend on the extent to which the Council approaches capacity building in these emerging areas.

The sustainable implementation of R&D programmes of most CSIR institutes has been seriously hampered by the lack of funding from central government. The perennial underfunding of

programmes has largely weakened the ability of CSIR institutes to respond to challenges faced by their stakeholders. Additionally, the lack of funding has compelled some of the institutes to operate outside their core mandates. This state of affairs has negatively affected the capacity of the CSIR to respond to emerging national issues; a situation which offers compelling justification for the CSIR to deepen its commercialisation efforts to sustain activities of Institutes.

Funding for R&D activities of CSIR institutes remains the biggest limitation to the implementation of their research mandates. While funding is generally public-sector driven, the current state of funding has strengthened the justification to explore more private-sector sources to address the perennial gap in funding. In a bid to address this state of affairs, the Committee makes the following proposal:

- Increase government dependence on the expertise of the CSIR in implementation public sector projects. Develop a mechanism for attracting more government contracts
- Develop winning R&D proposals. This calls for the need to build the capacity of scientists in proposals writing
- Respond, in a proactive manner, to tenders using the Council's Co-search initiative. The Commercialization outfit should be encouraged to scan for more state projects; interact more with state agencies requiring the services of the CSIR and maintain a desk for searching the media (especially the dailies) for potential state projects.
- Involve stakeholders who have the potential to contribute towards the funding of R&D activities in the formulation of R&D programmes for CSIR institutes. Such stakeholders must include commercial producers and processors, who may be better endowed to fund R&D activities. This will support the justification to shift the focus from public good research to commercial research
- Initiate processes towards the setting up of a Research Fund to address the funding needs of CSIR institutes. To ensure its effectiveness, the said Fund must be targeted to specific, timely programmes/projects relevant to current burning national issues. While the Committee welcomes the setting up the National Research Fund, it is the expectation of members that efforts will be channelled towards building structures to operationalize the implementation of the Fund.
- Intensify the commercialisation activities at institutes of the CSIR. The concept of commercialisation must be redefined and adequately operationalized for institutes to have a fair appreciation of the concept. In strict terms, the Committee had concerns with activities of some CSIR institutes interpreted as commercialisation.
- Strengthen the Patenting Office at the CSIR Head Office to offer adequate support for the patenting of the CSIR technologies. The Patent Office must be more effective and more proactive in supporting the work of scientists
- Set up more spin-off companies to boost the commercialisation drive. Such initiatives will encourage the development of more technologies to be handed over to identifiable

companies to be operated as business ventures for some returns to the CSIR as is the case with Pozzolana and Sumatra.

- Revisit the issue of organising a Donors' Conference to solicit funding from local and international donor agencies to support the R&D activities of the CSIR.
- Initiate moves to reduce cost in the pricing of projects/programmes or services to address the issue of overheads. Review unsustainable payment of allowances and work towards classifying meetings for the payment of allowances.
- Revive the processes for operationalizing the R&D Endowment Fund to support research activities of the Council.

To address challenges in the various sectors of the economy, fulfil national aspirations and remain relevant to society, the CSIR must respond to the needs of its various stakeholders. The CSIR ought to be more demand-driven in its research approach and remain more responsive to the needs of the private sector. It is imperative for the CSIR to engage more effectively with its stakeholders by building and sustaining institutional linkages. While evidence suggests a strong and more effective linkage with actors in the agricultural sector similar linkages with actors in the industrial sector ought to be deepened. The CSIR ought to invest, in a more sustainable manner, in structures that will ensure close relations with the various clusters of stakeholders in the various sectors.

Flowing from the performance review for the period 2014-2017, there are key emerging development issues that are likely to inform the transition into the next phase. Given the importance of these issues to our efforts at achieving the objectives set in the Ghana Shared Growth Development Agenda II, it is significant that these development issues are given the needed attention for the period 2018-2021. The issues are discussed in the following sessions.

Livelihood Issues:-The research and development activities of the CSIR are informed by the need to sustain the livelihoods of the Ghanaian populace, most of whom survive on small-scale business in the informal sector. The issue of improving the efficiency of their businesses and making their business activities competitive should not be lost on the CSIR as it moves in the next phase.

Farmers Empowerment:- Agriculture plays a critical role in the Ghana's economic growth, food security situation, poverty reduction initiatives, livelihoods and rural development. According to the Food and Agriculture Sector Development Policy 2 (FASDEP 2) document, about 90% of Ghana's agriculture requirements are produced by the country's small-scale farmers. There is thus the need to modernize agriculture through the generation of improved technologies for use by these smallholder farmers. It is against this background that agricultural research and development activities remain the catalyst for the introduction of the needed dynamism in Ghana's smallholder led agriculture and the drive for commercialization of Ghana's agriculture. This will ultimately serve as the platform to empower the Ghanaian farmer towards enhanced productivity.

Environmental Sanitation:- Issues of environmental sanitation occupy a central point in the country's effort at building a strong and healthy society capable of delivering economic goods and services needed to drive development. There is the need to explore the more extensive use of

products from research and development initiatives to improve environmental sanitation in the country and get the populace more enlightened in practices that promote sound environmental sanitation.

Value Addition to Address Post Harvest Losses: - Ghana, Malaysia and Thailand were at one stage similar in terms of development indicators. They were all engaged in subsistence made. Malaysia and Thailand are one of the highest exporters of value added products in the world today. For instance, dried cassava chips and cassava starch for use in commercial livestock feed and for industrial processing. Value addition has been projected as one of the strongest engines of growth for many industrializing countries. Ghana must therefore adapt some of these value addition models to local context in order to speed up the agricultural transformation agenda.

Provision of Potable and Accessible Water: - Water is an important natural resource that needs to be managed effectively for the benefit of the country. The Ministry will continue to monitor the quality of portable water to ensure its wholesomeness for domestic and industrial use. Additionally, MESTI, through its agency, the CSIR, will continue to test and identify more sources of underground water and employ the adoption of more rainwater harvesting technologies to meet the growing demand for water. Work towards the protection of the country's water bodies will be a central focus.

Affordable Housing Using Local Raw Materials: - Housing remains one of the basic needs of human. The issue of meeting the housing requirements of the citizenry has and continues to engage the attention of Governments. The central point in the discourse is how to make housing construction more to meet the housing demands of the country. The development and transfer of appropriate building technologies using local materials will continue to feature prominently in the research and development landscape of MESTI. This will ultimately seek to reduce cost and introduce much efficiency in building construction.

Land Reclamation: - In the wake of the campaign against illegal surface mining in view of its destructive effects on water bodies and land, reclamation of such degraded land and water bodies has become the possible option. Reclamation packages development through the Research and Development activities of agencies of MESTI will be transferred to ensure a safer environment. In terms of the infrastructural base to carry out their mandates, most CSIR institutes do not have all the full complement of R&D infrastructure such as laboratory and office facilities and field equipment to carry out their respective research activities. This situation has further been worsened by the growing sophistication of S&T equipment, which has further diminished the capacity of most institutes to respond effectively to the changing dynamics of science and technology research.

1.9.3. Environmental Protection and Management

Illegal mining continues to be one of the key development issues facing the sector with dire consequences for the security of the nation as water and land resources are degraded at alarming levels. The mining sector (illegal mining especially) is confronted with the indiscriminate use of all manner of chemicals that are eventually discharged into water bodies as waste water. In other cases, the mining is done directly in water bodies with high doses of poisonous chemicals being

released into those water bodies. The water bodies then become highly polluted rendering them unfit for human consumption as well as increasing the cost of treating water from such systems for distribution for human consumption. There is also the attendant destruction of farmlands as the top soil of most farmlands are removed with the creation of deep pits resulting in a decline in agricultural productivity. The issue of illegal and inappropriate mining practices must be addressed for sustainable development to become a reality in the country.

Air and water pollution by industry continues to be a major development issue with implications for human safety and of land and water health. Results of air quality monitoring at selected sites continuously indicate higher levels of main pollutants like PM10, NO2 and SO2 than the EPA and WHO recommended levels. Aside industry, the use of over-aged vehicles has been identified as the main source of these pollutants into the atmosphere. Effective collaborations with the Ghana Police Service and the DVLA need to be strengthened to solve this problem.

Sustainable waste management has been difficult to achieve over the period 2014-2017. In order to address the plastic waste issue, plastic manufacturers are currently using an oxo-biodegradable additive for the manufacture of flexible plastic based on ministerial directive. Monitoring of such industries need to be enhanced to ensure that a lot more industries comply with the directive. The electronic waste Act 917 of 2017 was also enacted to help deal with the electrical and electronic waste menace. A full operationalization of Act 917 is necessary for comprehensively dealing with the e-waste issue.

Provisions of the Environmental Assessment Regulation LI 1652 of 1999 are still not being adhered to by industries and companies. The result is that a number of companies are still operating without approval and permits from the Environmental Protection Agency. This state of affairs makes it difficult sustainable environmental management to be achieved. Enhanced compliance monitoring by the Agency may be helpful in addressing the situation.

Land degradation especially due to improper farming practices like use of fire for land clearance remains a major development issue. Working in collaboration with the ministries of Food and Agriculture (MOFA) and Lands, Natural Resources and Mining (MLNRM) may be a way forward for solving this problem.

Indiscriminate pesticide distribution and use especially by farmers is one main cause of environmental degradation and pollution in the country. This problem is characterized by the mis-application of pesticides and the problems associated with the disposal of used pesticide packages. A well-coordinated collaboration with the MOFA and MLNRM may be effective in dealing with this problem.

1.9.4. Human Settlements and Spatial Planning

Judicious use of land is essential for the development of any nation. However, in Ghana haphazard development and inappropriate land use have affected development. To address the challenge, the Ministry through the Land Use and Spatial Planning Authority in collaboration with NDPC developed the National Spatial Development Framework to govern the development of human settlements in the country. As part of the framework, at all levels spatial plans were to be developed. However, major challenges with the preparation of the spatial plans at the various levels have been the inadequate number of staff and the low technical capacity of staff. Out of the 216 MMDAs in Ghana, only 132 offices of the Physical Planning Department (representing 61%) are manned by professional spatial planners, while 39 percent of MMDAs do not have spatial planners of any grade.

Consequently, the unavailability of the SDFs, Structure Plans and Local Plans to guide development, coupled with the nature of housing delivery leads to a number of development challenges which include:

- Unbridled nature of settlement expansion (urban sprawl);
- Huge waste of land, biodiversity losses and loss of prime agricultural lands;
- Expensive cost of infrastructure provision and service delivery due to the sprawling settlements;
- Uncoordinated infrastructure delivery and inability of infrastructure to support growing settlements (population);
- Formation of slums (informal settlements)
- Settlements that do not have economic lives (dormitory towns without sources of employment and low income generating capacities) among others.

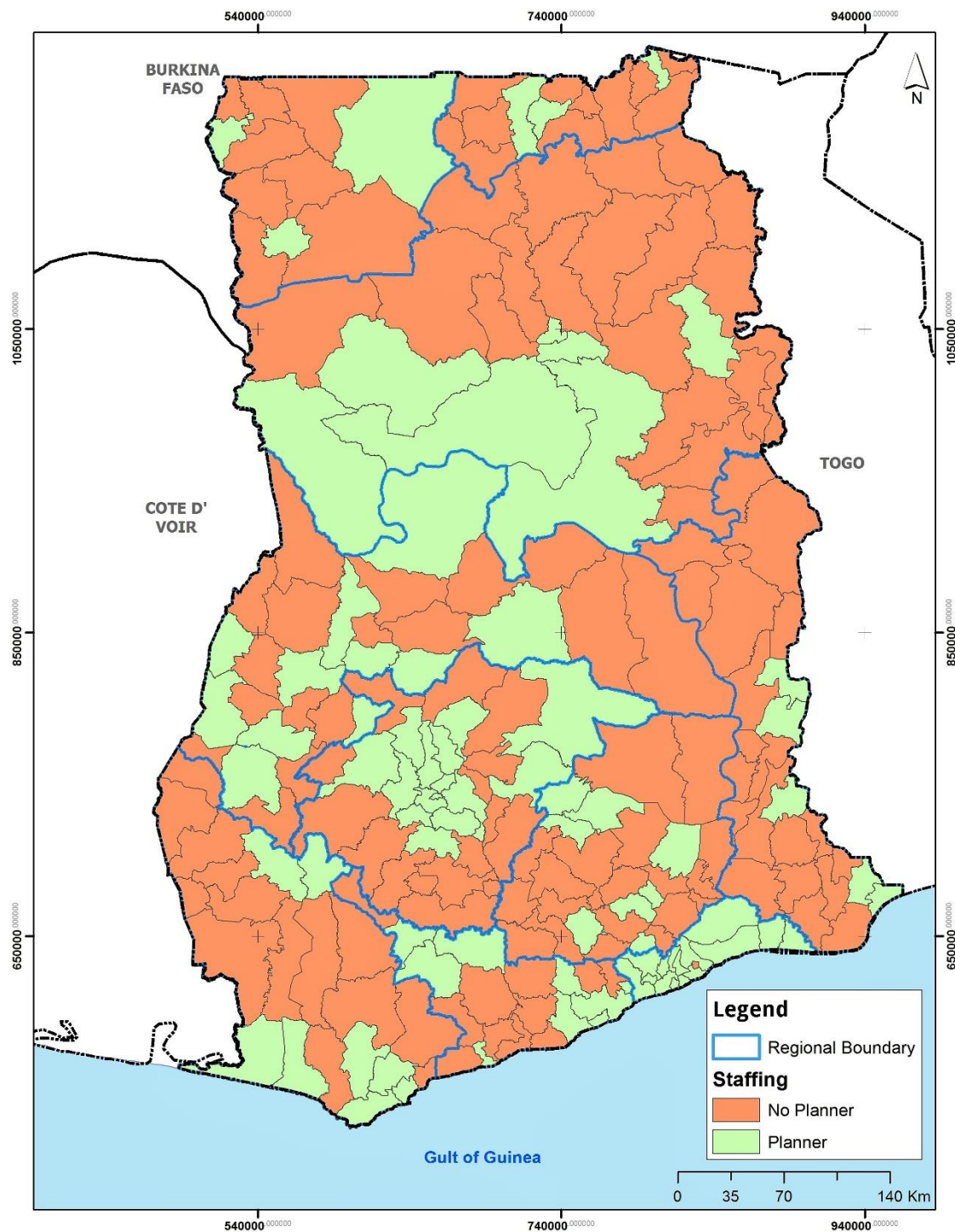
To effectively and efficiently plan and manage settlements and its burgeoning challenges in Ghana, it is imperative that measures are put in place to employ Spatial Planners in all the MMDAs, especially those without planners. In addition, the various grades and specialist planners needed particularly in the most urbanized and rapidly expanding MMDAs will have to be employed to contribute to managing the ever-growing challenges in Ghanaian settlements. Without these interventions, the challenges of pollution, waste management, traffic congestion, high levels of unemployment, inadequate infrastructure will continue to plague cities and towns in Ghana. In effect, the object of achieving the economic growth and development will be highly debilitated.

With the coming into force of the Land Use and Spatial Planning Act, 2016, Act 925, it is required that certain institutional reforms (actions) are undertaken to effectively operationalize the Authority. These include the inauguration of the Board of the Authority as the highest decision-making body of the institution, and the Spatial Planning Committees at the Regional and District levels to oversee and approve planning proposals and development in general at the various levels of government. Other administrative processes include developing a new organogram for the Authority, putting in place a new Scheme of Service and Conditions of Service of the authority,

training of MMDAs staff on the revised development permitting procedure as stipulated in the Act, and thereby reduce the number of processes and time that it takes for the issuance of development permits, etc. All these transitional provisions are yet to be implemented.

A spatial perspective of the MMDAs with and without spatial planners is presented in Figure 1.2.

Figure 1.2: MMDAs with and without Spatial Planners



Source: LUSPA, 2017

A detailed breakdown of the various grades of professional staff needed and the shortfalls are presented in Table 5. The table shows a dire situation where almost 1400 professionals are needed to make planning more effective and functional.

1.9.5. Biosafety Development

The National Biosafety Authority was established by the Biosafety Act 2011, Act 831 to regulate modern Biotechnology in Ghana. The core responsibility of the Authority is to regulate the Development, Handling, Transfer and use of Genetically Modified Organisms (GMOs) in the Country.

The National Biosafety Authority (NBA) is fully aware of the myriad of misinformation going round among the general public concerning GMOs. The NBA as an Authority has been mandated to educate the public on its activities under the Act.

The Authority has acquired laboratory equipment for detection of GMOs in the Country. This is supposed to support the surveillance of the environment for unapproved GMOs. The Authority is working fervently to ensure that GMOs that enter the country go through the approved assessment procedure before being allowed in.

1.9.6. Nuclear and Space Science Technology

The Ghana Atomic Energy Commission was established in 1963 with the main functions to promote, develop and utilize peaceful applications of nuclear and biotechnological techniques for economic and social advancement of Ghana. In pursuance of these objectives and with the support of the IAEA, the Commission has established Institutes and Centres which carry out appropriate research activities in the different thematic areas stated above.

The Ghana Atomic Energy Commission through its Institutes has been able to establish the capacity to use: (a) nuclear medicine techniques and methods in the fight against various communicable and non-communicable diseases such as cancer, HIV/AIDS and tuberculosis in the health sector; (b) nuclear and conventional techniques for the eradication of rinderpest disease and the improvement of cocoa production and livestock in the agriculture sector; (c) stable isotopes to improve water resources management; (d) ensure public and environmental safety and nuclear security (e) the available nuclear expertise and skills to train over 400 students at the established post graduate education courses in line with the national human capacity building agenda.

GAEC, with the assistance of the International Atomic Energy Agency has developed competencies in the peaceful uses of nuclear bio- and allied technologies to provide solutions to problem in the country. However, in order to yield nationwide results the government would have to increase its support for research and development activities through the provision of both financial and human resources. GAEC has the potential to provide solutions to some challenges facing the nation especially in various fields but has been constrained by limited resources over

the years. As an example, the Cobalt – 60 used in the GIF has decayed tremendously and needs replacement for effective utilisation. Also, the Isotope Hydrology Laboratory was commissioned recently and is being used to conduct research in water resources management but there will be the need engage more scientists and technologists to enable them to embark on nationwide projects to support the national agenda to provide safe and sustainable potable water to the population from groundwater sources. Additionally, the Mutation Breeding & Plant Biotechnology facility has not been able to operate for some time now due to inconsistent power supply and inability to purchase power to ensure continuous production of planting materials using the tissue culture technique.

With the increasing number of skilled and experience staff retiring from regular service as a result of attaining the statutory age for retirement the human capital of GAEC has reduced significantly over the past five years. There is the need for the engagement of more staff particularly, scientists, engineers and technologists to support the implementation of the planned activities as well as the introduction of nuclear energy in the country's energy mix. This is also required for succession planning for this unique institution.

1.9.7. Biodiversity, Climate Change, Green Economy and Environment in general

Ghana became a party to the United Nations Framework Convention on Climate Change (UNFCCC, hereinafter referred to as the Convention) after ratification in September 1995. Upon ratification, Ghana had committed itself to pursue coordinated actions to reduce greenhouse gas (GHG) emissions and climate change impacts on the most vulnerable people, while continuing to advance national economic development.

Ghana attained a Middle Income Country status in November 2010 after rebasing the economy. The main export commodities are the precious mineral (gold, bauxite, and manganese), cocoa, timber and recently oil and gas. With the revised GDP estimates, GDP/ capita has increased from US\$ 1,067 in 2000 to US\$ 1,652 in 2011. The country has largely experienced stable and consistent economic growth since 1960. The size of the Ghanaian economy has expanded by nearly 97% with the GDP increasing from USD1.2 billion in 1960 to USD 35.9 billion in 2012 in real terms.

The expanding trend in the economy corresponds to the increasing energy and the greenhouse gas (GHG) emission intensities especially in the last couple of years. As the economy expands and the population grows, lots of energy resources are utilized to meet the growing demand in industry, transport and households. Ghana's climate continued to get warmer whereas rainfall remains uncertain and difficult to predict. The projected rate of warming is more rapid in the northern inlands than the coastal regions. Projections of mean annual rainfall from different models predict wide range of changes. About half of the models predict increases while the other half project decreases.

Ghana's total GHG emissions stood at 33.66 million-ton (MT) CO₂-equivalent (CO₂e) in 2012. When the emissions came from Agriculture, Forestry and Other Land Use (AFOLU) sector were excluded, the total emissions came to 18.49 Mt CO₂e for the same year. However, in the 2011, which is the official latest reporting year to UNFCCC, Ghana's total GHG emissions, excluding the AFOLU sector, was estimated to be 16.51 Mt CO₂e. The 2011 emissions were 7.9 Mt CO₂e higher than 2000 levels and 10.9 Mt CO₂e above total emissions recorded in 1990. When emissions from AFOLU were added, Ghana's total emissions, the net emissions came to 30.60 Mt CO₂e for 2011. Similarly, the total emissions grew by 14.28 Mt CO₂e over 2000 levels and 16.38 Mt CO₂e over emissions recorded in 1990.

The observed general increases in the emission trends corresponded to the ongoing structural transformation, which has led to sustained growth and expansion of the national economy. The economic transformation programme has resulted in the notable rise in emissions from road transport, electricity generation crude-fired thermal plants, biomass burning in forest, cropland and grassland. Additionally, emissions due to land use changes also recorded significant increases between 1990 and 2010 mainly due to deforestation. However, as a result of implementation of government's national reforestation programme, emissions from "Land" have seen decreases between 2010 and 2012.

The loss of biodiversity is increasing over the years as a result of rapid degradation of forest reserves and wetlands. Forests and Wetlands are increasingly being lost as a result of uncontrolled construction of buildings, conversion of forest land to cropland, siltation and pollution of water bodies by illegal mining and other human activities.

Ghana is rich in terms of biodiversity. Majority of her population depends on biodiversity for their livelihoods. The benefits of plants, animals, water resources and microbial biodiversity to the people range from economic (source of rural and urban income, export earnings), social (as sources of food and food security, biofuel, medicine) religious and cultural (avenue for spiritual inspiration), aesthetic and recreational to ecological (watershed and catchment area protection, wind/storm break, forest regeneration, soil fertility maintenance, etc.) and environmental (maintenance of atmospheric carbon levels and absorption of pollutants by Ramsar sites, etc.).

Biodiversity in Ghana is under severe pressure in some ecosystems and this has made it impossible to state a uniform status situation. The direct impacts of biodiversity loss include spread of invasive species, climate change, over pollution, agriculture expansion, and misapplication of chemicals. Misuse of fire, mining commercial and residential building, oil and gas installations, roads and highways, dams etc. Indirect impacts include increase in human population, incomes, changes in lifestyle, and technological advancement, all resulting in habitat alteration and degradation of natural resources.

The World Bank estimates that the cost of biodiversity degradation is about 6% of Ghana's GDP (World Bank 2006). The rate of decline of the country's forest was estimated at 2.24% between 2005 to 2010. The total forest cover was reported to have reduced from 32.7% of total land area as at 1990 to 21.7% in 2010 (NDPC, 2014).

The Government is obliged per the provisions of the Convention on Biological Diversity, to conserve her biodiversity for sustainable and equitable benefits to all people, now and in the future. In pursuance of this objective and consistent with the 2010 to 2020 Aichi targets and the National Biodiversity Strategy, the management plans of Protected Areas (which was crafted in consonance with the above mentioned documents) in the various ecological zones have been implemented. Areas where no management regimes or plans are in place such as off-reserve areas have lacked the needed attention. However, the Environmental Protection Agency through the Man and Biosphere Programme (MAB) has strengthened the capacities of communities and also applied the CREMA concept e.g. the Lake Bosomtwe MAB programme to empower them to enforce requisite bye-laws to enable them sustainably manage their resources.

To ensure continuous improvement in Ghana's biodiversity, there is need to mainstream biodiversity issues into sectoral plans, programmes and Projects to cater for off reserve areas and involve all stakeholders. Increase advocacy and awareness raising campaigns, and research and training for effective monitoring and evaluation of status and trend.

All these earlier-mentioned human activities cause loss of livelihoods, irreversible loss of certain types of species of flora and fauna and the inability of ecosystems to provide the natural services which leads to flooding, water stress, extreme weather conditions, and loss of soil fertility among others. Another, major threat caused by climate change is the rise in sea levels and waves upsurge which is causing coastal erosion and destroying settlements and infrastructure along the coast. If not addressed, these will adversely affect the availability of water to meet domestic, agricultural and industrial needs nationwide as well as reduced volume of water for hydropower generation. Food security is a major challenge likely to crop up as arable lands are rapidly being converted to settlements.

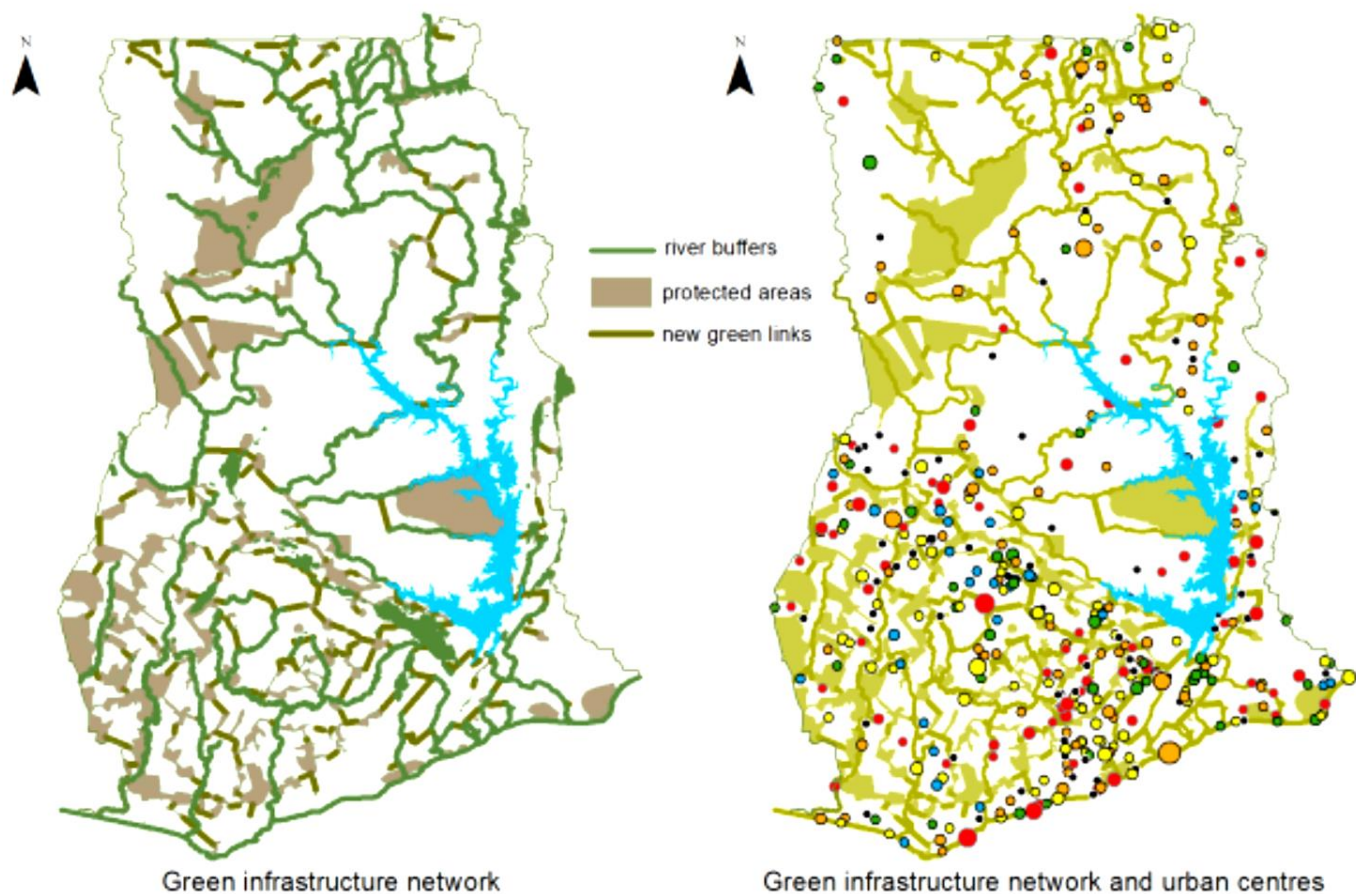
The Land Use and Spatial Planning Authority has proposed the development of a Green Infrastructure Network which can help mitigate some of the environmental challenges currently being faced in the country. The Green infrastructure network (GIN) is a new type of spatial intervention. It is a network of green places and water systems that delivers multiple environmental, social and economic values and services to urban and rural communities. It is simultaneously an ecological network, a wildlife corridor, a river buffering system, an enhanced forest reserve network, a recreational asset and a visual amenity. GINs provide the counterpoint to urban development and anchor the urban centres while at the same time protect and help restore natural systems and open spaces that serve as an environmental life support system for urban

settlements. Its implementation will contribute largely to the green economy agenda of the government and create the much needed open spaces which are almost absent in Ghanaian settlements/communities.

The implementation of the GIN will require collaboration between LUSPA, Forestry Commission, Environmental Protection Agency, Water Resources Commission and almost all MMDAs to ensure sustainable implementation of the project. A high level of community level engagement is a sine qua non for the success of the GIN nationwide.

Figure 1.3 Shows the GIN showing all the possible connections.

Figure 1.3: Proposed Green Infrastructure Network, 2015



Source: NSDF, 2015

BNARI under GAEC will, with the support of the International Atomic Energy Agency develop new varieties of food and horticultural crops using climate smart agriculture as mitigation against climate change. Under climate smart agriculture, the institute will use nuclear biotechnological

and related techniques to develop mutant or crop varieties which are tolerant to drought as well as resistant to pest and diseases associated with emerging climate change.

Since there is prolong drought and lack of irrigation facilities, food crops and vegetables will be produced using hydroponics system to ensure efficient use of water and land especially in the peri-urban centres. This system if adopted has the potential of improving the poor levels of household food insecurity and reduce the incidence of hidden hunger. With adequate financing, these projects could be carried out on a nationwide scale to yield great results for socio economic development and improve welfare and social protection. GAEC would need the support of Government and other stakeholders to train more technical staff to carry out such a large-scale project.

The variability of the climate is on the increase as the country tries to achieve its developmental goals. Power plays an important role in the country's development but some of the sources also contribute to the Carbon dioxide emissions that cause climate change/variability. Over the years, the energy mix of the country has gradually shifted to a more thermal base as opposed to hydro which is less polluting. This is partly due to the ever-increasing energy demand and the dwindling hydro resources in relation to other resources available to the country. There is therefore an urgent need to develop energy supply strategies that meet the growing demand but at the same time, addressing environmental issues relating to climate change. In this regard, the introduction of Nuclear Power into the country's energy mix is of paramount importance since it presents enormous benefits to the energy sector, environment and also to the economy. Below are the opportunities and challenges of the nuclear technology on the sector and the country as a whole.

1.9.8. Population Dynamics

The population growth and migration trends in Ghana have had major impacts on the management of settlements. The impacts of population growth are manifested in the form of high level of mushrooming informal settlements (slums), inadequate infrastructure to support growing population, high levels of traffic congestions, water pollution, air pollution and waste management challenges inter alia. These challenges are particularly intense in the most urbanized regions (Ashanti and Greater Accra regions) that are the most preferred destinations of migrants because of the higher income per capita earnings which are associated with more urbanized areas (See Figure 1.4 which shows the urbanization levels and net-migration levels).

Spatially, the distribution of the rapidly growing population and migration dynamics are manifested largely in the form of urban expansions (built-up area expansion) over the years due to the horizontal nature of housing delivery. To halt the unending challenges of unbridled lateral settlement expansion resulting from population growth and migration dynamics, LUSPA (then TCPD) prepared National Spatial Development Framework to curtail the situation. The NSDF proposes economic, land use planning and management as well as infrastructure provisions to meet the needs of the present population and the projected population over the next 20 years. Beyond, the large cities in the country, secondary cities and other lower level hierarchy of settlements have

been identified to be major focus areas of infrastructure investments spanning roads, railways, energy, educational, health and other economic investments. These identified secondary cities will also have to act as economic gateways or centres to hold back and attract the population that would have otherwise moved to the areas with high population concentration like Kumasi, Accra and Takoradi among others. This will contribute to solving the over-concentration of population in the southern parts of the country.

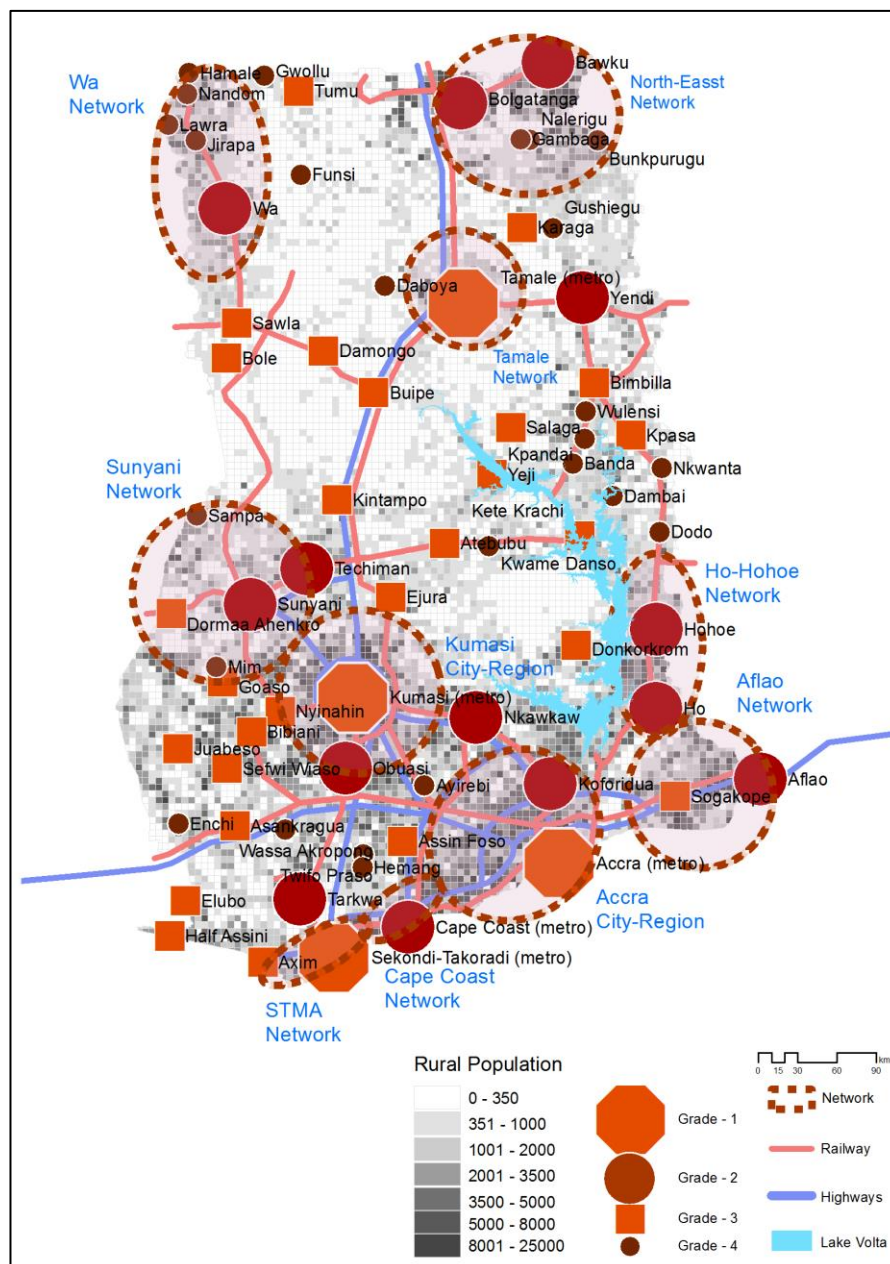


Figure 1.4: National Spatial Development Framework of Ghana, 2015-2035
Source: TCPD, 2015.

The regions are all supposed to prepare their RSDFs which dovetails into the NSDF but further proposes infrastructure, identifies economic areas/zones and protected areas to meet the needs of the current and expected population in the next 20 years taking into consideration the population growth dynamics and their spatial distribution as well.

1.9.9. Natural and Manmade Disasters

Disasters mostly occur in human settlements. The most popular form of disasters that have very devastating effects in Ghana are flooding. The most recent of such flooding is the so called “**June 3 Flooding**” which led to loss of over 100 lives and destroyed lots of properties which indirectly affected thousands of people. To prevent such disasters from occurring, planning for settlements which usually protects river bodies and areas liable to flooding by leaving them as open spaces with buffers will have to be enforced. However, due to the weak planning enforcement regime in the country, people build in water ways which triggers flooding with the least amount of downpour.

Planning, education and enforcement of local plans prepared for communities can help reduce the incidence of flooding in the country. The mounting of local plans on billboards in communities/settlements showing the water ways and green spaces can engender community activism on the implementation of local plans. Unfortunately, funds to prepare the local plans are mostly unavailable. Where the local plans are prepared hardly are they publicized in communities and become purely technical properties that are rarely known by the citizenry.

1.9.10. Natural Resource Utilization (water, minerals, forest products, etc.)

Freshwater availability Ghana is not uniform. The south-western part (rain forest ecological zone) are better watered than the coastal and northern regions (savannah ecological). Ghana is drained by three main river systems. The total annual runoff for Ghana is about 54.4 billion m³ out of which the Volta, South Western and Coastal Rivers systems contribute a total of 38.8 billion m³ in the proportions 64.7%, 29.2%, and 6.1% respectively. Domestic water demand is also projected to reach 5 billion m³ by 2020, a surplus of about 48 billion m³ indicating that surface water resources alone are sufficient to meet present and future domestic water demand (Water Resources Commission, 2008). However, temperature rise, increase in evaporation and rising demand for freshwater in Ghana means that efforts at sustainable water management must intensify.

Water quality in many of Ghana’s surface water system has been declining since 2005. Water quality analyses between 2005 and 2014 showed a decreasing water quality over the period especially in the South Western and Coastal River Systems. This is the result of population growth, land use change, pollution from illegal mining, urbanization resulting in the discharge of domestic and municipal waste in our water bodies and industrial development. These have led to the deterioration of water quality and quantity, and in most cases the destruction of landscapes, promoting explosion of aquatic weeds infestation and reducing water reservoir’s storage capacity.

Several interventions have been put in place and are also ongoing to address the problems and enhance water resources protection. These include the development of water policy, Basin Integrated water resources management plans and setting basin boards to manage water resources at the basin level, laws such as the water use rights. The Environmental Protection Agency per its mandate under the Act, Act 490 of 1994, and the Environmental Assessment Regulations of 1999, LI 1652 ensures proponents comply with the sector specific guidelines for effluent discharges to minimize pollution of water resources. Relevant stakeholders also promote water demand management and water harvesting technologies. Efforts would be continued in the next planning face to ensure that successes chalked are maintained.

An effective natural resource utilization strategy requires accurate data which is currently not well organized in the country. Facilities at GAEC which have been setup for the provision of such data include the following:

1. Miniature Neutron Source Reactor for multielement analysis of water, geological, biological as well as environmental samples.
2. Pelletron Accelerator for multielement analysis of water, geological, biological as well as environmental samples.
3. Isotope Hydrology Laboratory for analysis of water to ensure improved water resources management.

1.9.11. Land Use Analysis

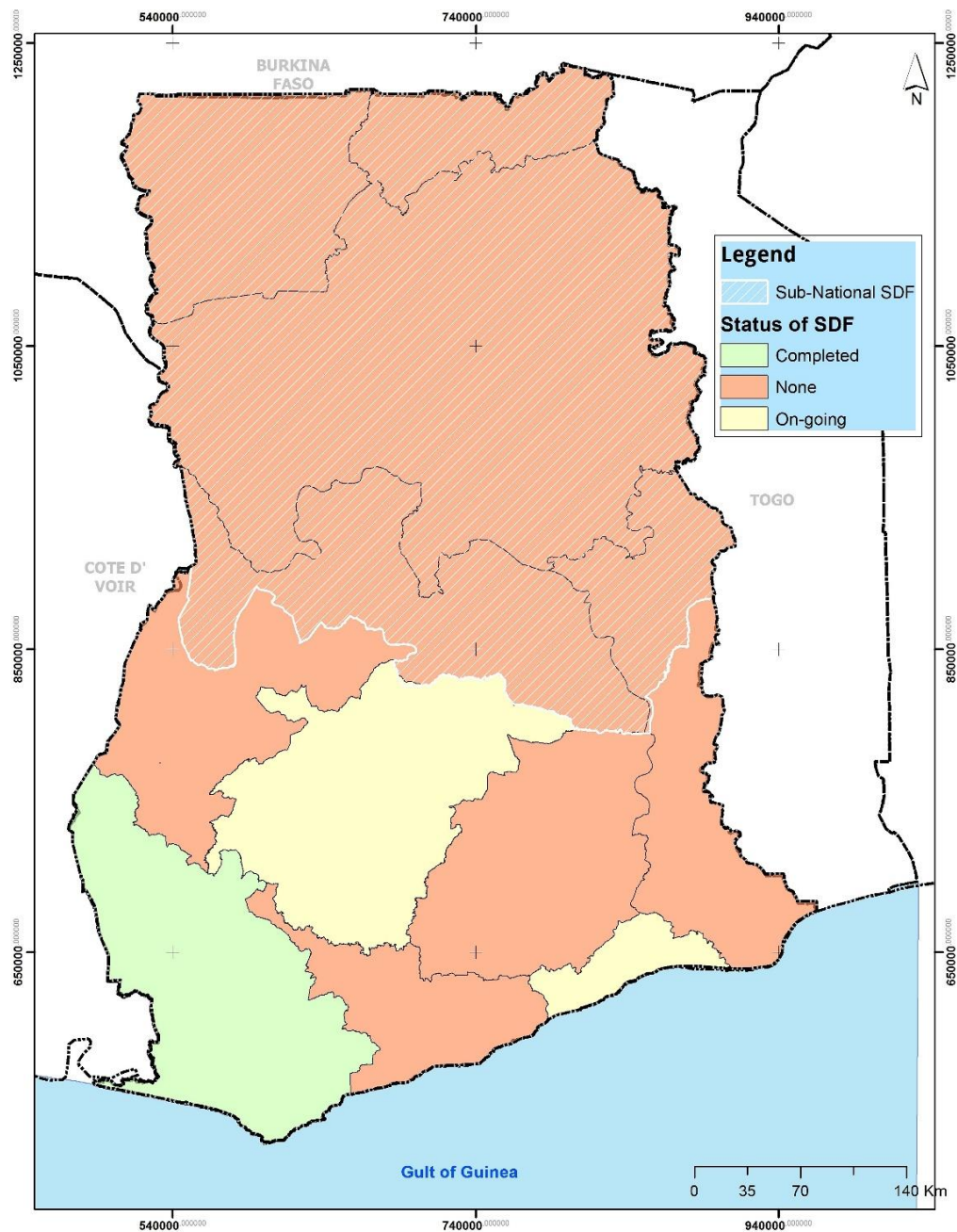
The new planning model stipulates a three-tier planning system where the lower level plans feed into the higher level and the higher-level plans give guidance for the preparation of the local/lower hierarchy plans. It requires the preparation of Spatial Development Frameworks (SDF) at National, Regional and District Levels, Structure Plans at District and Town levels and Local Plans at Sub district level. It also encourages the preparation of Joint District Plans as well as Special Zone or Enclaves plans.

Prior to 2014, a spatial Development Framework was prepared for the Western Region, concentrating on developing the Oil and Gas Enclave. A National Spatial Development Framework was also prepared in 2015 which spans over a period of 20 years and covers all the major physical and infrastructural requirements of the nation over the period. As a sequel to the NSDF, Sub-National SDF was prepared covering the Northern Savannah Ecological Zone which covers the Northern, Upper East and Upper West Regions and the Northern parts of the Volta and Brong Ahafo Regions in 2016. There are currently two SDFs being prepared to cover the Greater Accra Region and the Ashanti Region as strategic and key regions in the development of the nation. That leaves a gap of four regions; Central, Eastern and the Southern parts of Volta and Brong Ahafo regions without a Spatial Development Framework to guide their developments.

Figure 1.5 shows the map of Ghana indicating the number of regions with SDFs completed, those with their SDFs currently being prepared as well as those yet to be prepared. It should however

be noted that the three Northern regions and the northern parts of the Volta and Brong Ahafo Regions are covered by the Sub-National Spatial Development Framework for the Northern Savannah Ecological zone, and do not have specific Regional Spatial Development Frameworks. Following the National, Sub-National and Regional Spatial Development Frameworks, Structure plans would have to be prepared to cover the broad land uses and major accesses (road and rail networks) both existing and proposed in the various SDFs, and subsequently, Local plans which would further sub divide the broad land use zones into parcels for development. There is a huge gap in this area as the SDFs cannot be implemented to the letter without the lower hierarchy plans. This therefore means that all MMDAs are supposed to have SDFs, Structure Plans and Local Plans prepared to guide the management of human settlements.

Figure 1.5: Regions and Sub-national areas with and without SDFs and on-going SDFs



With the acquisition of satellite ground receiving station, GAEC will be able to provide vital land use information at a much lower cost.

1.9.12. Science, Technology and Innovation (STI)

GAEC through its institutes is involved in science, technology and innovation projects which address important development challenges in health, food and agriculture, industrial applications,

water resources management and in sustainable energy development through the use of the Ghana Research Reactor -1, the Pelletron Accelerator and analytical tools such as the Atomic Absorption Spectrometer, GAEC collaborates with the mining industries, food and agriculture industries and national regulatory bodies such as Ghana Standards Authority (GSA), Food and Drugs Authority (FDA) and Environmental Protection Agency (EPA) to determine useful and toxic elements in cocoa and other products for internal and export regulatory requirement, profiling geological materials in minerals exploration and for providing other analytical services.

Using isotopic and other techniques, GAEC collaborates with the Water Resources Commission to assess recharge areas and sources of water and pollution. This type of research provides useful data on hydro geochemistry/hydrogeology, geophysical characteristics, bacteriological and isotopes status, water level, discharge/recharge and groundwater age, groundwater vulnerability and contaminant pathway for researchers and students. Through such projects, assessment of the groundwater potential and sustainability for food production in the area under study is known. Projects are normally of great importance to the various stakeholders concerned with water resources management (Water Resources Commission, Environmental Protection Agency, Local Governments and international regulatory authorities in the environment and water sector, as well as commercial and peasant farmers). Research is also being focused on “Groundwater sustainability and quality assessment for irrigation in the three Northern regions of Ghana” and on “Scientific assessment of the impact of e-waste on the Environment and human health”.

GAEC through the National Data Centre (NDC) collates seismic, radionuclide, infrasound and hydro acoustic data for the monitoring of nuclear test explosions to ensure compliance to the Comprehensive Nuclear Test Ban Treaty (CTBT). This collaboration has the potential to provide regular data on earthquake and other natural disasters. This will help increase the poor public awareness on coping strategies during natural disasters. This can only be achieved with equipping the Commission and other partners with the state of the art technical equipment and adequate resourcing of the project. In collaboration with other stakeholders, GAEC also employs geophysical techniques in groundwater studies and in mineral and oil exploration. GAEC undertakes research in industrial process plants for asset integrity management of pipelines, pressure vessels, oil storage tanks, mineral ore processing plants and in distillation columns. Research is also conducted on nuclear electronic equipment, helping to offer services in the repair, maintenance and calibration of nuclear electronic equipment. Specifically, GAEC has been involved in regular maintenance and calibration of Gamma Camera and Spectroscopy at the Radiotherapy and Nuclear Medicine Centre at the Korle-Bu Teaching Hospital.

Through BNARI, GAEC engages in research activities to improve crops using mutation induction and biotechnology through a farmer participatory approach which involves the establishment of cultures of plantain, pineapples, sweet potatoes and cassava. GAEC is focusing on field establishment for release of four varieties of cherry tomato, training of 25 farmers on Composting,

the completion of a production plant for protein bait to control the fruit fly menace and the management of postharvest losses and enhancing health care delivery through the use of the Gamma Irradiation Facility (GIF).

The IAEA borehole disposal Concept is being implemented through the RPI in order to effectively dispose of Ghana's disused radioactive sources. In such projects, site characterisation activities are carried out the National Radioactive Waste Inventory is updated and human resources are developed. GAEC through the RPI conducts Hazard Assessment of Electromagnetic Radiation from Mobile phones operators and Radio Stations across the country, prior safety assessments on mobile base stations before installation and monitors Naturally Occurring Radioactive Nuclides. In human health, GAEC is also engaged in projects that seek to consolidate and enhance quality in the existing radiotherapy and nuclear medicine facilities in Ghana to increase accessibility of cancer care through the establishment of other radiotherapy and nuclear medicine facilities in the country for the diagnosis, curative and palliative treatment of cancer patients; to strengthen medical physicists' capacities to ensure safety in medical imaging, with an emphasis on paediatric imaging safety.

Other research and development area is that of nuclear power generation. The necessary Strategies and Infrastructure for the Establishment of a Nuclear Power Programme for Electricity generation in Ghana is being developed by GAEC through the NPI. GAEC through the NPI has been engaged in a Sustainable Energy Development project which has the objective of developing a national human resource capacity in the use of IAEA energy planning tools in energy planning. A comprehensive energy planning study for Ghana is being undertaken in line with the objectives of Ghana's 40-year development plan. With the use of IAEA planning models in identifying the role of nuclear power in the national energy mix with particular reference to its share in the coming years in relation to Ghana's 40-year development plan, a sustainable energy mix involving the proper integration of the various energy options for the generation of reliable and affordable electricity in an environmental friendly manner is being developed. A draft report on Assessment of Ghanaian and West African Grid Network for Nuclear Power Operation has been prepared. GAEC intends to organize stakeholder and public sensitization meetings on adoption of nuclear power.

GAEC through the GSSTI is converting a 32-m dish from a communication antenna to a radio telescope at Kuntunse and assessing critical indicators of radio astronomy capabilities. It is planning to acquire a ground receiving station to enable the country capture relevant satellite images to be used by the aviation, meteorological, security and environmental protection agencies. The GSSTI is also focusing on the development of Ghana Space Policy.

GAEC through SNAS is also involved in the training of manpower in nuclear science and technology including nuclear power engineering in preparation for possible introduction of nuclear

power to supplement Ghana's energy. SNAS has developed and introduced 12 nuclear-oriented and related academic programmes which are organised under 5 departments, leading to the award of Master of Philosophy (MPhil) and Doctor of Philosophy (Ph.D.) degrees of the University of Ghana. The School also runs the IAEA Post-graduate Educational Course (PGEC) on Radiation and the Safety of Radiation Sources.

However, GAEC faces challenges of inadequate funding by Government. The budgetary support from the Government over the years has been dwindling, making it difficult for GAEC to have its plans and programmes effectively implemented. The untimely release of funds by Government is also a challenge for the efficient operation of GAEC's activities.

A Concept for National Nuclear Imaging Centre has been developed and partners have been identified by RAMSRI. Research is undertaken in diagnostic radiology and radiotherapy to improve cancer and other degenerative diseases treatment outcome.

To promote sustainable industrialization GAEC's has the capacity to provide isotope data as well as a large volume of data within a short time using nuclear analytical techniques. This will help augment the current situation of having inadequate baseline information on environmental impact of the operations is oil and gas industry. In collaborate with EPA and other relevant state agencies, GAEC can help develop knowledge management system for a baseline database. However, we are constrained by inadequate logistics and limited number of staff employed in this sector. Also, the School of Nuclear and Allied Sciences under GAEC offers graduate courses in Environmental Protection and can produce the human capital to solve the problem of having inadequate capacity to manage environmental impacts. With collaborative efforts with IAEA, EPA and other relevant state agencies GAEC can train qualified personnel in environmental management. We are however faced with inadequate funds to purchase training equipment to embark on this project.

1.9.13. Local Economic Development

Economic development is a major focus area of settlement planning and management. The vibrancy of economic activities contributes the largest part of the functionality of settlements and hence the need for planning for the economy of settlements. The SDFs at the national, regional and district scales provide detailed in-depth economic analysis ranging from changing employment structure, areas with high level of economic concentration and lagging areas, of economic potentials, challenges and specific strategies. The appropriate location of Special Economic Zones, Industrial Parks/Estates, agricultural lands among others are proposed in the various spatial plans/frameworks. These details are particularly available at the sub-national level and regional and district levels. The Western Regional Spatial Development Framework and the Spatial Development Framework for the Northern Savannah Ecological Zone are full of such economic proposals.

It must be emphasized that the employment structure of the Ghanaian economy is one that is rapidly de-industrializing (particularly in the manufacturing sector) and growing more towards the Services industry which is dominated by Wholesale and Retail Services. The Wholesale and Retail sector however remains a low-income earning sector which virtually adds little or no value addition. LUSPA advises that the economic restructuring of the economy should focus more on manufacturing (industrialization) which tends to yield higher returns and combines perfectly well with urbanization. This will help resolve the proliferation of kiosks and street hawking that characterizes the urban space of most Ghanaian cities and major towns.

Availability of sustainable, low-cost reliable power supply plays an important role in both local and national economic development. The introduction of nuclear power in the national energy mix will be able to solve these issues and, provide the much-needed baseload power for industrial development. Below is an outline of the analysis of the introduction of nuclear power:

	Opportunities	Challenges
Energy Sector	<ul style="list-style-type: none"> • Reliable and stable base load power • Diversification of energy sources (reduces over dependence of hydroelectric power which can be affected by climate change) • learning and transfer of new technology • Grid Stability • Low cost electricity for consumers • Lower carbon emission (green environment) • Predictable and stable electricity prices 	<ul style="list-style-type: none"> • Possibility of increase of total cost of generating from all sources of energy • Regulatory issues • High mobility of experts across power plants • Perception on safety
Financial Services Sector	<ul style="list-style-type: none"> • Foreign Direct Investments (FDI) and Capital formation • Job creation and Savings mobilization • Financial depth and interest rates stability • lower inflation targets through cheaper electricity (opportunity for profitability and savings) 	<ul style="list-style-type: none"> • High capital cost / Highly leveraged energy sector •

Industrial Applications

Non-Destructive Evaluation Techniques (NDET) are applied in the Oil and Gas, Mineral Ore Processing Plants, Power stations and others. The Integrity of turbine blades at power stations such as turbines at Volta River Authority (VRA) and thermal plants have been assessed. Also the thickness gauging for corrosion assessment of Liquified Petroleum Gas (LPG) storage vessels have been conducted by NDET. In addition, scanning of distillation columns to assess integrity of trays, packings and other operating conditions are also carried out. GAEC's workshop fabricates fuel storage tanks for oil companies like Goil, Allied and others.

Funding remains a major challenge to the expansion of these services to include more local companies. The above activities serve as ways of acquiring some capital for GAEC and the nation. Most of these institutions give these contracts to foreign companies, which doesn't help the growth of the local economy. To ensure funds are retained in the country, such activities need to be adequately funded and back by government to contribute to local economic development.

The RPI undertakes analysis of food samples and industrial raw materials. It also monitors individuals and base stations, calibrates survey metres and nuclear gauges and assesses radiofrequency stations. In the year 2016, a total of 463 food samples and industrial raw materials were analysed for radioactivity contamination. Monitoring of individuals was undertaken for 1809 occupationally exposed workers in Ghana, 65 radiation survey metres and nuclear gauges were calibrated using the secondary standard dosimetry laboratory (SSDL). A total of 803 based stations were monitored and 224 radiofrequency safety assessments were undertaken.

The welfare and safety of employees of companies from being exposed to radiation from radiation sources is very important. There are many examples of employees who have suffered various forms of diseases from being exposed to radiation. A healthy workforce drives productivity in the country. It is therefore important for such radiation monitoring activities to be conducted regularly for staff who come into contact with radiation sources. This will help curb any disaster from occurring to harm the masses. GAEC does its best to expand these monitoring activities by funding such field monitoring activities through its own internally generated funds. However, with the support of government will be needed to enable nationwide coverage.

1.9.14. Nutrition

The health of the general public is of concern to the Commission. GAEC is currently working on a nutrition intervention project to evaluate the effects of ongoing vitamin A programmes in Ghana and the impact of subclinical inflammation on vitamin A status of preschool children and to compare vitamin A assessment using stable isotope to conventional methods such as serum retinol. Individual-level exposure to vitamin A using dietary intake and history of vitamin A supplementation, intake of fortified foods etc to support stable isotopes findings and to assess the effects of acute phase proteins on vitamin A indicators in settings of subclinical inflammation is also one of the objectives of the project. The use of isotopic techniques has also shown the potential in helping to reduce obesity and related health risks in Ghana. Over the years the Commission has been plagued with dwindling support shown towards this research. With enough funding and collaboration, this research could be embarked on nationwide to ascertain the nutritional needs of Ghanaians.

1.9.15. Water security

In the area of water resources management GAEC over the years has conducted many field researches into the quality of water bodies in the country. We have the potential to use our well-

resourced isotope hydrology, neutron activation analysis, and microbiology and accelerator facilities, we have the potential to provide comprehensive data on water resources.

Over the years, the country has been battling to resolve the effects of the pollution of our water bodies and forest reserves. To aide governments in this fight, GAEC has the potential to identify the sources of pollution and remediate polluted sites. Using isotopic and other techniques, GAEC can assist in the restoration of polluted water bodies. However, the Commission faces the constraint of having sufficient human resource to embark on this project and the lack of meta data. Also, the Commission needs adequate funding to enable it collect vital information in water resources management to prepare comprehensive data on water resources nationwide. This data will help the country manage its water resources better to ensure they remain clean and safe for the masses to use. GAEC has the opportunity to partner with IAEA partnership and other relevant stakeholders, to use isotope techniques for water resource assessment and sedimentation studies, using this information to remediate our polluted water bodies.

In collaboration with NGOs, GAEC has the potential to site high yielding, sustainable and safe (isotopic techniques) groundwater from boreholes drilling. This will help improve the current situation of the poor and low-income earners who have little access to potable water services. We also have the potential to provide technical advice on the use of groundwater as a safe source of water supply using isotope techniques. In collaborate with IAEA and other state agencies to our existing isotope hydrology laboratory could be upgraded to have the capacity to conduct more research.

However, the Commission faces the challenge of having limited human resource to carry out nationwide research. Inadequate funding for the research is also a major constraint to the project.

1.9.16. Social Services and their development implications

GAEC over the years has been playing its role to improve the social services and infrastructure available to its staff and the general public. The following are some gains that have been made by the Commission.

The School for Nuclear and Applied Sciences, trains and develops professionals in the area of Nuclear Technology and its related benefits. The country needs more technical staff to be trained especially in the field of nuclear power in tangent with the commencement of plans to introduce nuclear energy into the country's energy mix. There is therefore a vast opportunity for GAEC to educate more professionals. The school needs more infrastructures to augment the current ones and also increase public sensitization about the school and programs it offers.

The GAEC hospital was initially constructed to make available a health facility to cater immediately to the health needs of staff of the Commission. As a result of expansion works over the years the hospital now has the capacity to serve surrounding areas. However more efforts need

to be made to improve the infrastructure of the hospital to meet the ever growing size of its patients. The Commission is also at the initial stages of constructing an Ultramodern Nuclear and Medical Imaging Centre. This centre will provide cut edge technologies in diagnosing illnesses and diseases. However, the progress of this project is slow due to the unavailability of ready funds for the project.

GAEC is part of Malaria control board using Sterile Insect Technique (STI) technology. This technique is being developed to control the spread of malaria in Ghana. With adequate funding and more technical employees, the Commission will be able to positively reduce the number of malaria cases in the country. This provides the government with a great opportunity to help eradicate malaria from the nation. However, GAEC can barely raise enough funds to facilitate the smooth running of the research and its eventual operation.

Public education on Cancer causing Radon Gas is undertaken by GAEC. Gamma irradiation technology has been employed for sterilization of hospital devices. (eg M&J Pharmaceuticals, Ridge Hospital).

Air monitoring is undertaken by GAEC for persistent organic pollutant and particulate matter. Nuclear analytical techniques are used to support environmental monitoring and management eg Heavy metal analysis of foods and water using NAA. Water resources assessment is also undertaken by GAEC in the three Northern Regions and the Central Region. The Commission has assessed Recharge areas, sources of water and pollution identified.

List of Development Issues/Challenges

- Unbridled nature of settlement expansion (urban sprawl);
- Huge waste of land, biodiversity losses and loss of prime agricultural lands;
- Expensive cost of infrastructure provision and service delivery due to the sprawling settlements;
- Uncoordinated infrastructure delivery and inability of infrastructure to support growing settlements (population);
- Formation of slums (informal settlements)
- Settlements that do not have economic lives (dormitory towns without sources of employment and low income generating capacities) among others.
- Illegal and inappropriate mining practices
- Pollution by industry affecting air and water quality
- Waste management issues especially as relates to plastic and electronic waste
- Failure of most industries and companies to get approval (environment permit) before commencing on operational activities and
- land degradation as relates to biodiversity, climate change soil erosion
- Indiscriminate distribution and use of agrochemicals (especially pesticides)
- Financial constraints
- Inability to recruit new staff.
- Inadequate Research Funding:

- Inadequate Research Infrastructure
- Land Encroachment
- Uncontrolled use of radiation leading to potential risk of exposure to humans and the environment;
- Importation of nuclear and radioactive devices and materials without permit
- Uncontrolled import and export of food containing radioactive materials
- Uncontrolled use of nuclear and radioactive materials in the nuclear power industry
- Uncontrolled effects of non-ionizing radiation emissions from base stations and other non-ionizing radiation devices
- Uncontrolled release of radioactive materials into the environment from the extractive industries
- Inadequate professional and skilled staff
- Inadequate office and residential accommodation
- Inadequate baseline information on environmental impact of the operations in oil and gas industry
- Inadequate capacity to manage environmental impacts
- Challenges of ensuring environmental sustainability in the oil and gas industry
- Major land use challenges in the oil belts especially Western Region
- Inadequate capacity to manage waste and disaster in the industry
- Absence of a Human Settlements Policy to guide the comprehensive growth and development of human settlements in Ghana.
- Ineffective and inefficient spatial/land use planning and implementation particularly in the urban areas
- Inadequate human and institutional capacities for land use planning and management
- Spatial planning is disjointed from social and economic planning;
- Shortage of spatial planners within a background of a continuously increasing number of Metropolitan, Municipal and District Assemblies in response to the decentralization process;
- Unavailability of up-to-date base maps and orthophotos to facilitate prompt and effective land use and spatial planning works;
- Rapid, haphazard, uncontrolled and uncoordinated urban growth
- Weak enforcement of planning and building regulations

1.10. Summary of Development Issues under GSGDA II

Table 1.6: Summary of Issues identified under GSGDA II

Thematic Areas of GSGDA II	Identified Issues (From Performance Review and Profile)
Accelerated Agricultural Modernisation and Sustainable Natural Resource Management	<ul style="list-style-type: none"> • Poor public attitudes towards issues of the environment • Late/ non-release of GoG funds • Degradation of the nation's forests • Inefficient use and management of natural resources • Inadequate awareness of climate change and its impact

Thematic Areas of GSGDA II	Identified Issues (From Performance Review and Profile)
	<ul style="list-style-type: none"> • Weak institutional and regulatory framework for natural resource management and environmental governance especially at the district level • Weak integration of biodiversity issues in development decision making especially at the local level • Inadequate financial resources for biodiversity activities • Limited human resource capacity in Climate Change issues • Weak sub-regional network • Negative impact of some farm practices and mining technologies • Negative impact of mining on host communities • Conflict between mining and forest resource conservation • Destruction of the environment, pollution by illegal miners • Illegal felling of trees • Weak institutional and regulatory framework for natural resource management and environmental governance • Poor enforcement of regulations and laws governing the environment and for the management of natural resource • Limited awareness of the negative impact of improper disposal of waste i.e. solid, liquid, e-waste on the environment • Limited awareness of the negative impact of noise pollution on the health of citizens • Lack of strategies that encourage the participation of all key stakeholders in the sustainable management of natural resources • Lack of awareness on climate change and its impact • Uncontrolled use of radiation leading to potential risk of exposure to humans and the environment; • Importation of nuclear and radioactive devices and materials without permit • Uncontrolled import and export of food containing radioactive materials • Uncontrolled use of nuclear and radioactive materials in the nuclear power industry • Uncontrolled effects of non-ionizing radiation emissions from base stations and other non-ionizing radiation devices • Uncontrolled release of radioactive materials into the environment from the extractive industries • Inadequate professional and skilled staff • Inadequate office and residential accommodation • Inadequate Human Resource • Inadequate logistics for the operations of the NRA • Lack of public awareness on the hazards associated with the use of ionizing and non-ionizing radiation

Thematic Areas of GSGDA II	Identified Issues (From Performance Review and Profile)
	<ul style="list-style-type: none"> • Inadequate collaboration with internal and external organizations and bodies.
Oil and Gas Development	<ul style="list-style-type: none"> • Inadequate baseline information on environmental impact of the operations in oil and gas industry • Challenges of ensuring environmental sustainability in the oil and gas industry
Infrastructure and Human Settlements	<ul style="list-style-type: none"> • Low level of Science, Technology and Innovation culture in all spheres of life. • Low level of Science, Technology and Innovation culture in all spheres of life. • Weak institutional framework and infrastructure to promote the development and application of STI in the country. • Inadequate funding for research and development (R&D) activities • Weak linkage between the research institutions & industry • Weak institutional framework and infrastructure to promote the development and application of STI in the country • Absence of a Human Settlements Policy to guide the comprehensive growth and development of human settlements • Absence of a Human Settlements Policy to guide the comprehensive growth and development of human settlements. • Ineffective and inefficient spatial/land use planning and implementation particularly in the urban areas • Inadequate human and institutional capacities for land use planning
Transparent, Responsive and Accountable Governance	<ul style="list-style-type: none"> • Weak evidence-based development policy formulation • Inefficient and ineffective implementation of development policies and plans • Poor coordination in development policy formulation and implementation • Ineffective monitoring and evaluation of the implementation of development policies and plans

CHAPTER TWO

IDENTIFICATION OF DEVELOPMENT ISSUES WITH IMPLICATION FOR 2018-2021

2.1. Introduction

This chapter deals with the prioritised development issues of the sector identified in the NMTDPF. The prioritised development issues which relate to the sector will be a guide in the adoption of appropriate policy objectives and strategies to support the development of the sector over the medium term (2018-2021).

2.2. Harmonisation of identified development issues of GSGDA II and Agenda for Jobs, 2018-2021

The Sector had to deal with a number of development issues during the previous planning phase (2014-2017). During the next planning phase, the sector will still have to deal with some of the initial development issues so as to ensure its goal of ensuring accelerated socio-economic development of the nation through the formulation of sound policies and a regulatory framework to promote the use of appropriate environmentally friendly, scientific, and technological practices.

For continuity of relevant on-going programmes and in accordance with Article 35 (7) of the 1992 Constitution of Ghana, the Ministry and its Agencies have harmonised the issues associated with programmes and projects commenced under GSGDA II, 2014-2017, with those issues of the Agenda for Jobs, 2018-2021 (*see table 2.1*). Accordingly, the adopted development dimensions and issues for the SMTDP of the Ministry has also been presented in *table 2.2* below.

Table 2.1: Identified Development Issues under GSGDA II and Agenda for Jobs, 2018-2021

GSGDA II 2014-2017		Agenda for Jobs, 2018-2021	
Thematic Area	Development Issues	Development Dimension	Development Issues
Accelerated Agricultural Modernisation and Sustainable Natural Resource Management	<ul style="list-style-type: none"> • Poor public attitudes towards issues of the environment • Late/ non-release of GoG funds • Degradation of the nation's forests • Inefficient use and management of natural resources • Inadequate awareness of climate change and its impact • Weak institutional and regulatory framework for natural resource management and environmental governance especially at the district level • Weak integration of biodiversity issues in development decision making especially at the local level • Inadequate financial resources for biodiversity activities • Limited human resource capacity in Climate Change issues • Weak sub-regional network • Negative impact of some farm practices and mining technologies • Negative impact of mining on host communities 	Environment, Infrastructure and Human Settlements	<ul style="list-style-type: none"> • Environmental degradation • Upsurge in Illegal Mining (Galamsey) • Weak enforcement of environmental and mining laws and regulations • Weak natural resource management systems • Improper disposal of solid and liquid waste • Destructive Impact of Plastic Waste on Terrestrial, aquatic and marine ecosystems • Air and Noise Pollution, especially in urban areas • Improper management of E-waste • Emissions from poorly maintained vehicles • Vulnerability to climate change • Inadequate Institutional capacity to access global funds • Low institutional/economic capacity to adapt to climate change and undertake mitigation actions • Loss of trees and vegetation cover • Inefficient energy use

GSGDA II 2014-2017		Agenda for Jobs, 2018-2021	
Thematic Area	Development Issues	Development Dimension	Development Issues
	<ul style="list-style-type: none"> • Conflict between mining and forest resource conservation • Destruction of the environment, pollution by illegal miners • Illegal felling of trees • Weak institutional and regulatory framework for natural resource management and environmental governance • Poor enforcement of regulations and laws governing the environment and for the management of natural resource • Limited awareness of the negative impact of improper disposal of waste i.e. solid, liquid, e-waste on the environment • Limited awareness of the negative impact of noise pollution on the health of citizens • Lack of strategies that encourage the participation of all key stakeholders in the sustainable management of natural resources • Lack of awareness on climate change and its impact • Uncontrolled use of radiation leading to potential risk of 		

GSGDA II 2014-2017		Agenda for Jobs, 2018-2021	
Thematic Area	Development Issues	Development Dimension	Development Issues
	exposure to humans and the environment;		
Oil and Gas Development	<ul style="list-style-type: none"> • Inadequate baseline information on environmental impact of the operations in oil and gas industry • Challenges of ensuring environmental sustainability in the oil and gas industry 	Environment, Infrastructure and Human Settlements	<ul style="list-style-type: none"> • Inadequate capacity to manage environmental impacts of Oil and Gas Industry
Infrastructure and Human Settlements Development	<ul style="list-style-type: none"> • Low level of Science, Technology and Innovation culture in all spheres of life. • Low level of Science, Technology and Innovation culture in all spheres of life. • Weak institutional framework and infrastructure to promote the development and application of STI in the country. • Inadequate funding for research and development (R&D) activities 	Environment, Infrastructure and Human Settlements	<ul style="list-style-type: none"> • Limited utilization of relevant research outputs • Limited collaboration between public research institutions and businesses on product, service and process innovation • Inadequate infrastructure to support the delivery of energy services. • High cost electricity generation. • Low adoption of energy efficiency technology. • Unreliable power supply • High dependence on wood fuel • Low utilization of waste as an energy resource • Weak enforcement of planning and building regulations

GSGDA II 2014-2017		Agenda for Jobs, 2018-2021	
Thematic Area	Development Issues	Development Dimension	Development Issues
	<ul style="list-style-type: none"> • Weak linkage between the research institutions & industry • Weak institutional framework and infrastructure to promote the development and application of STI in the country • Absence of a Human Settlements Policy to guide the comprehensive growth and development of human settlements • Absence of a Human Settlements Policy to guide the comprehensive growth and development of human settlements. • Ineffective and inefficient spatial/land use planning and implementation particularly in the urban areas • Inadequate human and institutional capacities for land use planning 		<ul style="list-style-type: none"> • Inadequate spatial plans for regions and MMDAs • Inadequate human and institutional capacity for land use planning • Scattered and unplanned human settlements
		Economic Development	<ul style="list-style-type: none"> • Low transfer and uptake of research findings • Limited application of science and technology

GSGDA II 2014-2017		Agenda for Jobs, 2018-2021	
Thematic Area	Development Issues	Development Dimension	Development Issues
Transparent and Accountable Governance	<ul style="list-style-type: none"> • Weak evidence-based development policy formulation • Inefficient and ineffective implementation of development policies and plans • Poor coordination in development policy formulation and implementation • Ineffective monitoring and evaluation of the implementation of development policies and plans 	Governance, Corruption and Public Accountability	<ul style="list-style-type: none"> • Ineffective M&E and implementation of development policies and plans • Weak research capacity of MDAs and MMDAs • Inadequate financial resources

Table 2.2: Development Dimensions and Adopted Issues

Development Dimensions, 2018 – 2021	Adopted Issues
Economic Development	<ul style="list-style-type: none"> • Low transfer and uptake of research findings • Limited application of science and technology
Environment, Infrastructure and Human Settlements	<ul style="list-style-type: none"> • Environmental degradation • Upsurge in Illegal Mining (Galamsey) • Weak enforcement of environmental and mining laws and regulations • Weak Natural Resource Management Systems • Improper disposal of solid and liquid waste • Destructive Impact of Plastic Waste on Terrestrial, aquatic and marine ecosystems • Air and Noise Pollution, especially in urban areas • Improper management of E-waste • Emissions from poorly maintained vehicles • Vulnerability to climate change

Development Dimensions, 2018 – 2021	Adopted Issues
	<ul style="list-style-type: none"> • Inadequate Institutional capacity to access global funds • Low institutional/economic capacity to adapt to climate change and undertake mitigation actions • Loss of trees and vegetation cover • Inadequate capacity to manage environmental impacts of Oil and Gas Industry • Inefficient energy use • Limited utilization of relevant research outputs • Limited collaboration between public research institutions and businesses on product, service and process innovation • Low utilization of waste as an energy resource • Inadequate infrastructure to support the delivery of energy services. • High cost electricity generation. • Low adoption of energy efficiency technology. • Unreliable power supply • High dependence on wood fuel • Weak enforcement of planning and building regulations • Inadequate spatial plans for regions and MMDAs • Inadequate human and institutional capacity for land use planning • Scattered and unplanned human settlements
Governance, Corruption and Public Accountability	<ul style="list-style-type: none"> • Ineffective M&E and implementation of development policies and plans • Weak research capacity of MDAs and MMDAs • Inadequate financial resources

2.3.Prioritization of Development Issues

Due to the limited resources available to the sector for the operationalization of its programmes, it is necessary for Ministry and Agencies/Authorities to prioritise development issues, so as to make efficient use of scarce resources. To help do this, the Ministry adopted the Potentials (Strength), Opportunities, Constraints (Weakness) and Challenges (Threats) (POCC), Impact and Sustainability Analysis to help make the analysis as objective and evidence-based as possible.

2.3.1. Potentials (Strength), Opportunities, Constraints (Weakness) and Challenges (Threats) (POCC) Analysis

This analysis will facilitate in identifying issues with potentials and opportunities to be addressed as priorities while considering other measures to address those with constraints and challenges. Summary of the POCC is presented in Table 2.3 below.

Table 2.3: Application of POCC

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
1. Limited application of Science and technology	<ul style="list-style-type: none"> • There is existence of strong technological base • Available expertise in nuclear science and technology as applied to agriculture, industry and health. • There is existence of Functioning Biosafety Law 	<ul style="list-style-type: none"> • Collaboration with MDAs, MMDAs and tertiary institutions • MOFA to facilitate Research Extension Liaison Committees (RELCs) activities 	<ul style="list-style-type: none"> • Inadequate funding of the RELCs activities • Inadequate financial resources to scale-up research 	<ul style="list-style-type: none"> • Inadequate human resource to facilitate extension delivery using the RELCs • Lack of understanding of the potential and benefits of nuclear technology. • Existence of anti-GM groups and huge information gap • Inadequate funding from government
Conclusion: With the Modernizing Agriculture in Ghana (MAG) programme in place and MOFA poised for action in terms of facilitation and AEAs available at the MMDAs level this issue could be addressed. With the availability of funds, nuclear technologies could be scaled up and disseminated to industries for application. Intensive public awareness programs must be organized to correct public misconception on GMO issues				
2. Low transfer and uptake of research findings	<ul style="list-style-type: none"> • Availability of research findings in most sectors for stakeholders • Availability of technologies for transfer in most sectors and stakeholders such as (Gamma Irradiation Facility for management of postharvest losses, Cottage scale protein bait production facility, A modified small to medium scale composting facility has been developed and tested at GAEC ready for deployment in various parts of the country, Welding and Non-Destructive Test training) 	<ul style="list-style-type: none"> • Easy to adopt viable research findings by farmers and other end users • Collaborations with exporters of perishable foodstuffs and farmers. • Collaboration with National Buffer Stock Company Limited. • Collaborations with professional welders in the country • Collaboration with the MDAs and MMDAs 	Weak awareness creation structures of the research findings due to inadequate funding	<ul style="list-style-type: none"> • 'Wait and see' attitude by some stakeholders (late adopters). • Lack of understanding of the potential and benefits of nuclear technology
Conclusion: Strengthening and up-scaling of the awareness creation process of technology transfer and uptake will encourage late adopters of research findings to try the use of these findings as 'seeing is believing'. The issue can be addressed by the adoption of nuclear technologies which can result in the increased use of scientific research in Ghana.				
3. Environmental Degradation	Existence of developed land, forestry and water management technologies by the CSIR	High demand for land, forestry and water management technologies for environmental management	Inadequate funding to integrate sustainable land and water management (SLWM)	Weak RELCs activities

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
			practices into agriculture extension system.	
Conclusion: Funds from the MAG programme and other development partners' support will enable the implementation of various environmental management practices and methodologies				
4. Upsurge in Illegal Mining (Galamsey)				
5. Weak enforcement of environmental and mining laws and regulations	<ul style="list-style-type: none"> Regulatory framework [NRA Act 895] Qualified staff Availability of Radiation monitoring equipment 	<ul style="list-style-type: none"> Stakeholder engagements [GRA,GCAA,GAEC,NCA,UG, EPA] Support from central government and International partners Existence of licensed facilities Media/public relations 	<ul style="list-style-type: none"> Inadequate qualified staff Inadequate logistics such as radiation monitoring equipment and vehicles insufficient funds for regulatory activities Inadequate office space Lack of regulatory guides 	<ul style="list-style-type: none"> Insufficient governmental support in terms of funds and logistics Inadequate donor support
Conclusion: Existing potentials and identified opportunities can partly address issues. Constraints can be address through increased governmental commitments and recruitment of additional staff; Challenges can be managed through timely release of governmental allocations and increase in international partnerships.				
6. Weak Natural Resource Management Systems				
7. Weak regulatory enforcement	<ul style="list-style-type: none"> Regulatory framework [NRA Act 895] Qualified Staff Regulatory Guides logistics such as inspection equipment and vehicles 	<ul style="list-style-type: none"> Support from central government and international partners Stakeholder engagements [GRA,GCAA,GAEC,NCA,UG, EPA, GPS] Media/public relations 	<ul style="list-style-type: none"> Inadequate qualified staff Insufficient funds for regulatory activities Lack of regulatory guides Inadequate office space 	<ul style="list-style-type: none"> Insufficient governmental support in terms of funds and logistics Inadequate donor support
Conclusion: Existing potentials and identified opportunities can partly address issues. Constraints can be address through increased governmental commitments and recruitment of additional staff. Challenges can be managed through timely release of governmental allocations and international partnerships.				
8. Improper disposal of solid and liquid waste	<ul style="list-style-type: none"> Act 490 and LI 1652 available Highly skilled staff Availability of some trained prosecutors 	<ul style="list-style-type: none"> Collaboration with donors ,MDAs, MMDAs, NGOs and religious bodies Availability of training institutions 	<ul style="list-style-type: none"> Inadequate logistics and inadequate legal and waste management personnel 	<ul style="list-style-type: none"> Weak collaboration between stakeholders Weak compliance regime Weak planning regime
Conclusion: This issue can be addressed by ensuring that MMDAs comply with effective waste management practices.				
9. Destructive impact of plastic waste on Terrestrial, aquatic and marine ecosystems	<ul style="list-style-type: none"> Highly skilled staff available Availability of draft standards on the use of bioodegradable additives in flexible plastics 	Collaboration with key stakeholders like GSA, CSIR and CSOs	<ul style="list-style-type: none"> Inadequate logistics inadequate legal and waste management personnel 	<ul style="list-style-type: none"> Weak compliance regime Weak collaboration among stakeholders
Conclusion: This issue can be addressed by the finalization and implementation of standards on the use of bioodegradable additives in the production of flexible plastics				

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
10. Air and noise pollution, especially in urban areas	Act 490, Act 917 and LI 2250 available Availability of some skilled staff and monitoring equipment	Collaboration with donors ,MDAs, MMDAs, NGOs, US EPA and religious bodies	Inadequate number of skilled staff Inadequate logistics	Low level of support from MMDAs Low level of awareness, collaboration and support from the security agencies and the Judiciary
Conclusion: This can be addressed by collaborating with MMDAs in prosecuting individuals who flout noise standards. Air pollution issues would be addressed by collaborating with US EPA in the implementation of the Mega City air quality project.				
11. Improper management of E-waste	<ul style="list-style-type: none"> • Availability of Act 917 and LI 2250 • Highly skilled staff • A strategy for a medium scale e-waste management developed and a prototype facility being constructed at GAEC. 	<ul style="list-style-type: none"> • Collaboration with donors ,MDAs, MMDAs, NGOs ,religious bodies and relevant stakeholders • Build capacity in the area of e-waste management. • Implement projects in e-waste management • Create awareness on e-waste laws. • Provide consultancy services to e-waste management companies and MMDAs to better manage e-waste in the country and create safe jobs. 	Inadequate awareness creation due to lack of resources including funding.	<ul style="list-style-type: none"> • Low level of awareness, collaboration and support from the security agencies and the judiciary • Lack of functional strategic plan to manage e-waste by all stakeholders
Conclusion: This issue can be addressed to solve the current e-waste menace in the country by full implementation of Act 917 and LI 2250. The establishment of medium scale e-waste management plants across the country would improve the management of e-waste and create jobs.				
12. Emissions from poorly maintained vehicles	<ul style="list-style-type: none"> • Act 490 and LI 1652 available • Availability of some skilled staff 	Collaboration with DVLA, GSA, Police and other stakeholders Collaboration with international community	<ul style="list-style-type: none"> • Lack of emission testing Standards • Inadequate logistics • Inadequate skilled personnel 	<ul style="list-style-type: none"> • Low level of collaboration from MMDAs • Low level of awareness, collaboration and support from the security agencies and the judiciary
Conclusion: EPA will address this by finalizing emissions testing standards for implementation by DVLA				
13. Vulnerability to climate change	<ul style="list-style-type: none"> • National Climate Policy and Master Plan, Ghana's NDCs, GH-NDC Implementation Plan • Baseline and Vulnerability Assessment conducted in 2017 • Situational analysis of issues in Climate Change in the 3 northern regions 	<ul style="list-style-type: none"> • Ongoing projects within the various sectors e.g. Rooftop solar programme • DP funds • Donor funding from the Adaptation Fund, World Bank • Technical and quality Assurance support being provided by the UNDP 	<ul style="list-style-type: none"> • Inadequate funding to transfer technologies for wider area coverage • Inadequate logistics • Delayed release of funding from the donor 	<ul style="list-style-type: none"> • Rising sea levels • Political will to push through important issues • Institutional bureaucracy • Weak RELCs activities

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
	<ul style="list-style-type: none"> Availability of technologies to address negative effects/impacts of climate change 	<ul style="list-style-type: none"> Project ownership by MESTI enhances smooth project delivery. High demand for the technologies to address climate change effects 		
Conclusion: Combating/adaptation of climate change effects is of paramount concern to many stakeholders like the Ghana Government, Development Partners and Civil Society organizations and therefore, internal resources as well as government and donor support will make it possible for activity implementation to address the issue				
14. Inadequate institutional capacity to access global funds	<ul style="list-style-type: none"> Act 490 and LI 1652 available Availability of some skilled staff 	<ul style="list-style-type: none"> Collaboration with international community to address capacity gaps Ratification of Paris Agreement on climate change Availability of the Green Climate Fund Availability of the Global Environment Facility (GEF) 	<ul style="list-style-type: none"> Inadequate number of climate change experts Inadequate logistics 	Weak collaboration among stakeholders
Conclusion: The Agency will address this by developing existing capacity through collaboration with international organizations.				
15. Low institutional/economic capacity to adapt to climate change and undertake mitigation actions	<ul style="list-style-type: none"> Act 490 and LI 1652 available National Climate Policy and Master Plan, Ghana's NDCs, GH-NDC Implementation Plan Climate Change and Green Economy Learning Strategy MMDAs are being trained on climate change and how to mainstream into the MTDPs 	<ul style="list-style-type: none"> Ongoing projects within the various sectors e.g. Rooftop solar programme DP funds UN:CC Learn Online Training on Climate Change and Green Economy 	<ul style="list-style-type: none"> Inadequate logistics Institutional bureaucracy Political will to push through important issues 	Political will to push through important issues
Conclusion: The Agency will address this by enhancing capacity gaps.				
16. Loss of trees and vegetation cover	<ul style="list-style-type: none"> Existence of the Final Draft National Biodiversity Policy Institutional memory Existence of the National Biodiversity Strategy and Action Plan (NBSAP) Availability of technologies to raise fast 	<ul style="list-style-type: none"> FC's reforestation programme Government's commitment and political will to protect the environment Teeming unemployed youth Commitment of DP to biodiversity conservation 	<ul style="list-style-type: none"> Inadequate funding to raise enough seedlings to meet demand Inadequate logistics 	<ul style="list-style-type: none"> Weak institutional/stakeholder collaboration Weak inter-sectoral collaboration Inadequate resources to replant our forests Weak enforcement of legislations to conserve biodiversity resources

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
	growing tree seedlings and supply to farmers to re-vegetate their fields	<ul style="list-style-type: none"> Availability of fast growing indigenous and exotic tree species in the country 		<ul style="list-style-type: none"> Human activity in protected areas.
Conclusion: The positives outweigh the negatives. This issue can be easily resolved by an upscale of the forest reforestation programme, greening our cities, upscale of SLWMP, enhance inter-sectoral collaboration between MDAs/ Development of coordinated response to preserve and conserve biodiversity resources through linkages between academia, industry and government. The fulfilment of responsibility by the Government by providing funding and with support from Development partners the issue of tree and vegetation loss will be addressed				
17. Inadequate capacity environmental impacts of oil and gas industry	<ul style="list-style-type: none"> Available capacity to provide isotope data as well as a large volume of data within a short time using nuclear analytical techniques. Available capacity to ascertain the integrity of welds and determine potential failure sites in reservoirs and pipelines using gamma radiography and other non-destructive techniques (NDT) 	<ul style="list-style-type: none"> Collaborate with EPA and other relevant state agencies to help develop knowledge management system for a baseline database. Collaborate with IAEA, EPA and other relevant state agencies to train and certify qualified personnel in welding and NDT as well as environmental management 	Inadequate logistics and limited number of staff employed in this sector	Inadequate funding from government
Conclusion: GAEC is willing to collaborate with EPA and other stakeholders to undertake the environmental impact assessment in the oil and gas industry.				
18. Inefficient energy use	Available capacity to facilitate the training of technicians and engineers to improve electricity grid efficiency	Collaboration with GRIDCo and IAEA for smooth deployment of the Nuclear Power in Ghana	Limited facilities for local training	Inadequate local component of funding for training in Europe and Asia from government
Conclusion: Collaboration with GRIDCo and IAEA will help create awareness on efficient energy use				
19. Limited utilization of research outputs	Availability of research findings and outputs in most sectors to improve well-being of the population	<ul style="list-style-type: none"> Easy adoptability of research findings by end users easy. Collaboration with MMDAs and the industrial sector 	Inadequate funding for a consistent public awareness drive and investor support	<ul style="list-style-type: none"> 'Wait and see' attitude by some stakeholders (late adopters). Inadequate public acceptability as well as resources for technology transfer
Conclusion: Strengthening /intensifying the awareness creation structures/process will encourage the late adopters to make use of research findings. Availability of funds will also help resolve this issue.				
20. Limited collaboration between public research institutions and businesses on product, service and process innovation	<ul style="list-style-type: none"> Establishment of Ghana Innovation and Research Commercialization (GIRC) Centre CSIR as an institution is mandated by law to 	<ul style="list-style-type: none"> Partnerships with Academia, Private Sector and businesses Availability of recognized scientists of international repute for collaborate with the CSIR and business entities 	Inadequate human and financial resources to promote collaboration	<ul style="list-style-type: none"> Reluctance by other research institutes that are used to working in silos Misconceptions about Nuclear Technology

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
	<ul style="list-style-type: none"> coordinate all research in Ghana with high level of competent scientists to collaborate other institutions and businesses Several nuclear and allied technologies have been developed at GAEC Technology Transfer Centres (TTC) established in 5 R&D institutions 	<ul style="list-style-type: none"> Collaboration with other Ministries Departments Agencies (e.g. Health, Sanitation and Water Resources, Energy 		
Conclusion: Availability of financial and human resources will improve collaboration with research institutes and business. Consultations/engagements with public research institutions and businesses will open the doors for mutual collaboration on product, service and process innovation				
21. Low utilization of waste as an energy resource	Available technology to use municipal waste for biogas production	Abundance of municipal waste in urban areas	Inadequate funding to scale up use of technology in communities	Slow pace of awareness creation to major stakeholders such as MMDAs
Conclusion: Proactive engagement of the MMDAs will increase the utilization of waste as energy resource thereby providing clean and cheaper energy to house-holds, offices, etc.				
22. High cost electricity generation.	Availability of local experts to facilitate the introduction of nuclear power which will reduce the cost of electricity.	<ul style="list-style-type: none"> IAEA and other vendors willing to help complete the Nuclear Power Project. Collaboration with Ministry of Energy. 	Inadequate financial resources to implement the project.	<ul style="list-style-type: none"> High cost of initial capital Limited local content. Key decision makers have not been adequately informed
Conclusion: The introduction of Nuclear Power will significantly reduce the cost of electricity generation in Ghana				
23. Low adoption of energy efficiency technology.	<ul style="list-style-type: none"> Nuclear power project when operationalized will provide efficient energy. 	Stakeholders engagement in nuclear power program implementation	Inadequate promotion strategies	Inadequate funding to promote nuclear power program from government
Conclusion: With adequate funding, nuclear power can provide energy efficient technology				
24. Unreliable power supply	Introduction of Nuclear Power to provide reliable power supply.	<ul style="list-style-type: none"> Collaborate with power distributors to supply reliable power. Support from international donors like the IAEA. Foreign Direct Investments (FDI) and Capital formation with Nuclear power. 	Inadequate Funding to promote nuclear power program.	Negative perception about nuclear power.
Conclusion: Reliable power supply will create sustainable jobs in collaboration with the Association of Ghana Industries				
25. High dependence on wood fuel	Introduction of Nuclear Power can help reduce carbon dioxide emissions through the	Collaboration with IAEA and MMDAs to train and educate the public on the negative environmental impact on dependence on wood fuel	Inadequate funding to promote nuclear power programme	Negative perception about nuclear energy

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
Conclusion: The introduction of nuclear power will provide a cheaper alternative energy that will reduce the dependence on wood fuel				
26. Weak enforcement of planning and building regulations	<ul style="list-style-type: none"> New Land Use and Spatial Planning Act gives more powers to MMDAs and LUSPA Available SDFs, structure and local plans in some regions and MMDAs Available zoning regulations and planning standards Existing building regulations (LI 1630) 	<ul style="list-style-type: none"> Availability of Land Use and Spatial Planning Act 925. Draft Land Use and Spatial Planning Regulation (2018) Draft building code (2018) 	<ul style="list-style-type: none"> Non-existence of SDFs, structure and local plans in most MMDAs. Delay in the building and development permitting acquisition process Inadequate number of physical planners and allied built environment professionals to enforce regulations Inadequate funds and capacity for the preparation of SDFs, structure plans and local plans Low planning education and participation in planning process 	<ul style="list-style-type: none"> Weak enforcement capacity of MMDAs Poor citizen/community participation in enforcement of planning and building regulations
Conclusion: Conclusion: This challenge can be tackled if government recruits more spatial planners and releases fund for the preparation of SDFs, structure and local plans. This will help with enforcement of the planning regulations crucial for successful management of human settlements				
27. Inadequate spatial plans for regions and MMDAs	<ul style="list-style-type: none"> Available expertise of LUSPA to assist with preparation of SDFs, Structure and Local Plans Available National, sub-national and some regional SDFs to guide preparation of District SDFs, structure and local plans 	<ul style="list-style-type: none"> Availability of consultants to aid MMDAs with the preparation of SDFs, structure and local plans Available technical expertise of Development Partners like WB, UN Habitat etc., to assist with preparation of SDFs, Structure and Local Plans 	Inadequate financial resources to procure services of consultants by MMDAs and other RCCs	Inadequate government funding for preparation of SDFs, Structure and local plans
Conclusion: It is an action to be taken by all MMDAs and RCCs and forms the basis upon which effective land use management can be undertaking. Government must commit resources for this exercise.				
28. Inadequate human and institutional capacity for land use planning	<ul style="list-style-type: none"> Availability of skilled staff Availability of LUPMIS 	<ul style="list-style-type: none"> Availability of unemployed trained spatial planners. Commitment of Development partners and other NGOs to fund the preparation of spatial plans Availability of training institutions 	<ul style="list-style-type: none"> Unavailability of continuous professional development programme in LUSPA. Inadequate funds to employ more spatial planners 	Government ceiling on recruiting into the Civil/Public Service.

Issue To Be Addressed	Potentials (From Baseline Situation, Etc.)	Opportunities	Constraints	Challenges
Conclusion: The inadequate human and institutional capacity for land use is the main reason why human settlement planning and management seems not to be functional, if solved over 70% of planning challenges would be solved.				
29. Scattered and Unplanned human settlements	<ul style="list-style-type: none"> • Availability of NSDF, RSDFs, sub-national, sub-regional SDFs, structure and local plans • Availability of NSDF, RSDFs, sub-national, sub-regional SDFs, structure and local plans • Availability of Human Settlement Study 	<ul style="list-style-type: none"> • SDFs and structure plans available to guide settlement development • Availability of consultants and LUSPA staff to assist with the preparation of SDFs, structure and local plans • Commitment of Development Partners to provide funds for the preparation of SDFs, structure and local plans • SDFs and structure plans available to guide settlement development 	<ul style="list-style-type: none"> • Inadequate funds to prepare spatial plans • Low level of participatory planning • Inadequate number of SDFs, structure plans and local plans 	<ul style="list-style-type: none"> • Uncontrolled rate of housing development • Encroachment on growth boundaries • Limited capacity of MMDAs to implement plans • Inadequate funding for preparation of human settlement policy • Poor appreciation of the impact of spatial plans •
Conclusion: This challenge can be solved if spatial planners are recruited to strengthen the institutional capacity of the Authority and funds are provided for the preparation of spatial plans.				
30. Ineffective M&E and implementation of development policies and plans	<ul style="list-style-type: none"> • Availability of policies/ plans 	<ul style="list-style-type: none"> • Availability of expertise from Development Partners 	<ul style="list-style-type: none"> • Inadequate logistics • Inadequate/ late release of funds • Inadequate staff for M&E 	<ul style="list-style-type: none"> • High staff turnover
Conclusion: Availability of funds for implementation and M&E will help address this issue				
31. Weak research capacity of MDAs and MMDAs	<ul style="list-style-type: none"> • Existing Research and statistics Information Management Department 	<ul style="list-style-type: none"> • Available technology for research and information management 	<ul style="list-style-type: none"> • Inadequate logistics • Inadequate/ late release of funds • Inadequate staff capacity 	<ul style="list-style-type: none"> • Weak appreciation of research and statistics information management
Conclusion: Availability of funds and capacity building will help address this issue				
32. Inadequate financial resources	<ul style="list-style-type: none"> • Availability of some funds from GoG and IGF 	<ul style="list-style-type: none"> • Funds from Development Partners 	<ul style="list-style-type: none"> • Late release of GoG funds • Weak capacity to access global funds 	<ul style="list-style-type: none"> • Limited allocation from Government Budget
Conclusion: Capacity building will help increase access to global funds				

2.3.2. Impact Analysis of Issues

To ensure further prioritization of the adopted issues, the issues considered priority from the POCC analysis were subject to the test of its significant linkage effect on meeting basic human needs/rights, significant multiplier effect on economic efficiency, impact on – the different population groups; balanced development; natural resource utilisation; cultural acceptability; resilience and disaster risk reduction; climate change mitigation and adaptation; and institutional reforms and issues that promote opportunities for the promotion

of cross-cutting issues such as HIV and AIDS, gender equality, and nutrition. The impact analysis revealed limited application of science and technology and loss of trees and vegetation cover as first ranked, Upsurge in Illegal Mining (Galamsey) and Inadequate capacity to manage environmental impacts of Oil and Gas Industry as second ranked and others ranked from third to seventh as in table 2.4.

Table 2.4: Impact Analysis of Issues

ISSUES	CRITERIA				Total score	Rank
	Significant linkage effect on meeting basic human needs/rights	Significant multiplier effect on economic efficiency	Impact on: a. The different population groups (e.g. girls, aged, disabled) b. Balanced development; c. Natural resource utilization; d. Cultural acceptability; e. Resilience and disaster risk reduction; f. Climate change mitigation and adaptation; g. Institutional reforms.	Opportunities for the promotion of cross-cutting issues such as HIV and AIDS Gender equality Nutrition.		
Low transfer and uptake of research findings	1	3	2	1	7	3 rd
Limited application of science and technology	1	3	3	2	9	1 st
Environmental degradation	1	2	3	1	7	3 rd
Upsurge in Illegal Mining (Galamsey)	2	3	2	1	8	2 nd
Weak enforcement of environmental and mining laws and regulations	2	2	1	1	6	4 th
Weak Natural Resource Management Systems	1	2	2	1	6	4 th
Improper disposal of solid and liquid waste	1	2	1	1	5	5 th

ISSUES	CRITERIA				Total score	Rank
	Significant linkage effect on meeting basic human needs/rights	Significant multiplier effect on economic efficiency	Impact on: a. The different population groups (e.g. girls, aged, disabled) b. Balanced development; c. Natural resource utilization; d. Cultural acceptability; e. Resilience and disaster risk reduction; f. Climate change mitigation and adaptation; g. Institutional reforms.	Opportunities for the promotion of cross-cutting issues such as HIV and AIDS Gender equality Nutrition.		
Destructive Impact of Plastic Waste on Terrestrial, aquatic and marine ecosystems	0	1	1	1	3	7 th
Air and Noise Pollution, especially in urban areas	3	1	1	1	6	4 th
Improper management of E-waste	1	1	3	1	6	4 th
Emissions from poorly maintained vehicles	2	1	3	1	7	3 rd
Vulnerability to climate change	2	2	2	1	7	3 rd
Low institutional/economic capacity to adapt to climate change and undertake mitigation actions	1	2	3	1	7	3 rd
Loss of trees and vegetation cover	2	2	3	2	9	1 st
Inadequate capacity to manage environmental	2	3	2	1	8	2 nd

ISSUES	CRITERIA				Total score	Rank
	Significant linkage effect on meeting basic human needs/rights	Significant multiplier effect on economic efficiency	Impact on: a. The different population groups (e.g. girls, aged, disabled) b. Balanced development; c. Natural resource utilization; d. Cultural acceptability; e. Resilience and disaster risk reduction; f. Climate change mitigation and adaptation; g. Institutional reforms.	Opportunities for the promotion of cross-cutting issues such as HIV and AIDS Gender equality Nutrition.		
impacts of Oil and Gas Industry						
Limited collaboration between public research institutions and businesses on product, service and process innovation	0	3	1	1	5	5 th
High cost electricity generation	1	3	2	2	8	2 nd
Unreliable power supply	1	3	2	1	7	3 rd
Weak enforcement of planning and building regulations	2	2	1	1	6	4 th
Inadequate spatial plans for regions and MMDAs	0	2	1	1	4	6 th
Ineffective M&E and implementation of development policies and plans	0	2	1	1	4	6 th
Weak research capacity of MDAs and MMDAs	0	3	1	1	5	5 th

ISSUES	CRITERIA				Total score	Rank
	Significant linkage effect on meeting basic human needs/rights	Significant multiplier effect on economic efficiency	Impact on: a. The different population groups (e.g. girls, aged, disabled) b. Balanced development; c. Natural resource utilization; d. Cultural acceptability; e. Resilience and disaster risk reduction; f. Climate change mitigation and adaptation; g. Institutional reforms.	Opportunities for the promotion of cross-cutting issues such as HIV and AIDS Gender equality Nutrition.		
Inadequate financial resources	1	3	2	2	8	2 nd

2.3.3. Sustainability Analysis of Issues

The Ministry as part of the process of prioritizing the adopted issues, subjected the issues with positive impacts to sustainability analysis. The focus was to determine the internal consistency and compatibility of the issues especially on how the issues support each other to achieve the objectives outlined in the SMTDP. Annex 1 represents the internal consistency of prioritized issues adopted by MESTI in its SMTDP.

Table 2.6: Sustainable prioritised issues as categorised under Development Dimensions

Development Dimension	Focus Areas of SMTDP 2018 - 2021	Adopted Sustainable Prioritized Issues
Economic Development	Agriculture and Rural Development	<ul style="list-style-type: none"> • Low transfer and uptake of research findings • Limited application of science and technology
Environment, Infrastructure And Human Settlements	Mineral Extraction	<ul style="list-style-type: none"> • Environmental degradation • Upsurge in Illegal Mining (Galamsey) • Weak enforcement of environmental and mining laws and regulations • Weak Natural Resource Management Systems
	Environmental Pollution	<ul style="list-style-type: none"> • Improper disposal of solid and liquid waste • Destructive Impact of Plastic Waste on Terrestrial, aquatic and marine ecosystems • Air and Noise Pollution, especially in urban areas

Development Dimension	Focus Areas of SMTDP 2018 - 2021	Adopted Sustainable Prioritized Issues
		<ul style="list-style-type: none"> • Improper management of E-waste • Emissions from poorly maintained vehicles
	Climate variability and change	<ul style="list-style-type: none"> • Vulnerability to climate change • Inadequate Institutional capacity to access global funds • Low institutional/economic capacity to adapt to climate change and undertake mitigation actions • Inadequate inclusion of gender and vulnerability issues in climate change actions
	Climate variability and change	<ul style="list-style-type: none"> • Loss of trees and vegetation cover • Inefficient energy use
	Science, Technology and Innovation	<ul style="list-style-type: none"> • Limited collaboration between public research institutions and businesses on product, service and process innovation
	Energy and Petroleum	<ul style="list-style-type: none"> • High cost electricity generation. • Unreliable power supply • Weak regulatory enforcement
	Energy and Petroleum	<ul style="list-style-type: none"> • Inadequate capacity to manage environmental impacts
	Human settlements and Housing	<ul style="list-style-type: none"> • Weak enforcement of planning and building regulations • Inadequate spatial plans for regions and MMDAs
Governance, Corruption And Public Accountability	Public Policy Management	<ul style="list-style-type: none"> • Ineffective M&E and implementation of development policies and plans • Weak research capacity of MDAs and MMDAs • Inadequate financial resources

CHAPTER THREE

DEVELOPMENT PROJECTIONS, GOALS, ADOPTED OBJECTIVES AND STRATEGIES

3.1. Introduction

Chapter three provides a view of the projected developments in the sector within the medium-term (2018-2021) as well as the adopted goals, objectives and strategies to be implemented by the Ministry in the rolling out of its programmes, projects and activities.

3.2. Projected Development Requirements

The Ministry of Environment, Science, Technology and Innovation by its nature, appears to be a crosscutting ministry and its development outcomes holds high prospects for the entire development of the nation. Over the Medium Term, the following programme areas are projected to significantly contribute to the transformation of the economy;

a) Research and Development:

The aim of this programme is to promote and develop Science, Technology and Innovation in all sectors of the economy for socio-economic development. This programme involves the promotion of nuclear technology, scientific and industrial research.

In the medium term, the sector expects to have a very strong partnership with the private sector for Research & Development Services and the general commercialisation of research in scientific and industrial development. A draft national STI policy would be passed to serve as a catalyst for advancement of this sector.

More technology transfers are expected to inspire and promote the use of technology in MDAs, MMDAs as well as the private sector for effective and efficient management of government and private sector businesses. For instance scientific research and technology makes it possible to drill oil in deep seas that hitherto was hard to reach.

Local technology developments would be inspired by Technology transfer and learning through formal institution and the ICT/ Social media platforms.

Sites for nuclear energy would have been acquired by the end of the medium term and feasibility studies and designs completed to usher in the initiation of the nuclear project.

b) Environmental Protection and Management:

This programme aims at protecting and improving the environment in Ghana by ensuring that air, land and water are protected by everyone in today's society and to ensure the protection of humans and the environment from the harmful effects of radiation.

The programme also seeks to ensure better use of ecosystem services and natural resources, for purposes of poverty reduction and sustainable development; and to enhance the application of Act 490 and its regulations, to reduce environmental impacts, control environmental degradation and enhance restoration of degraded resources.

The medium term would experience a radical shift in enforcements as a matter of national commitment to the implementation of the NDCs and SDGs.

The recent level of Galamsey related pollution of water bodies has been a wakeup call for the citizenry as reflected in the unanimous call for government action. The resulting programmes and social costs would inform better management of the environment.

The government initiatives for renewable energy and a 10% target of renewables in the energy mix would reduce level of emissions by the energy sector.

Afforestation projects initiated for reclamation and increasing forest stocks by relevant MDAs would further decrease emission levels.

There is however, a government resource for infrastructure project agreement with the Chinese government that would lead to some significant forest loss due to bauxite mining.

It is expected that, the necessary environmental assessment and management plan would be put in place to mitigate the loss of forest cover.

c) *Human Settlements and Spatial Planning:*

To promote efficient and effective planning and management of human settlements and ensure compliance with guidelines, standards and regulations to support socio-economic development. This programme relates to promoting orderly development of human settlements through preparation and management of the requisite spatial plans and backed by adequate research and capacity building.

The new Land Use and Spatial Planning Act (Act 925) 2016 and LUSPA are expected to bring a transformation in the planning system especially by the District Planning Authorities. The medium term would therefore experience a shift in the traditional ways of planning to a modern technologically inclined system of planning. This would be guided by the approved National Spatial Development Framework and resourced by the development fund established under section 21 of Act 925.

The Spatial Planning law and related guidelines and manuals have dealt adequately with environmental considerations in planning and thus expected to resolve or minimise the inconsistencies between planning and environmental permitting decisions.

d) Biotechnology Development:

The Biotechnology Development programme aims at ensuring an adequate level of protection in the field of safe development transfer, handling and use of genetically modified organisms resulting from biotechnology that may have an adverse effect on health and the environment.

The advancement of Biotechnology in developed countries and research on the best use of biotechnology would penetrate developing countries and enlighten more people about its benefits. This would bring about the proliferation of biotechnology transfers and initiation in the country.

The ministry through its agencies and other MDAs is preparing towards a safe development of this sector and the medium term would experience government policy and regulations in this direction.

3.3. Adopted Development Issues, Development Dimension Goals, Policy Objectives and Strategies from Agenda for Jobs

The adopted goals, policy objectives and strategies MESTI from the Agenda for Jobs (2018-2021) to help MESTI achieve its goals and national goals respectively in relation to the appropriate theme of the Agenda for Jobs (2018-2021) is presented in *table 3.1*.

Table 3.1: Adopted Goals, Development Dimension, Issues, Policy Objectives and Strategies

DEVELOPMENT DIMENSIONS: ECONOMIC DEVELOPMENT

GOAL: BUILD A PROSPEROUS SOCIETY

FOCUS AREA	ISSUES	KEY POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	GLOBAL/ REGIONAL LINKAGES
Goal: Build a Prosperous Society					
Development Dimensions: Economic Development					
AGRICULTURE AND RURAL DEVELOPMENT	<ul style="list-style-type: none"> • Low transfer and uptake of research findings • Limited application of science and technology 	Enhance the application of science, technology and innovation	<ul style="list-style-type: none"> • Improve the effectiveness of Research-Extension-Farmer Liaison Committees (RELCs) and integrate the concept in the agriculture research system to increase participation of end users in technology development (SDG Target 2.a) • Strengthen research programmes of the Council for Scientific and Industrial Research (CSIR), as well as of the agricultural and related sciences departments of public universities and other institutions (SDG Target 2.a) 	MESTI, CSIR, GAEC, MoFA,	SDG AU 1, 3, 4, 5,20
Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment					
Development Dimensions: Environment, Infrastructure And Human Settlements					
Mineral Extraction	<ul style="list-style-type: none"> • Environmental degradation • Upsurge in Illegal Mining (Galamsey) • Weak enforcement of environmental and mining laws and regulations <p>Weak Natural Resource Management Systems</p>	Ensure sustainable extraction Mineral Resources	Ensure mining and logging activities are undertaken in an environmentally sustainable manner (SDG Target 6.5, 8.4, 12.2, 12.8, 14.2, 15.1, 15.2, 15.3, 15.4, 15.5)	MESTI, EPA, MLNR, MC	SDG 6, 8, 12, 14, 15 AU 4, 7,12
Environmental Pollution	<ul style="list-style-type: none"> • Improper disposal of solid and liquid waste • Destructive Impact of Plastic Waste on Terrestrial, aquatic 	Reduce Environmental Pollution	<ul style="list-style-type: none"> ▪ Promote science and technology in waste recycling and waste-to-energy technologies (SDG Target 12.5) ▪ Promote the use of environmentally friendly methods and products (SDG Target 9.4, 12.4, 17.7) 	MESTI, EPA, MLGRD, MoWRS	SDG 3, 6, 7, 9, 11, 12, 14, 16, 17 AU 1, 7, 11,12

FOCUS AREA	ISSUES	KEY POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	GLOBAL/ REGIONAL LINKAGES
	<ul style="list-style-type: none"> and marine ecosystems Air and Noise Pollution, especially in urban areas Improper management of E-waste Emissions from poorly maintained vehicles 		<ul style="list-style-type: none"> Intensify enforcement of regulations on noise and air pollution, including open burning (SDG Target 11.6, 16.b) Enforce environmentally sound management of chemicals and all waste throughout their life cycle (SDG Target 12.4) Protect sensitive areas from pollution and contamination, especially groundwater sources and intake of public water supplies (SDG Target 6.3, 6.6) Ensure companies, especially large and transnational companies, conform to sustainable practices (SDG Target 12.6) <p>Enforce Hazardous and Electronic Waste Control and Management Act 2016, (Act 917) (SDG Target 3.9, 6.3, 16.b)</p>		
Climate variability and change	<ul style="list-style-type: none"> Vulnerability to climate change Inadequate Institutional capacity to access global funds Low institutional/economic capacity to adapt to climate change and undertake mitigation actions Inadequate inclusion of gender and vulnerability issues in climate change actions 	Enhance Climate Change Resilience	<ul style="list-style-type: none"> Implement Ghana's commitments under Paris Climate Agreement (COP21) (SDG Target 13.a) Mainstream climate change in national development planning and budgeting processes (SDG Target 11.b, 13.2) Collaborate with international partners to have more access to the Green Climate Fund (\$30 billion Global Fund) for climate change purposes (SDG Target 13.a) <p>Develop coordinated response to climate change challenges through linkages between research, industry and government (SDG Target 13.2)</p>	MESTI, EPA, CSIR, MoFA, MoFAD, MoGSP, MLGRD, MMDAs	SDG 1, 2, 9, 11, 13, 16 AU 3, 5, 7, 10, 12, 17
Climate variability and change	<ul style="list-style-type: none"> Loss of trees and vegetation cover Inefficient energy use 	Reduce greenhouse gases	<ul style="list-style-type: none"> Accelerate programmes to significantly reduce environmental risks and ecological scarcity, focusing on energy, agriculture, forestry and waste sectors (SDG Target 3.d) <p>Update and facilitate implementation of the National Low Carbon Growth (LCG) strategy (SDG Target 13.1, 13.2)</p>	MESTI, EPA, MLNR, FC, CSIR, MLGRD, MMDAs	SDG 3, 11, 13, 15, 16 AU 7,12

FOCUS AREA	ISSUES	KEY POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	GLOBAL/ REGIONAL LINKAGES
Science, Technology and Innovation	<ul style="list-style-type: none"> Limited utilization of relevant research outputs Limited collaboration between public research institutions and businesses on product, service and process innovation 	Mainstream science, technology and innovation in all socio-economic activities	<ul style="list-style-type: none"> Apply science, technology and innovation in implementation of policies, programmes and projects (SDG Target 17.8) Scale up investments in research and development to find local solution to challenges (SDG Target 17.5) Promote necessary environment for strong partnership with research institutions, academia and industry including the technology commercialization units at MESTI (SDG Target 17.16, 17.17) Promote the establishment foundry-based manufacturing and precision machine tooling, using computer-aided design (CAD) and computer numerical control (CNC) systems to produce basic tools, equipment and parts (SDG Targets 9.4, 9.5, 9.c) Ensure that research output is turned into industrial applications (SDG Target 9.5) Establish technology information centers on all campuses of public research institutions (SDG Targets 9.c, 16.10) 	MESTI, CSIR, GAEC, MoE, GES, NCTE, COTVET	SDG 9, 17 AU 1, 2, 4, 7, 11, 12,17
Energy and Petroleum	<ul style="list-style-type: none"> Inadequate infrastructure to support the delivery of energy services. High cost electricity generation. Low adoption of energy efficiency technology. Unreliable power supply High dependence on wood fuel Low utilization of waste as an energy resource 	Ensure availability of clean, affordable and accessible energy	<ul style="list-style-type: none"> Develop, implement and maintain a safe, secure and sustainable nuclear power programme (SDG Targets 7.3, 7.a) Support research into development of nuclear power (SDG Targets 7.3, 7.a, 7.b) 	MESTI, MoEP, GAEC, NPI, NRA	SDG 7 AU 1, 6, 7, 9, 10, 20
Energy and Petroleum	Inadequate capacity to manage environmental	Minimize potential environmental impacts of oil and gas industry	<ul style="list-style-type: none"> Ensure compliance with applicable laws and international standards for environment, health and safety in the oil and gas sector 	MESTI, EPA, GAEC, MoEP, PC, EC, PURC, VRA, GNPC,	SDG 11, 12, 14 AU 5, 6, 7, 12

FOCUS AREA	ISSUES	KEY POLICY OBJECTIVES	STRATEGIES	IMPLEMENTING AND COLLABORATING AGENCIES	GLOBAL/ REGIONAL LINKAGES
	impacts of Oil and Gas Industry		including the policy on zero gas flaring (SDG Target 11.6,12.4)		
Human settlements and Housing	<ul style="list-style-type: none"> Weak enforcement of planning and building regulations Inadequate spatial plans for regions and MMDAs Inadequate human and institutional capacity for land use planning Scattered and unplanned human settlements 	Promote sustainable, spatially integrated, balanced and orderly development of human settlements	<ul style="list-style-type: none"> Fully implement Land Use and Spatial Planning Act, 2016 (Act 925) (SDG Target 16.6, 17.16) Fully implement National Spatial Development Framework (NSDF) (SDG Targets 16.6, 17.16) Ensure proper urban and landscape design and implementation (SDG Target 11.a) Ensure institutional, technological and legal reforms in support of land use planning (SDG Target 11.b) <p>Strengthen the human and institutional capacities for effective land use planning and management nationwide (SDG Target 16.a)</p>	MESTI, LUSPA, MLGRD, MWH, MLNR, LC	SDG 11, 16, 17 AU 1,10, 12
Goal: Maintain a stable, united and safe society					
Development Dimension: Governance, Corruption and Public Accountability					
Public Policy Management	<ul style="list-style-type: none"> Ineffective M&E and implementation of development policies and plans Weak research capacity of MDAs and MMDAs Inadequate financial resources 	Enhance capacity for policy formulation and coordination	<ul style="list-style-type: none"> Strengthen capacity of research and statistical information management systems of MDAs and MMDAs (SDG Target 17.19) Intensify the use of Strategic Environmental Assessment (SEA) in public policy processes, plans and programmes (SDG Targets 11.6, 16.6) Strengthen the relationship between the national development planning system and budgeting processes (SDG Target 17.14) 	MESTI, CSIR, GAEC, EPA, LUSPA, NRA, NBA, NDPC, MoF	SDG 1, 16, 17, AU 11, 12

CHAPTER FOUR

DEVELOPMENT PROGRAMMES AND SUB-PROGRAMMES

4.1. Introduction

Chapter four provides the programmes, sub-programmes of the Ministry and its linkages to the adopted policy objectives and strategies for the plan period, 2018-2021. The chapter also provides the detailed programme of action and an indicative financial plan outlining the required resources to implement the MTDP.

4.2. Programmes & Sub-Programmes

During the Medium Term (2018–2021), MESTI with its Agencies/Department has five (5) Programmes and fourteen (15) Sub-Programmes to be implemented as indicated in *table 11* below. The programmes to be implemented over the Medium Term are as follows;

e) ***Management and Administration:***

The aim of this programme is to formulate policies and legislations that would facilitate the sustainable development of the country through the application of science, technology and innovation and the adoption of international standards/protocols and conventions that relate to the environment, science, technology and innovation sector of the country.

f) ***Research and Development:***

The aim of this programme is to promote and develop Science, Technology and Innovation in all sectors of the economy for socio-economic development. This programme involves the promotion of nuclear technology, scientific and industrial research.

g) ***Environmental Protection and Management:***

This programme aims at protecting and improving the environment in Ghana by ensuring that air, land and water are protected by everyone in today's society and to ensure the protection of humans and the environment from the harmful effects of radiation.

The programme also seeks to ensure better use of ecosystem services and natural resources, for purposes of poverty reduction and sustainable development; and to enhance the application of Act 490 and its regulations, to reduce environmental impacts, control environmental degradation and enhance restoration of degraded resources.

h) ***Human Settlements and Spatial Planning:***

To promote efficient and effective planning and management of human settlements and ensure compliance with guidelines, standards and regulations to support socio-economic development. This programme relates to promoting orderly development of human settlements through preparation and management of the requisite spatial plans and backed by adequate research and capacity building

i) Biotechnology Development:

The Biotechnology Development programme aims at ensuring an adequate level of protection in the field of safe development transfer, handling and use of genetically modified organisms resulting from biotechnology that may have an adverse effect on health and the environment.

4.3 Prioritisation of Programmes

The formulated programmes have been subjected to prioritisation to ensure they meet the social, economic, environmental and spatial impacts for the plan period. Table 4.1 is a prioritisation matrix for the programmes.

Table 4.2 also shows the link between the Programmes, Sub-programmes and the adopted policy objectives and strategies.

Table 4.1: Prioritisation of Programme Matrix

PROGRAMME	CRITERIA				TOTAL SCORE	AVERAGE SCORE	RANK
	Social Impact (education, health, etc.)	Economic Impact (employment generation, poverty reduction)	Environmental Impact (climate change, green economy etc.)	Spatial Impact (nationwide, selected region)			
<i>Research and Development</i>	2	2	2	3	9	2.25	1 st
<i>Management and Administration</i>	2	1	2	3	8	2	2 nd
<i>Human Settlements and Spatial Planning</i>	1	1	3	3	8	2	2 nd
<i>Environmental Protection and Management</i>	1	3	2	1	7	1.75	3 rd
<i>Biotechnology Development</i>	1	2	1	2	6	1.5	5 th

Table 4.2: Programmes and Sub-Programmes

KEY OBJECTIVES	POLICY	STRATEGIES	PROGRAMME	SUB-PROGRAMME
1. Enhance the application of science, technology and innovation		<ul style="list-style-type: none"> Improve the effectiveness of Research-Extension-Farmer Liaison Committees (RELCs) and integrate the concept in the agriculture research system to increase participation of end users in technology development (SDG Target 2.a) Strengthen research programmes of the Council for Scientific and Industrial Research (CSIR), as well as of the agricultural and related sciences departments of public universities and other institutions (SDG Target 2.a) 	1. Management & Administration	1.1 General Administration
			2. Research & Development	2.1 Scientific and Industrial Research 2.2 Nuclear Science and Technology 2.3 Commercialization of Research
2. Ensure sustainable extraction of Mineral Resources		Ensure mining and logging activities are undertaken in an environmentally sustainable manner (SDG Target 6.5, 8.4, 12.2, 12.8, 14.2, 15.1, 15.2, 15.3, 15.4, 15.5)	3. Environmental Protection & Management	3.1 Environmental Compliance and Enforcement 3.2 Environmental Education, Information and Communication
3. Reduce Environmental Pollution		<ul style="list-style-type: none"> Promote science and technology in waste recycling and waste-to-energy technologies (SDG Target 12.5) Promote the use of environmentally friendly methods and products (SDG Target 9.4, 12.4, 17.7) Intensify enforcement of regulations on noise and air pollution, including open burning (SDG Target 11.6, 16.b) Enforce environmentally sound management of chemicals and all waste throughout their life cycle (SDG Target 12.4) Protect sensitive areas from pollution and contamination, especially groundwater sources and intake of public water supplies (SDG Target 6.3, 6.6) Ensure companies, especially large and transnational companies, conform to sustainable practices (SDG Target 12.6) Enforce Hazardous and Electronic Waste Control and Management Act 2016, (Act 917) (SDG Target 3.9, 6.3, 16.b) 	3. Environmental Protection & Management	3.1 Environmental Compliance and Enforcement 3.2 Environmental Education, Information and Communication 3.3 Enforcement and Compliance of Ionizing And Non-Ionizing Radiation
4. Enhance Climate Change Resilience		<ul style="list-style-type: none"> Implement Ghana's commitments under Paris Climate Agreement (COP21) (SDG Target 13.a) Mainstream climate change in national development planning and budgeting processes (SDG Target 11.b, 13.2) Collaborate with international partners to have more access to the Green Climate Fund (\$30 billion Global Fund) for climate change purposes (SDG Target 13.a) Develop coordinated response to climate change challenges through linkages between research, industry and government (SDG Target 13.2) 	1. Management & Administration	1.1 General Administration
			4. Environmental Protection & Management	3.4 Environmental Compliance and Enforcement 3.5 Environmental Education, Information and Communication

KEY OBJECTIVES	POLICY	STRATEGIES	PROGRAMME	SUB-PROGRAMME
5. Reduce greenhouse gases		<ul style="list-style-type: none"> Accelerate programmes to significantly reduce environmental risks and ecological scarcity, focusing on energy, agriculture, forestry and waste sectors (SDG Target 3.d) Update and facilitate implementation of the National Low Carbon Growth (LCG) strategy (SDG Target 13.1, 13.2) 	1. Management & Administration 2. Environmental Protection & Management	1.2 General Administration 3.1 Environmental Compliance and Enforcement 3.2 Environmental Education, Information and Communication
6. Mainstream science, technology and innovation in all socio-economic activities		<ul style="list-style-type: none"> Apply science, technology and innovation in implementation of policies, programmes and projects (SDG Target 17.8) Scale up investments in research and development to find local solution to challenges (SDG Target 17.5) Promote necessary environment for strong partnership with research institutions, academia and industry including the technology commercialization units at MESTI (SDG Target 17.16, 17.17) Promote the establishment foundry-based manufacturing and precision machine tooling, using computer-aided design (CAD) and computer numerical control (CNC) systems to produce basic tools, equipment and parts Ensure that research output is turned into industrial applications (SDG Target 9.5) <ul style="list-style-type: none"> Establish technology information centers on all campuses of public research institutions 	1. Management & Administration 2. Research & Development	1.1 General Administration 2.1 Scientific and Industrial Research 2.2 Nuclear Science and Technology 2.3 Commercialization of Research
7. Ensure availability of clean, affordable and accessible energy		<ul style="list-style-type: none"> Develop, implement and maintain a safe, secure and sustainable nuclear power programme (SDG Targets 7.3, 7.a) Support research into development of nuclear power (SDG Targets 7.3, 7.a, 7.b) 	2. Research & Development	2.1 Scientific and Industrial Research 2.2 Nuclear Science and Technology
8. Minimize potential environmental impacts of oil and gas industry		Ensure compliance with applicable laws and international standards for environment, health and safety in the oil and gas sector including the policy on zero gas flaring (SDG Target 11.6, 12.4)	1. Management & Administration 2. Research & Development 3. Environmental Protection & Management	1.1 General Administration 2.1 Nuclear Science and Technology 3.1 Environmental Compliance and Enforcement 3.2 Environmental Education, Information and Communication
9. Promote sustainable, spatially integrated, balanced and orderly development of human settlements		<ul style="list-style-type: none"> Fully implement Land Use and Spatial Planning Act, 2016 (Act 925) (SDG Target 16.6, 17.16) Fully implement National Spatial Development Framework (NSDF) (SDG Targets 16.6, 17.16) Ensure proper urban and landscape design and implementation (SDG Target 11.a) 	4. Spatial Planning & Human Settlement	4.1 Human Settlement and Land Use Research and Policy 4.2 Geographic Information Systems Development

KEY OBJECTIVES	POLICY	STRATEGIES	PROGRAMME	SUB-PROGRAMME
		<ul style="list-style-type: none"> Ensure institutional, technological and legal reforms in support of land use planning (SDG Target 11.b) Strengthen the human and institutional capacities for effective land use planning and management nationwide (SDG Target 16.a) 		
10. Enhance capacity for policy formulation and coordination		<ul style="list-style-type: none"> Strengthen capacity of research and statistical information management systems of MDAs and MMDAs (SDG Target 17.19) Intensify the use of Strategic Environmental Assessment (SEA) in public policy processes, plans and programmes Strengthen the relationship between the national development planning system and budgeting processes (SDG Target 17.14) 	1. Management Administration &	1.1 General Administration 1.2 Finance 1.3 Human Resource 1.4 Policy Planning, Budgeting, Monitoring & Evaluation 1.5 Statistics, Research, Information & Public Relations
			4. Environmental Protection & Management	4.1 Environmental Compliance and Enforcement 4.2 Environmental Education, Information and Communication

4.4 Programme of Action

The programme of action (POA) contains the sets of programmes/projects/activities to address the adopted issues, policy objectives and strategies. It highlights outcome/impact indicators, time-frame, indicative budget and implementing Agencies for the plan period (2018 – 2021). Details are highlighted in **Table 4.3**.

Table 4.3: Programme of Action (POA) for 2018-2021

DEVELOPMENT DIMENSION:ECONOMIC DEVELOPMENT														
Adopted MDA Goal(s): Build a Prosperous Society														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget (GHC)			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
Enhance the Application of Science, Technology and Innovation	Strengthen research programmes of the council for Scientific and Industrial Research (CSIR) as well as of the agricultural and related sciences departments of public universities and other institutions (SDG Target 2.a)	Research and Development	Scientific & Industrial Research	Biotechnology: Germplasm collection, characterization, conservation and distribution nationwide.	Access to Germplasm nationwide					2,750,000.00	1,350,000.00	2,891,217.58	CSIR-PGRRI	CSIR-CRI CSIR-FRI CSIR-SARI CSIR-OPRI
		Research and Development	Scientific & Industrial Research	Develop strategies to reduce field and post-harvest losses for developed varieties.	Higher yields of varieties					480,000.00	1,050,000.00	315,000.00	CSIR-SARI CSIR-Head Office	CSIR-CRI CSIR-FRI
		Research and Development	Scientific & Industrial Research	Development and dissemination of improved varieties. (Crops/Livestock/Poultry/ fisheries)	Improved varieties used across the country					1,500,000.00	1,760,000.00	1,760,000.00	CSIR-CRI, CSIR-FRI, CSIR-SARI CSIR-OPRI CSIR-ARI CSIR-WRI	CSIR-PGRRI CSIR-SRI CSIR-FRI MoFA
		Research and Development	Scientific & Industrial Research	Development of Strategies to enhance processing of Crop livestock, poultry and fishery products	Crops, livestock, poultry and fishery processed with developed strategies					550,000.00	1,300,000.00	2,450,000.00	CSIR-FRI	CSIR-IIR CSIR-WRI CSIR-OPRI CSIR-ARI MOFA-WIAD

		Research and Development	Scientific & Industrial Research	Conduct baseline surveys and adoption studies of released improved crop varieties	Improved crop varieties adopted					1,000,000.00	1,700,000.00	1,550,000.00	CSIR-SARI CSIR-Head Office	CSIR-STEPRI
		Research and Development	Scientific & Industrial Research	Promotion of Science Agenda for Agriculture in Africa (S3A)	Science based Agriculture in Africa					1,500,000.00	1,600,000.00	1,550,000.00	CSIR-Head Office	FARA, MESTI MOFA
		Research and Development	Scientific & Industrial Research	Production of improved planting materials for commercial purposes	Improved Commercial Planting Materials					1,800,000.00	1,700,000.00	1,450,000.00	CSIR-Head Office	CSIR-OPRI, CSIR-CRI, CSIR-SARI, MOFA
		Research and Development	Nuclear & Space Science Technology	Public sensitization on the benefits of using gamma irradiation	Gamma Irradiation widely used by the public					20,000.00	2,000.00		GAE C	
		Research and Development	Nuclear & Space Science Technology	Upgrading of Gamma Irradiation Facility (GIF)	Upgraded Gamma Irradiation Facility					1,175,625	1,175,625		GAE C	
		Research and Development	Nuclear & Space Science Technology	Establishment of cultures of plantain, pineapples, sweet potatoes, and cassava Expansion of compost facility	Expanded compost facility on crops culture					30,000.00	2,000.00		GAE C	
		Research and Development	Nuclear & Space Science Technology	Use of Gamma Irradiation Facility for the management of postharvest losses and enhancing health care delivery	Post-harvest losses managed due to Gamma Irradiation Facility					50,000.00	3,000.00		GAE C	

		Research and Development	Nuclear & Space Science Technology	Complete a production plant for protein bait to control fruit fly menace	Fruit flies reduced significantly					300,000.00			GAE C	
		Research and Development	Nuclear & Space Science Technology	Improving crops using mutation induction and biotechnology through a farmer participatory approach	Improved crops					20,000.00	1,000.00		GAE C	
		Research and Development	Nuclear & Space Science Technology	Train farmers on compost making	Increased use of compost by farmers					40,000.00	2,000.00		GAE C	
		Research and Development	Nuclear & Space Science Technology	Field establishment for release of four varieties of cherry tomatoes by 2019	4 varieties of cherry tomatoes added to existing stock					40,000.00	3,000.00		GAE C	

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
Minimize potential environmental impacts of oil and gas industry	Ensure compliance with applicable laws and international standards for environment, health and safety in the oil and gas sector including the policy on zero gas	Management and Administration	General Administration	Finalize environmental management Policy on oil and Gas for cabinet approval	Approved Policy					-	-	800,000	MESTI-ENV	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
		Management and Administration	General Administration	Develop policy strategy for environmental management of oil and gas	Policy strategy approved by cabinet					-	-	900,000	MESTI-ENV	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
		Management and Administration	General Administration	Develop implementation Plan for	Implementation plan developed and					-	-	900,000	MESTI-ENV	MoEn, EC, GNPC, PC, CSIR, GAEC,

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Administration		environmental management of oil and gas	mainstreamed into sectoral plans									EPA, LUSPA, CSOs, MMDAs, Academia
		Environmental Protection and Management	Environmental Protection and Management	Undertake regular audits of the oil and gas industry	Increased compliance level of companies to permit conditions						17,588,755.37		EPA	
		Environmental Protection and Management	Environmental Protection and Management	Operationalize the National Oil Spill Contingency Plan	High Level of preparedness to oil spill emergencies						17,588,755.37		EPA	
Enhance Climate Change Resilience	Develop coordinated response to climate change challenges through linkages between research, industry and government	Management and Administration	General Administration	Implement Sustainable land and Water Management technologies in the three Northern Regions of Ghana	SLWM technologies implemented in the three Northern Regions					-	-	15,979,800	MESTI-ENV	EPA, MESTI, WD, FSD
	Implement Ghana's commitments under Paris Climate Agreement	Management and Administration	General Administration	Finalized the MRV for climate action and upgrade the climate change data hub to include information on climate change adaptation	MRV for climate action developed and upgraded climate change data hub including adaptation					-	-	346,400	MESTI-ENV	MOF, NDPC, EC, GES, Academia

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Management and Administration	General Administration	Coordinate and report on the implementation of NDC readiness programmes identified	Report on coordinated implementation of NDC readiness					4,396,700	-	-	MESTI-ENV	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
		Management and Administration	General Administration	promote the scale of biogas energy across public institutions and schools	biogas energy adopted across a significant number of public institutions					4,396,700	-	-	MESTI-ENV	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
		Management and Administration	General Administration	Coordinate and report on the implementation of NDC phase I activities as identified by the Investment Strategy	Implementation report on coordinated NDC phase I activities.					1,319,010	-	-	MESTI-ENV	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
		Management and Administration	General Administration	Develop Sectoral NDC MRV systems and a centralized MRV process established in line with the UNFCCC reporting structures for two highest priority NDC sectors	Sectoral NDC and Centralised MRV process established in line with UNFCCC C reporting structure					-	-	439,670	MESTI-ENV	MDAs, NDPC, EC, Academia
		Management and Administration	General Administration	Integrate NDC indicators into the Annual	NDC indicators integrated into annual progress report					-	-	439,670	MESTI-ENV	MDAs, NDPC, EC, Academia

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				progress report (APR)										
	Mainstream climate change in national development planning and budgeting processes	Manage ment and Administ ration	General Administ ration	Mainstream CC/GE issues into basic and second cycle institutions curriculum	CC/GE issues mainstreamed into curriculum of Basic and Second Cycle Institutions					-	-	200,000	MESTI- ENV	MOF, NDPC, EC, GES, Academia
		Manage ment and Administ ration	General Administ ration	Train all MDAs & MMDAs on climate change issues	Adequate capacity of MDAs & MMDAs on Climate Change issues					1,098,350	-	-	MESTI- ENV	MOF, NDPC, EC, GES, CSOs, Academia
		Manage ment and Administ ration	General Administ ration	Develop tailored training packages and train MDAs & MMDAs on how to access funds locally and globally for climate change actions	Increased funding for Climate Change actions at MDAs & MMDAs level					1,319,010	-	439.67	MESTI- ENV	MDAs, NDPC, EC, Academia
	Develop coordinated response to climate change challenges through linkages between research, industry and government	Manage ment and Administ ration	General Administ ration	Review and enact new policies actions to stimulate investment mobilization, capacity and R&D	Improved investment mobilization, capacity and R&D.					1,100,000	-	-	MESTI- ENV	MOF, NDPC, EC, GES, CSOs, Academia

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
Reduce greenhouse gases	Accelerate programmes to significantly reduce environmental risks and ecological scarcity, focusing on energy, agriculture, forestry and waste sectors	Management and Administration	General Administration	Implement CREMA management plans	CREMA management plans developed and implemented					-	-	1,680,000	MESTI-ENV Wildlife Division (FC)	MESTI, EPA, MoFA, FSD
		Management and Administration	General Administration	Establishment of green fire breaks in two Forest Reserves (Ambalara and Kulpawn Forest Reserves)	Green fire breaks established in Ambalara and Kulpawn forest reserves.					-	-	1,637,900	MESTI-ENV FSD (FC)	MESTI
		Management and Administration	General Administration	Conduct Reconnaissance Survey for large scale multi-purpose water storage investments	Reconnaissance survey Report for large scale multi-purpose water storage investments					-	-	240,000	MESTI-ENV	SADA, FSD
		Management and Administration	General Administration	Build Capacity in Natural Capital Accounting	Detailed account of Natural Capital					136,000		100,000	MESTI-ENV	EPA, MoF, GSS, MLNR
		Management and Administration	General Administration	Build adequate capacity to deal with biodiversity concerns that might come up while implementing various activities, projects plans and policies	biodiversity safeguards in project management at all levels						-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
		Management and Administration	General Administration	Finalise NBP	Approved NBP						-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC,

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
														MMDAs, Academia, Private Sector, CSOs
		Management and Administration	General Administration	Mainstream biodiversity into the national development planning process	Biodiversity mainstreamed into the planning process at the national level					500,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
		Management and Administration	General Administration	Develop National Biodiversity Policy Communication Strategy	communication strategy on biodiversity policy developed					50,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector , CSOs
		Management and Administration	General Administration	Sponsor 5 staff to participate in the Biennial Conference of the Parties to the Convention on Biological Diversity	COP Decisions					150,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
		Management and Administration	General administration	Improve basin level management and planning of water resources taking into account climate change impacts on surface and groundwater sources Climate resilient management of water	Improved basin level management and integrated water resources management					-	-	28,578,550	MESTI-ENV	UNDP NADMO WRI WRC

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
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Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				resources by 50 communities in northern Ghana Enhanced diversification of livelihoods by 50 communities in northern Ghana										
	Update and facilitate implementation of the National Low Carbon Growth (LCG) strategy	Management and Administration	General Administration	Review the Low Carbon Development Strategy	Low Carbon growth Strategy updated					307,770	-	-	MESTI-ENV	NDPC, Academia EC,
Ensure sustainable extraction Mineral Resources	Ensure mining and logging activities are undertaken in an environmentally sustainable manner (SDG Target 6.5, 8.4, 12.2, 12.8, 14.2, 15.1, 15.2, 15.3, 15.4, 15.5)	Environmental Protection and Management	Environmental Compliance and Enforcement	Undertake regular audits of mining companies to ensure compliance to permitting conditions	improved compliance on environmental permit conditions						17,588,755.37		EPA	MLNR, MC

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
Reduce Environ mental Pollution	Intensify enforcemen t of regulations on noise and air pollution, including open burning (SDG Target 11.6, 16.b)	Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Review environmen tal laws, regulations and guidelines to address emerging issues.	Emerging issues addressed in reviewed environmental laws, regulations and guidelines.						17,588,755.37		EPA	
		Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Develop environmen tal laws and regulations for emerging issues							17,588,755.37		EPA	
		Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Ensure the use of bio-oxodegradabl e additives in the manufacture of flexible Plastics	Greater share of bio-oxodegradable flexible plastics in the country						17,588,755.37		EPA	
	Intensify enforcemen t of regulations on noise and air pollution, including open burning (SDG Target 11.6, 16.b)	Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Monitor selected sites for air quality and pollutants, including PM10, CO, NO2, SO2	Trends in pollution levels of selected locations in relation to WHO guideline level						17,588,755.37		EPA	
	Enforce environmen tally sound management	Environ mental Protection and	Environ mental Complian ce and	Sample and analyse level of pollution of Effluent	Status of sampled industries							17,588,755.37		EPA

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
	t of chemicals and all waste throughout their life cycle (SDG Target 12.4)	Manage ment	Enforcem ent	quality from industries and hotels	effluent pollution									
		Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Upscale the source waste segregation programme to institutions	Source waste segregation across institutions						17,588,755.37		EPA	
		Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Update of pesticide register annually to indicate list of approved ,banned and pesticides for experimental purposes	Use of only approved pesticides for experimental purposes						17,588,755.37		EPA	
		Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Develop a system that effectively and rapidly responds and deal with chemical related emergencies nationwide	Rapid response system for chemical related emergencies nationwide.						17,588,755.37		EPA	
	Protect sensitive areas from pollution and contamination.	Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Monitor the marine ecosystem to ascertain the levels of pollutants	Trends in the concentrations of heavy metals and petroleum products in the						17,588,755.37		EPA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
	especially groundwater r sources and intake of public water supplies (SDG Target 6.3, 6.6)			(Coastal Sensitivity Mapping)	marine ecosystem									
	Ensure companies, especially large and transnational companies conform to sustainable practices (SDG Target 12.6)	Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	High levels of compliance by companies						17,588,755.37		EPA	
	Ensure companies, especially large and transnational companies conform to sustainable practices (SDG Target 12.6)	Environ mental Protection and Manage ment	Environ mental Complian ce and Enforcem ent	Monitor all permitted projects to ensure compliance with LI1652	High level of compliance						17,588,755.37		EPA	
	Enforce Hazardous and Electronic	Environ mental Protection and	Environ mental Complian ce and	Establish and operationalize e-waste	High rate of e-waste collection						17,588,755.37		EPA	MESTI

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Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
	Waste Control and Management Act 2016, (Act 917) (SDG Target 3.9, 6.3, 16.b)	Management	Enforcement	collection centres										
		Environmental Protection and Management	Environmental Compliance and Enforcement	Establish and operationalize treatment plants for managing e-waste	e-waste management treatment plants established						17,588,755.37		EPA	
	Accelerate programmes to significantly reduce environmental risks and ecological scarcity, focusing on energy, agriculture, forestry and waste sectors (SDG Target 3.d)	Environmental Protection and Management	Environmental Compliance and Enforcement	Commit to attain 45% emission reduction goal by 2030 compared to 2010 emission levels	Improved trends in level of reduction of greenhouse gas emissions in metric tonnes						17,588,755.37		EPA	MESTI
	Promote the use of environmentally friendly methods and products (SDG Targets 9.4, 12.4, 17.7)	Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Draft six (6) regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials annually	6 regulations enacted on nuclear materials and facilities.					50,061	83,435	33,374	NRA	GAEC,EPA,GHS,FDA,GSA

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Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Draft six (6) guidance document on radioactive and nuclear waste management annually.	Radioactive and nuclear waste management done according to guidelines					21,987	36,645	14,658	NRA	GAEC,EPA,GHS,FD A,GSA
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Hold Stakeholders workshop on draft regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials annually.	Workshop on draft regulations on nuclear materials and facilities held					61,286	102,143	40,857	NRA	GAEC,EPA,GHS,FD A,GSA
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Hold Stakeholders workshop on Draft guidance document on radioactive and nuclear waste management annually.	Stakeholders workshop held					61,286	102,143	40,857	NRA	GAEC,EPA,GHS,FD A,GSA

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Sensitize the licensees on regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials annually.	Licensees Sensitized					152,438	254,063	101,625	NRA	GAEC,EPA,GHS,FD A,GSA
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Undertake regulatory inspections and enforcement of facilities annually.	Regulatory inspections and enforcements Undertaken					232,793	387,988	155,195	NRA	GAEC,EPA,GHS,FD A,GSA
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Build capacity of 40 Front Line Officers (FLOs) biennially to detect and interdict illicit trafficking of nuclear and radioactive materials out	High level capacity for detecting and interdicting illicit trafficking of nuclear and radioactive materials.					33,053	55,088	22,035	NRA	GSA, NSC

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				of regulatory control										
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Train 4 ICT staff to customize the Regulatory Authority Information System (RAIS) to maintain and update national register of radiation sources of practices and persons authorized to carry out any activity related to nuclear technology	Customized Regulatory Authority Information System (RAIS)					1,419	2,365	946	NRA	
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Train 25 NRA inspectors annually on how to access and use the RAIS	increased usage of RAIS by NRA inspectors					1,657	2,762	1,105	NRA	
		Environmental Protection and Management	Enforcement and Compliance of ionizing	Train four hundred (400) Radiation Protection Officers						170,400	284,000	113,600	NRA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
			and non-ionizing radiation	(RPO) on how to access and use the RAIS (Northern and southern sector)										
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Recruit additional professionals to undertake specialized functions	Specialised functions undertaken by additional staff					8,400	14,000	5,600	NRA	
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Train staff in specialized areas (ionizing and non-ionizing radiation, forecasting and financial management, M&E, public administration management, etc) at local and foreign institution	Professional staff for NRA					1,358,885	2,264,808	905,923	NRA	
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-	Engage architect to design the office complex	Designs for office complex					9,000	15,000	6,000	NRA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
			ionizing radiation											
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Acquire 4 cross country vehicles by Dec. 2019 for regulatory inspections	regular regulatory inspections					180,000	300,000	120,000	NRA	
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Acquire regulatory equipment	Enhanced regulation					89,100	148,500	59,400	NRA	
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	3 meetings to undertake quarterly monitoring & evaluation activities	reviewed activities					28,125	46,875	18,750	NRA	
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Organize 5 days workshop of the budget committee to revise SMTDP annually	Reviewed plans					102,770	171,283	68,513	NRA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Organize annual budget activities	Participatory planning and budgeting.					102,770	171,283	68,513	NRA	
		Environ mental Protecton and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation	Organize 2 days management meeting to approve SMTDP and annual budget						7,407	12,345	4,938	NRA	
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation							587,551	979,251	391,700	NRA	
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing and non-ionizing radiation		Relations with international regulatory bodies strengthened					1,204,340	2,007,233	802,893	NRA	
		Environ mental Protection and Manage ment	Enforcem ent and Complian ce of ionizing	Initiate the process to adopt and ratify relevant international	Signatories to relevant international conventions					953,726	1,589,543	635,817	NRA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
			and non-ionizing radiation	conventions, protocols and treaties										
		Environmental Protection and Management	Enforcement and Compliance of ionizing and non-ionizing radiation	Organize quarterly meetings of national nuclear security committee	Decisions and actions of the committee					225,553	375,921	150,368	NRA	
Promote a sustainable, spatially integrated, balanced and orderly development of human settlement	Ensure institutional , technological and legal reforms in support of land use planning	Spatial Planning and Human Settlements	Land Use and Spatial Planning	Revise the National zoning regulations and planning standards	Orderly development in space					250,000			LUSPA	MESTI, MLGRD, NDPC
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Review manuals for preparation of spatial plans						250,000			LUSPA	MESTI, MLGRD, NDPC
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Complete the Legal Instruments for the Land Use and Spatial Planning Act									LUSPA	AG’s Department, PARLIAMENT OF GHANA
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Inaugurate 10 Regional Spatial Planning Committees	Spatial Planning Committees in all 10 regions								LUSPA	MLGRD
		Spatial Planning	Land Use and	Organize orientation for	Indepth understanding					800,000			LUSPA	MLGRD

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		and Human Settlements	Spatial Planning	RSPCs and DSPCs	of RSPCs & DSPCs									
	Fully implement Land Use and Spatial Planning Act, 2016 (Act 925)	Spatial Planning and Human Settlements	Land Use and Spatial Planning	Set up the Land Use Planning and Development Fund	Reliable funding for Land Use Planning					100,000			MESTI	LUSPA
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Formulate a human settlements policy	Human Settlements guided by policy					250,000			LUSPA	NDPC
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Train key stakeholders on the application of revised spatial planning guidelines, manuals and zoning regulations	Indepth knowledge of planning instruments					160,000			LUSPA	MMDAs
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Construct head office for LUSPA	New Head office space for LUSPA					35,150,000			LUSPA	MMDAS
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Prepare SDF and structure plan for all 49 Municipal Assemblies	Developments guided by SDF & Structure Plans							66,150,000	LUSPA, Local Governm ent	World Bank

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Prepare RSDFs for Eastern, Volta, Brong Ahafo and Central Regions	Developments guided by RSDFs					7,500,000			LUSPA	MLGRD
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Prepare spatial Plans for 3 Regional Industrial Parks to support Industrial Growth Agenda	Spatial Plans for Industrial Parks					2,100,000			LUSPA & MOTI, GIPC, GFZA	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Train officers on the new spatial planning guidelines	Application of guidelines in Spatial Planning					500,000			LUSPA	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Publicize GARSDF & ARSDF on LUSPA Website	Availability of GARSDF and ARSDF on LUSPA Website								LUSPA	RCC
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Organize 3 No. public awareness and education programmes on radio and television	Informed public on new Spatial Planning system					350,000			LUSPA	
		Spatial Planning and	Land Use and	Organize special training to	Application of GIS on Land					600,000			LUSPA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Human Settlements	Spatial Planning	200No. stakeholders on GIS application to land use planning, street naming, development permitting, property tax administration	Use and Spatial Planning									
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Train MMDAs on new permitting guidelines and collect permit data	Database on all approved permits								LUSPA (FUNDING TIED TO SPATIAL PLANNING GUIDELINES)	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Redesign LUSPA's website and publicize RSDFs	Functional redesigned LUSPA website					5000			LUSPA	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Prepare condition and Scheme of Service for the Authority	Condition & Scheme of service for LUSPA					85,000			LUSPA	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Recruit 100 planners for the Authority and MMDAs	Qualified & Professional Planners for the Authority and MMDAs					1,680,000			LUSPA & MOF	MLGRD

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				without planners										
	Support research and development in urban and regional development planning	Spatial Planning and Human Settlements	Land Use and Spatial Planning	Train 100No. Professional staff and 50No. Technical staff recruited	Competent staff for LUSPA					300,000			LUSPA	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Undertake 2No. study tours and partake in Urban Planning and management	Applications of experiences and lessons locally					500,000			LUSPA	
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Participate in 2No. international conferences urban and regional spatial planning	Applications of experiences and lessons locally					300,000			LUSPA	
	Support research and development in urban and regional development planning	Spatial Planning and Human Settlements	Land Use and Spatial Planning	Sponsor 7 No. staff to train at GIMPA	improved skills for planning					4,000,000			LUSPA	MESTI
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Sponsor 10N. staff for postgraduate programmes in urban and regional spatial	Improved skills for spatial planning					400,000			LUSPA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				planning and management										
		Spatial Planning and Human Settlements	Land Use and Spatial Planning	Sponsor 20No.each of technical, administrative and finance staff for relevant courses	Improved skills for the sector					280,000			LUSPA	
Mainstream Science, Technology and Innovation in all socio-economic activities	Apply science, technology and innovation in implementation of policies, programmes and projects (SDG Target 17.8)	Management and Administration	General Administration	Develop the National STI Policy	STI guided by National Policy.					0	0	0	MESTI-STI	R&D Institutions/Academic Institutions/Private Sector
		Management and Administration	General Administration	Prepare National Space Policy	Approved National Space Policy					100,000		100,000	MESTI-STI	GSSTI/NDPC/Academia/MoFA/ MoF
		Management and Administration	General Administration	Develop the National STI Development Plan 2019-2023	Development of the STI sector					50,000			MESTI-STI	R&D institutions/Academic institutions/Private Sector/MoF.
		Management and Administration	General Administration	Preparation of a national STI Investment Plan	Financing for STI					100,000			MESTI-STI	NDPC/MoFEP/R&D Institutions/Academic Institutions/MoF
		Management and Administration	General Administration	Monitoring and Evaluation of the mainstreaming programme	Improvements and reviews in plans/policy					100,000		100,000	MESTI-STI	PACSTI/ R&D Institutions/Academic Institutions/MoF

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Manage ment and Administ ration	General Administ ration	Celebrating Annual National STI Week and Scientific Renaissance day	Celebrations held					100,00		200,000	MESTI-STI	NDPC/R&D Institutions/Academi c Institutions
		Manage ment and Administ ration	General Administ ration	Assessing STI Infrastructure Needs of Ghana	National STI Infrastructure profile & plan					200,00		200,000	MESTI-STI	R&D Institutions/Academi c Institutions
		Manage ment and Administ ration	General Administ ration	Develop Science and Technology Parks	2 Science and Technology Parks developed.					100,000 ,000		50,000, 000	MESTI-STI	MoT/MoF/ R&D Institutions/ Academic Institutions
		Manage ment and Administ ration	General Administ ration	Implement the Ghana Technology Incubation Programme	10 incubation centres established					10,000, 000		10,000, 000	MESTI-STI	NDPC/R&D Institutions/Academi c Institutions/ MoT/MoF
		Manage ment and Administ ration	General Administ ration	Establish High Performance Computer (HPC) Centres	3 HPC Centres Established					500,000			MESTI-STI	R&D Institutions/ Academic Institutions/ MoF
		Manage ment and Administ ration	General Administ ration	Establish National Space Data Centre by establishing a Satellite Ground Receiving Station.	Space data available to institutions.					100,000 ,000		10,000, 000	MESTI-STI	GSSTI/Academic Institutions/MoF

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Management and Administration	General Administration	Establish a Presidential Advisory Council on Science, Technology and Innovation (PACSTI)	PACSTI and Secretariat fully established and operational					10,000,000			MESTI-STI	Office of the President/ Academia/MoJ/MoF
		Management and Administration	General Administration	Establish an Inter-Ministerial Coordinating Committee to ensure the coordination of the application of STI in all sectors of the economy	Inter-ministerial coordinating committee for STI					100,000			MESTI-STI	Office of the President/ All MDAS/ Academic Institutions
		Research and Development	Scientific & Industrial Research	Landscape management systems or technologies resilient to climate change vulnerabilities in time and space.	Medium to high resilience level to climate change					1,400,000.00	1,500,000.00	1,450,000.00	CSIR-SRI	CSIR-FORIG Forestry Commission
		Research and Development	Scientific & Industrial Research	Innovative risk management strategies that foster resilient	Improved resilience level					1,050,000.00	1,738,000.00	2,780,000.00	CSIR-FORIG	CSIR-SRI CSIR-WRI CSIR-CRI

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Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectiv es	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				rural livelihoods for sustainable landscape restoration.	for climate change								CSIR-Head Office	CSIR-SARI
		Research and Develop ment	Scientific & Industrial Research	Development of Strategies to combat effect of climate change	Resilience and adaptation to climate change					850,000 .00	1,550,00 0.00	2,560,0 00.00	CSIR	
		Research and Develop ment	Scientific & Industrial Research	Control and elimination of water and soil borne diseases	reduced water and soil borne diseases					1,200,0 00.00	2,000,00 0.00	1,600,0 00.00	CSIR-WRI CSIR-Head Office	Ghana Health Services and Liverpool School of Tropical medicine
		Research and Develop ment	Scientific & Industrial Research	Develop transmission indices to determine feasibility of eliminating diseases	transmission indices for eliminating diseases					1,650,0 00.00	3,831,54 7.55	6,450,0 00.00	CSIR-WRI CSIR-Head Office	Imperial College, UK
		Research and Develop ment	Scientific & Industrial Research	Development of Strategies to address water, air and soil pollution	Reduced pollution levels					1,100,0 00.00	1,147,83 8.01	1,600,0 00.00	CSIR-WRI	CSIR-SRI

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Research and Development	Scientific & Industrial Research	Development of essential materials and industrial products using local raw materials	Locally produced materials and products					1,200,000.00	1,570,000.00	1,600,000.00	CSIR-BRRI	CSIR-IIR
		Research and Development	Scientific & Industrial Research	Development of local building materials for affordable housing delivery and provision of road construction advisory services	Reduced cost of housing and improvements in road construction					500,000.00	1,620,000.00	1,750,000.00	CSIR-BRRI	CSIR-IIR
		Research and Development	Scientific & Industrial Research	Promotion of renewable Energy systems for both domestic and commercial buildings	Increased share of renewables in the energy mix					1,030,000.00	2,430,000.00	1,650,000.00	CSIR-IIR CSIR-Head Office	Energy Commission
		Research and Development	Scientific & Industrial Research	Promote Climate – friendly bioenergy options for sustainable rural livelihoods	Climate friendly energy options					1,150,000.00	1,800,000.00	1,650,000.00	CSIR-IIR	Energy Commission

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Research and Development	Scientific & Industrial Research	Establishment of ICT Centre for the provision of electronics and computer engineering services	Computer and engineering services provided by ICT Centre					1,350,000.00	2,590,000.00	1,950,000.00	CSIR-INSTI CSIR-IIR Head Office	MESTI CSIR-IIR CSIR-STEPRI
		Research and Development	Nuclear & Space Science Technology	Protection of GAEC land from encroachment	GAEC land fenced					4,000,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Compensation for GAEC land	Compensation paid					1,500,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Aligning with the One District One Factory policy to establish a protein bait plant.	Cottage-based Protein bait production plant at Manya Krobo constructed								GAEC	
		Research and Development	Nuclear & Space Science Technology	Refurbishment of central waste processing facility.	One (1) centralized waste processing facility established					1,200,000			GAEC	

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Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Research and Development	Nuclear & Space Science Technology	Evaluating the Vitamin A status of children	Stable isotope techniques applied to evaluate vitamin A health status of children					55,000.00	55,200	54,815.97	GAEC	
		Research and Development	Nuclear & Space Science Technology	Ensure obesity cases in the country especially among children is reduced	Nuclear Techniques to Design and Evaluate Interventions to Reduce Obesity and Related Health Risks applied.								GAEC	
		Research and Development	Nuclear & Space Science Technology	Conducting pre-installation and post installation assessment of mobile phone sites.	Safety assessment of mobile phone base stations conducted before construction					500,000.00			GAEC	
		Research and Development	Nuclear & Space Science Technology	Monitoring of telephone masts and base stations	Safe mobile phone cell sites					2,100,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Commencing the National Radon mapping project	National radon mapping project commenced					205,585.00	575,000.00		GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Research and Development	Nuclear & Space Science Technology	Monitoring of occupational exposures for mine, industrial, medical, educational and educational research institution workers	1000 occupationally exposed workers involved in ionizing radiation monitored					288,000.00	1,000,000.00		GAEC	
		Research and Development	Nuclear & Space Science Technology	Assessment of food/dairy products and water samples for radioactive contamination	1000 containers analysed to ensure safety of food import and water are free from radioactive contamination					51,890.00			GAEC	
		Research and Development	Nuclear & Space Science Technology	Calibration of radiation detection equipment and nuclear density gauges used in medical and industrial facilities.	70 Calibrated survey meters and 10 density gauges					69,900.00	40,000.00		GAEC	
		Research and Development	Nuclear & Space Science	Monitoring the air quality in the country.	Persistent organic pollutants and particulate					150,000.00			GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
			Technology		matter in air monitored.									
		Research and Development	Nuclear & Space Science Technology	Groundwater recharge and sustainability studies using classical and isotopic approach in the white river basin of Ghana.	isotopic approach on ground water and sustainability studies					1,443,260.00	125,000.00	822,239.59	GAEC	
		Research and Development	Nuclear & Space Science Technology	Assessing the effects of domestic and industrial discharges on Volta River quality	Improve standard of living of the people along the Volta River. *Improved fishing					40,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Measurement of gross alpha-beta in drinking water (bottled and sachet)	Analysis at least 700-1500 containers of food/dairy and water samples for radioactive contamination .					380,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Training of MPhil and PhD students	*50 MPhil and 25 PhD students trained								GAEC	
		Research and	Nuclear & Space	Training and public	Improved safety against					160,000			GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Develop ment	Science Technology	education in Radiation Safety, Radiation Protection and Nuclear Security	radiation and nuclear.									
		Research and Develop ment	Nuclear & Space Science Technology	Completion of the National Space policy	Ghana Space Science Policy developed.					20,000			GAEC	
		Research and Develop ment	Nuclear & Space Science Technology	Development of a National Space Strategy	National space strategy completed					30,000			GAEC	
		Research and Develop ment	Nuclear & Space Science Technology	Science awareness, engagement and outreach	High level of science awareness					160,000.00	40,000.00	150,000.00	GAEC	
		Research and Develop ment	Nuclear & Space Science Technology	Research with Ghana Radio Telescope	Radio telescope research findings					2,200,000			GAEC	
		Research and Develop ment	Nuclear & Space Science Technology	Human capital development and training in space science and	Increased capacity in space science and technology					900,000	80,000	900,000	GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				technology (staff and non-staff)										
		Research and Development	Nuclear & Space Science Technology	Establishment of spin-off ventures	Products in use and improved.					100,000	1,000,000		GAEC	
		Research and Development	Nuclear & Space Science Technology	Climate research	Climate prediction over Ghana produced					30,000	30,000	80,000	GAEC	
		Research and Development	Nuclear & Space Science Technology	Earth Observation research	Research on satellite applications using data gathered in agriculture, water resources, and environment completed.					10,000	100,000		GAEC	
		Research and Development	Nuclear & Space Science Technology	Introduction of space science courses at SNAS	Graduate program in space science started and improved on						150,000		GAEC	
		Research and Development	Nuclear & Space Science Technology	Installation of equipment	Automatic weather and seismic station installed.					1,000,000	1,000,000		GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Research and Development	Nuclear & Space Science Technology	Installation of ground Satellite receiving station	Ground receiving station installed and commissioned.					50,120,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Capacity building in remote sensing techniques, climate modelling techniques, image processing and GIS.	Improved capacity in remote sensing techniques, climate modelling techniques, image processing and GIS.					20,000	70,000		GAEC	
		Research and Development	Nuclear & Space Science Technology	Unmanned Aerial Vehicle (UAV)/Drone training	Skills in Unmanned Aerial Vehicle (UAV)/Drone acquired.					50,000	50,000		GAEC	
		Research and Development	Nuclear & Space Science Technology	Setting Up of a Standard Electrical/Electronic laboratory	Electronic laboratory established					300,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Generating, processing and making existing satellite data available	Satellite rainfall data generated for every 4km radius for Ghana.							100,000	GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Research and Development	Nuclear & Space Science Technology	Capacity building on Satellite receiving station	Human capacity developed in operation and software of ground receiving station.					80,000.00			GAEC	
		Research and Development	Nuclear & Space Science Technology	Orbital space mission utilizing SNC’s Dream Chaser® space vehicle.	Ground Station Development, data acquisition and motoring of illegal gold mining					500,000	230,000		GAEC	
		Research and Development	Nuclear & Space Science Technology	Management of radioactive waste	Characterization and storage of collected radioactive waste materials completed					70,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Scientific assessment of the environment and human health impact of e-waste.	scientific findings of e-waste impact on environment and humans							35,000	GAEC	
		Research and Development	Nuclear & Space Science Technology	Implementation of the borehole disposal concept for Disused Sealed	Closed disposal boreholes					275,000		1,973,375.02	GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				Radioactive Sources (DSRS) in Ghana.										
		Research and Development	Nuclear & Space Science Technology	Initiation of cancer (tumour) biomarker service at RAMSRI	Cancer (tumour) services at RAMSRI					900,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Strengthening activities on radiation counter measures to mitigate/ treat radiation	i. SOPs for predicting individual hyper-sensitivity completed ii. Calibration curves completed iii. Candidate radio protectors identified iv. Database of medicinal flora with high promise for radioprotection available					155,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	National Quality Assurance Audit of radiotherapy, diagnostic	Thirty - forty (30-40) diagnostic radiology					155,000			GAEC	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				radiology and nuclear medicine practice in Ghana	centres in Ghana audited									
		Research and Development	Nuclear & Space Science Technology	Conduct Feasibility studies and the establishment of a National Nuclear Imaging Centre	National Nuclear Imaging Centre established							GAEC		
		Research and Development	Nuclear & Space Science Technology	Establish a National Professional Training Institute for welding and Non-destructive testing to train and certify welders and Non-destructive Testing (NDT) professionals.	Certified welders and NDT Professionals							GAEC		
		Research and Development	Nuclear & Space Science Technology	Applying Radiation technologies to Assess Sediment Transport for the	Radiation technologies applied							200,000	GAEC	

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Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				Management of Coastal Infrastructures (RAF/7/018)										
		Research and Development	Nuclear & Space Science Technology	Development of computed Gamma tomography for industrial process diagnostics	Computed tomography system installed and tested on laboratory scale					100,000	520,000		GAEC	
		Biotechnology Development	Biosafety Regulation	Certify biotech laboratories and institutional biosafety committees (IBC)	certified biotech laboratories and IBCs					256,250			NBA	CSIR, GACE, Universities
		Biotechnology Development	Biosafety Regulation	Conduct monitoring and inspection on biosafety research activities	biosafety research findings used for activities					1,724,052			NBA	Regulatory Agencies
		Biotechnology Development	Biosafety Regulation	Train IBC members and principal investigators in application review	Skills in application review developed					669,000			NBA	UNEP, ICGEB, ABNE, PBS, Universities

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Biotechnology Development	Biosafety Regulation	Conduct 42 television and radio programmes	increased level of awareness					862,024			NBA	Regulatory Agencies, TAC,IBC
		Biotechnology Development	Biosafety Regulation	Conduct sensitization programmes with farmers and local communities on biotech and biosafety	Increased knowledge of farmers and local communities on biotech and biosafety						788,124		NBA	Regulatory Agencies, TAC,IBC
		Biotechnology Development	Biosafety Regulation	Publish articles and print educational materials on biosafety	Increased awareness level on biosafety					334,576		30,000	NBA	Regulatory Agencies
		Biotechnology Development	Biosafety Regulation	To train NBA staff, Technical Advisory Committee members Principal Investigators and Institutional Biosafety Committee members Inspectors Journalists on	increased knowledge and awareness levels of biosafety					2,532,201	40,000	800,000	NBA	TAC, IBCs, Regulatory agencies

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				biosafety issues										
		Biotechnology Development	Biosafety Regulation	Prepare biosafety guidelines	Guidelines for biosafety applied					340,000		140,000	NBA	TAC, IBCs, Regulatory agencies
		Biotechnology Development	Biosafety Regulation	Maintain GMO detection laboratory	GMO detections					7,348,754	40,000	37,000	NBA	UNEP, ABNE, ICGEB, PBS, Universities, GSA
		Biotechnology Development	Biosafety Regulation	Review biosafety applications	Applications approved or rejected					1,574,056	90,000		NBA	TAC, Regulatory Agencies, Applicants
		Biotechnology Development	Biosafety Regulation	Hold NBA Board Meetings	Decisions of NBA Board implemented					478,532			NBA	
		Biotechnology Development	Biosafety Regulation	Conduct Appeals Tribunal meetings	Appeals Tribunals					39,547			NBA	
		Biotechnology Development	Biosafety Regulation	Conduct Technical Advisory Committee (TAC) meetings	Decisions of TAC implemented					206,888			NBA	
		Biotechnology Development	Biosafety Regulation	Manage NBA website	Up-to-date Website					191,214			NBA	

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating	
		Biotechnology Development	Biosafety Regulation	Implement project on mainstreaming biodiversity (including biosafety) in to government decision making	Biodiversity mainstreamed into decision making at all levels							3,374,800	NBA	UNEP-WCMC	
		Biotechnology Development	Biosafety Regulation	International Conferences	Enhanced capacities of staff					150,083			NBA	International Institutions	
		Biotechnology Development	Biosafety Regulation	Capital Expenditure (CAPEX)	Capital equipments and facilities					3,230,500			NBA	Service providers	
		Biotechnology Development	Biosafety Regulation	Internal management of the NBA including	Smooth operations of NBA					648,539			NBA	Service providers	
	Scale up investments in research and development to find local solution to challenges (SDG Target 17.5)	Management and Administration	General Administration	Establish the STI Fund	Reliable funding for STI					10,000,000			MESTI-STI	R&D institutions/Academic Institutions/Private Sector/MoF	
		Management and Administration	General Administration	Encouraging R&D by the Private Sector	Adequate R&D for industry					50,000		10,000,000	MESTI-STI	R&D institutions/Academic Institutions/Private Sector.	
			Biotechnology Development	Biosafety Regulation	Implement project on mainstreaming biodiversity (including biosafety) in to government decision making	Biodiversity mainstreamed into decision making at all levels							3,374,800	NBA	UNEP-WCMC
			Biotechnology Development	Biosafety Regulation	International Conferences	Enhanced capacities of staff					150,083			NBA	International Institutions

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Management and Administration	General Administration	Promote Venture Capital for Business Development in Technology Parks and Business Incubators	Capital financing for business development in technology parks and business incubators					40,000			MESTI-STI	R&D institutions/Academic Institutions/Private Sector/MESTI/MOTI/MDU
	Promote necessary environment for strong partnership with research institutions, academia and industry including the technology commercialisation units at MESTI (SDG Target 17.16, 17.17)	Management and Administration	General Administration	Create a Data Base of Scientists, Engineers and Technologists in the Country through the use of MIS	A national database on the profile of scientists, engineers, and technologists created.					100,000		400,000	MESTI-STI	R&D Institutions/Academic Institutions/MoF
		Management and Administration	General Administration	Promote the participation of Ghanaian STI experts in National Programmes	STI experts involved in National programmes					100,000		100,000	MESTI-STI	PACSTI/ R&D Institutions/Academic Institutions/Private Sector/MoFA/MoF
		Management and Administration	General Administration	Prepare bi-Annual National STI Report	Report on the Current status of the national innovation system					200,000			MESTI-STI	NDPC/ PACSTI/ R&D Institutions/Academic Institutions.

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						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Management and Administration	General Administration	Establishment of the Ghana Innovation and Research Commercialization Center (GIRC-Center) /National Innovation Agency (NIA)	GIRC Centre/NIA established					10,000,000		10,000,000	MESTI-STI	R&D Institutions/Academic Institutions/Gratis foundations/MoF
		Management and Administration	General Administration	Development of a National Databank on Indigenous Knowledge and Technologies	National Databank on Indigenous Knowledge and Technology					100,000		200,000	MESTI-STI	R&D Institutions/Academic Institutions/Gratis foundations/MoF
		Management and Administration	General Administration	Improving Regional, Continental and global cooperation for STI	Improved Cooperation for STI at Regional, Continental and Global level.					400,000		200,000	MESTI-STI	MoFA/MoF
		Management and Administration	General Administration	Continue the Implementation of the SGCI	100 researchers trained in Research Management					100,000		1,000,000	MESTI-STI	Academic Institutions/ R&D Institutions/

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
					100 Researchers Trained in measuring STI Indicators 5 Technologies Transfer to Private Sector									
		Management and Administration	General Administration	Support the Ghana-South Africa Bilateral	Projects jointly implemented					400,000		5,000,000	MESTI-STI	MoFA/R&D Institutions/Academic institutions/DST-SA
		Management and Administration	General Administration	Support the Ghana – Cote d’Ivoire Bilateral	Projects jointly implemented					100,000		100,000	MESTI-STI	MoFA/R&D Institutions/Academic Institutions/Ministry of Science and Technology, Cote d’Ivoire.
		Management and Administration	General Administration	Support the Ghana-Colombia Bilateral	Projects jointly implemented					100,000		200,000	MESTI-STI	MoFA/R&D Institutions/Academic Institutions/
		Management and Administration	General Administration	Support the Implementation of the EU H2020 NCPs Project	Projects implemented in support of EU H2020 NCPs					100,000			MESTI-STI	R&D Institutions/Academic Institutions
		Management and Administration	General Administration	Support the Implementation of the SKA/AVN Project.	8 SKA/AVN partner countries meetings attended.					1,000,000		1,000,000	MESTI-STI	GSSTI/ Academic Institutions/MoF/DST-South Africa/MoFA.

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
					One National Planetarium established at Kuntunse. 30 Astronomers and Engineers trained.									
		Management and Administration	General Administration	Organize an annual STI consultative workshop with STI Advocacy and Professional Bodies.	Joint consultative workshop on STI					200,000			MESTI-STI	R&D Institutions/Academic Institutions/Private Sector
	Promote the establishment foundry-based manufacturing and precision machine tooling, using computer-aided design (CAD) and computer numerical control (CNC)	Management and Administration	General Administration	Establish National Foundry and Machine Tooling Centres in various parts of the country.	National Foundries and Machine tooling centres established					10,000,000		20,000,000	MESTI-STI	R&D Institutions/Academic Institutions/Private Sector/MoT/ MoF

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
	systems to produce basic tools, equipment and parts													
Ensure availability of, clean, affordable and accessible energy	Support research into development of nuclear power	Research and Development	Nuclear & Space Science Technology	Preferred site(s) selected and assessed into account geological, seismological, population density, human induced factors, environmental, water availability and quality consideration and other relevant studies.	Suitable sites available for construction of nuclear power plant					2,845,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Conduct studies for national and regional grid network	Detailed national and regional grid network developed					460,000			GAEC	
	Develop, implement and maintain a safe, secure	Research and Development	Nuclear & Space Science Technology	Organize stakeholder and public sensitization meetings on	Stakeholder consensus on Nuclear power option					520,000			GAEC	

DEVELOPMENT DIMENSIONS: ENVIRONMENT, INFRASTRUCTURE AND HUMAN SETTLEMENT														
Adopted MDA Goal(s): Safeguard the natural Environment and ensure a resilient, built environment														
Adopted Objectives	Adopted Strategies	Program mes	Sub-program mes	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
	and sustainable nuclear power programme			adoption of nuclear power										
		Research and Development	Nuclear & Space Science Technology	Develop human resource for the implementation of Nuclear Power	Adequate capacity and skills in Nuclear Power management					325,000			GAEC	
		Research and Development	Nuclear & Space Science Technology	Review of environmental protection framework to include nuclear power	Reviewed EPF with Nuclear power					60,000			GAEC	

DEVELOPMENT DIMENSIONS: GOVERNANCE, CORRUPTION AND PUBLIC ACCOUNTABILITY														
Adopted MDA Goal(s): Maintain a stable, united and safe society														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
Enhance capacity for policy formulation and coordination	Strengthen the relationship between the national development planning system and budgeting processes (SDG	Management & Administration	General Administration	Payment of Utility bills	uninterrupted supply of utility service					231,000.00			F&A	Other Service Providers
		Management & Administration	Management & Administration	General Expenses	Smooth administrative running of the Ministry					23,611.49			F&A	MESTI Directorates and other stakeholders
		Management & Administration	Management &	Material and Office Consumables	Availability of office consumables					140,000.00			F&A	Service Providers

DEVELOPMENT DIMENSIONS: GOVERNANCE, CORRUPTION AND PUBLIC ACCOUNTABILITY														
Adopted MDA Goal(s): Maintain a stable, united and safe society														
Adopted Objective s	Adopted Strategies	Programme s	Sub-programme s	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						201 8	201 9	202 0	202 1	GoG	IG F	Donor	Lead	Collaborati ng
	Target 17.14)		Administrati on											
		Management & Administrati on	Management & Administrati on	Training Seminar and Conference Cost	Improved Directorate staff performance and sound policy and managerial decisions					700,000.00			F&A	MESTI Directorates and Agencies, HRM, OHCS, GIMPA
		Management & Administrati on	Management & Administrati on	Travel and Transport	Delivery of official correspondence and staff participation in official engagements					2,170,000. 00			F&A	MESTI Directorates and other stakeholders
		Management & Administrati on	Management & Administrati on	Repairs and Maintenance	Good condition of official assets					350,000.00			F&A	Other Service Providers
		Management & Administrati on	Management & Administrati on	General Cleaning	Clean office environs					245,000.00			F&A	Other Service Providers
		Management & Administrati on	Management & Administrati on	Insurance	Insured official assets					140,000.00			F&A	Other Service Providers
		Management & Administrati on	Finance	Treasury & Accounting Activities	Financial reports					800,000			Accounts	
		Management & Administrati on	Finance	Preparation of Financial reports	Quarterly financial reports					400,000			Accounts	

DEVELOPMENT DIMENSIONS: GOVERNANCE, CORRUPTION AND PUBLIC ACCOUNTABILITY														
Adopted MDA Goal(s): Maintain a stable, united and safe society														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
		Management & Administration	Finance	Internal Audit Operations	Audit reports					800,000			IAU	
		Management & Administration	Human Resource	Preparation of Sector Annual Performance Report	Annual Performance Reports					40,625.00			HRM	MESTI-PPMED Directorates, LUSPA,
		Management & Administration	Human Resource	Undertake Scheme of Service Training programmes for all categories of staff	All categories of staff trained					406,250.00			HRM	MESTI Directorates
		Management & Administration	Human Resource	Organise Training/workshops on Performance Management for staff of the Ministry	Improved performance of staff					335,000.00			HRM	MESTI Directorates, LUSPA, EPA, GAEC, CSIR
		Management & Administration	Human Resource	Organise Promotion Interviews	Promoted staff					406,250.00			HRM	MESTI Directorates
		Management & Administration	Human Resource	Organise HR Forum/ workshop with sector Agencies/Dept to discuss HR issues	Reports					121,875.00			HRM	MESTI Directorates and Agencies
		Management & Administration	Human Resource	Organise workshop on Civil Service Rules and Regulations	Better understanding of Civil Service Rules & Regulations					121,875.00			HRM	MESTI Directorates, Agencies
		Management & Administration	Human Resource	Participation in local and international	Improved skills of staff					162,500.00			HRM	MESTI Directorates

DEVELOPMENT DIMENSIONS: GOVERNANCE, CORRUPTION AND PUBLIC ACCOUNTABILITY														
Adopted MDA Goal(s): Maintain a stable, united and safe society														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
				training conference										
		Management & Administration	Human Resource	Organize workshop on Cabinet Memo for Leadership of the Ministry	Cabinet memos prepared by leadership					165,360.00			HRM	Heads of Directorates
		Management & Administration	Policy Planning, Budgeting, Monitoring & Evaluation	Policy Planning, Implementation Reporting	Comprehensive sector Policy, Plans and Performance reports					500,000			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC, MoF
		Management & Administration	Policy Planning, Budgeting, Monitoring & Evaluation	Budget Preparation And Coordination	Sector budget well coordinated					600,000			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, OHCS, MoF, NDPC
		Management & Administration	Policy Planning, Budgeting, Monitoring & Evaluation	Sound recycling and disposal of waste of Electrical Electronic Equipment	E-Waste properly disposed and managed							82,105,826.85	PPME Directorate	KfW, GIZ, EPA, MMDAs
		Management & Administration	Policy Planning, Budgeting, Monitoring & Evaluation	Monitoring And Evaluation	reviewed plan and policy recommendations					200,000			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC, CHRAJ

DEVELOPMENT DIMENSIONS: GOVERNANCE, CORRUPTION AND PUBLIC ACCOUNTABILITY														
Adopted MDA Goal(s): Maintain a stable, united and safe society														
Adopted Objectives	Adopted Strategies	Programmes	Sub-programmes	Projects/Activities	Outcome/Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						2018	2019	2020	2021	GoG	IGF	Donor	Lead	Collaborating
	Strengthen capacity of research and statistical information management systems of MDAs and MMDAs (SDG Target 17.19)	Management & Administration	Statistics, Research, Information & Public Relations	Celebration of 4 Environmental Days	commitment on environment upheld					500,000.00			MESTI-RSIM	All other Directorates, Agencies under MESTI
		Management & Administration	Statistics, Research, Information & Public Relations	Organize ICT capacity training workshop for staff on the use of Information Management System	application of ICT by staff					80,000.00			MESTI-RSIM	
		Management & Administration	Statistics, Research, Information & Public Relations	Organize Capacity training programs for ICT staff	improved skills in ICT management					50,000.00			MESTI-RSIM	MESTI-Procurement, MoC
		Management & Administration	Statistics, Research, Information & Public Relations	Acquire modern tools and technology to enhance information flow to the public e.g. Website, software and hardware tools.	Effective communication to the public					500,000.00			MESTI-RSIM	MESTI-Procurement, MoC
		Management & Administration	Statistics, Research, Information & Public Relations	Produce of brochures, half yearly journals documentaries and other publications on MESTI programs, projects and activities.	Publicity for MESTI's activities					80,000.00			MESTI-RSIM	MESTI-HRM

DEVELOPMENT DIMENSIONS: GOVERNANCE, CORRUPTION AND PUBLIC ACCOUNTABILITY														
Adopted MDA Goal(s): Maintain a stable, united and safe society														
Adopted Objective s	Adopted Strategies	Programme s	Sub-programme s	Projects/ Activities	Outcome/ Impact Indicators	Time Frame				Indicative Budget			Implementing Agencies	
						201 8	201 9	202 0	202 1	GoG	IG F	Donor	Lead	Collaborati ng
		Management & Administration	Statistics, Research, Information & Public Relations	Provide media coverage for Minister and Dep. Minister's activities	Publicity for Ministers activities					300,000.00			MESTI-RSIM	All other Directorates, Agencies under MESTI
		Management & Administration	Statistics, Research, Information & Public Relations	Organize Meet-The-Press Series	Informed press on MSTI's policies					150,000.00			MESTI-RSIM	All other Directorates, Agencies under MESTI
		Management & Administration	Statistics, Research, Information & Public Relations	Organize capacity training programs for PR Officers	Effective public relations with the public					100,000.00			MESTI-RSIM	All other Directorates, Agencies under MESTI

4.3. Indicative Financial Strategy

The Ministry would in the Medium Term, embark on innovative mobilisation of the needed financial resources to execute this development plan. This would involve new methods of generating revenues from; Government of Ghana, Internally Generated Fund, Development Partners and Public Private Partnership mechanisms.

The estimated total funding amount for the Medium Term is GHC 1,150,567,835.80 out which, GoG, IGF and Donor sources would generate GHC488, 767,008.08 representing 42% of total estimated budget and a total funding gap of GHC661, 800,827.00 representing 58% of total funding amount. This funding gap would be bridged through increased regulatory activities, commercialisation of research, Public Private Partnerships and expanding Development Partnership Networks amongst others.

The increasing demand for investment in the key agencies of the sector Ministry requires the efficient and optimum use of available resources to achieve the desired objectives of the MTDP. In view of this, the Ministry would ensure value for money analysis on all projects and programmes before they are initiated. There would also be strict compliance to the Public Procurement and Public Financial management acts for the management of expenditure. Table 4.3 indicates the revenue requirements for the implementation of the MTDP.

Table 4.4: Indicative Financial Strategy

Programme	Total Cost 2018-2021	Expected Revenue					Gap	Summary of resource mobilisation strategy	Alternative course of action
		GoG	IGF	Donor	Others	Total revenue			
Management & Administration	530,081,143.16	47,684,389.85	0.00	57,841,141.57	0.00	105,525,531.42	424,555,611.74	<ul style="list-style-type: none"> GoG Funds Donor Funds 	Public-Private Partnership (PPP)
Research & Development	172,867,118.72	30,715,191.30	74,831,576.07	27,658,756.01	0.00	133,205,523.39	39,661,595.33	<ul style="list-style-type: none"> GoG Funds Donor Funds IGF 	<ul style="list-style-type: none"> Commercialization of research PPP
Environmental Protection and Management	300,233,433.92	6,288,397.10	224,630,433.14	0.00	0.00	230,918,830.24	69,314,603.68	<ul style="list-style-type: none"> GoG Funds Donor Funds IGF 	<ul style="list-style-type: none"> Increase IGF through increased regulatory activities
Human Settlements & Spatial Planning	121,460,000.00	11,407,595.65	0.00	0.00	0.00	11,407,595.65	110,052,404.35	<ul style="list-style-type: none"> GoG Funds Donor Funds 	<ul style="list-style-type: none"> Raise IGF through regulatory activities
Biotechnology Development	25,926,140.00	6,288,397.10	0.00	1,421,131.00	0.00	7,709,528.10	18,216,611.90	<ul style="list-style-type: none"> GoG Funds Donor Funds 	<ul style="list-style-type: none"> Raise IGF through regulatory activities
Total	1,150,567,835.80	102,383,971.00	299,462,009.22	86,921,028.58	0.00	488,767,008.80	661,800,827.00		

CHAPTER FIVE

ANNUAL ACTION PLANS

5.1. Introduction

This Chapter deals with the relevant activities to be rolled-out each year (2018 – 2021) with corresponding budgets, indicators and implementation arrangements. The Annual Action Plans will form the basis for the annual budget for the Sector and as input into the annual national budget.

5.2. Annual Action Plans

The Ministry's annual action plan for the years 2018, 2019, 2020 and 2021 is presented below.

Table 5.1: 2018 Annual Action Plan

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Biotechnology: Germplasm collection, characterization, conservation and distribution nationwide.	Nation wide		No. of Plant Accessions collected, conserved and distributed nation					600,000.00	250,000.00	591,217.58	CSIR-PGRRI	CSIR-CRI CSIR-FRI CSIR-SARI CSIR-OPRI
Scientific and Industrial Research	Develop strategies to reduce field and post-harvest losses for developed varies.	Northern Ghana		Percentage reduction in Postharvest losses in cereals and legumes					150,000.00	150,000.00	60,000.00	CSIR-SARI CSIR-Head Office	CSIR-CRI CSIR-FRI
Scientific and Industrial Research	Development and dissemination of improved varieties. (Crops/Livestock/Poultry/fisheries)	Nationwide		No. of improved varieties (Crop/Livestock/ Fishery) developed and disseminated					350,000.00	350,000.00	350,000.00	CSIR-CRI, CSIR-FRI, CSIR-SARI, CSIR-OPRI, CSIR-ARI, CSIR-WRI	CSIR-PGRRI CSIR-SRI CSIR-FRI MoFA
Scientific and Industrial Research	Development of Strategies to enhance processing of Crop livestock, poultry and fishery products	Nation wide		No. of Strategies developed to enhance food processing					150,000.00	250,000.00	500,000.00	CSIR-FRI	CSIR-IIR CSIR-WRI CSIR-OPRI CSIR-ARI MOFA-WIAD
Scientific and Industrial Research	Conduct baseline surveys and adoption studies of released improved crop varieties	Northern Ghana		No. of baseline surveys and adoption studies carried out					150,000.00	250,000.00	550,000.00	CSIR-SARI, CSIR-Head Office	CSIR-STEPRI

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Promotion of Science Agenda for Agriculture in Africa (S3A)	Nation wide		No. of sensitization and implementation workshops organized					200,000.00	250,000.00	550,000.00	CSIR-Head Office	FARA MESTI MOFA
Scientific and Industrial Research	Production of improved planting materials for commercial purposes	Kumasi, Tamale, Bunso, Kade		No. of improved planting materials produced					250,000.00	250,000.00	550,000.00	CSIR-Head Office	CSIR-OPRI CSIR-CRI CSIR-SARI MOFA
Nuclear and Space Science Technology	Public sensitization on the benefits of using gamma irradiation	GAEC / Nationwide	Sensitization of major stakeholders in Health and Exporters of perishables	5 stakeholder meeting to increase awareness of the benefits of using GIF held by the end of the year Stakeholders: Hospitals Food exporters Pharmaceutical co.					2,500.00	500.00		GAEC	
Nuclear and Space Science Technology	Upgrading of Gamma Irradiation Facility	GAEC		Complete the signing of one MOU on the strategy to upgrade GIF source.					USD\$ 50,000.00	USD\$ 50,000.00		GAEC	
Nuclear and Space Science Technology	Establishment of cultures of plantain, pineapples, sweet potatoes, and cassava	GAEC / BNARI	Initiation of cultures started	One (1) million planting materials for farmers produced					5,000.00	500.00		GAEC	

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Use of Gamma Irradiation Facility for the management of postharvest losses and enhancing health care delivery	GAEC		Treat over 30 tonnes of food crops to support export in the year and 10 tote boxes of medical equipment					20,000.00	1,000.00		GAEC	
Nuclear and Space Science Technology	Complete a production plant for protein bait to control fruit fly menace	GAEC	Production plant 70% completed	Protein bait supplied to mango farmers					100,000.00			GAEC	
Nuclear and Space Science Technology	Improving crops using mutation induction and biotechnology through a farmer participatory approach	GAEC	Mutation breeding is on-going	Mutation evaluation of mutant lines continues and Chinese yam with large tube size be released					2,500.00	200.00		GAEC	
Nuclear and Space Science Technology	Train farmers on compost making	GAEC	Expansion works about 60% complete	Complete the expansion works on compost production site					5,000.00	500.00		GAEC	
Nuclear and Space Science Technology	Field establishment for release of four varieties of cherry tomatoes by 2019	GAEC/BNARI	Cherry tomatoes successfully established	Release of four (4) varieties to farmers					15,000.00	1,000.00		GAEC	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Organise national validation for Environmental Management Policy on Oil and Gas (EMPOG)	Accra	Draft policy	Reports of stakeholder consultations Reviewed policy draft with technical inputs					-	-	400,000	MESTI-ENV	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Organise working session for Select Committee on Environment, Science and Technical on draft Policy	Accra	N/A	Reviewed policy draft with technical inputs Reports on PSC working session					-	-	200,000	MESTI-ENV	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Prepare Cabinet memo to parliament for approval of policy (EMPOG)	Accra	N/A	Copy of cabinet memo Approved policy document					-	-	200,000	MESTI-ENV	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Develop participatory community land use plans	Northern Ghana	174 community land use plans as at 2017	Number of community land use plans developed					-	-	244,800	MESTI-ENV	EPA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Implement Community land use plan developed	Northern Ghana	18,246 farmers benefited so far	Number of farmers benefiting from implementation of the plans					-	-	5,500,000	MESTI-ENV	EPA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Establishment and maintenance of demonstration fields	Northern Ghana	199 demo plots established as at 2017	Number of demo fields established and maintained					-	-	200,000	MESTI-ENV	EPA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Train selected CSO's and NGO's on the use of the participatory watershed planning	Northern Ghana		Number of NGO's and CSO's trained					-	-	80,000	MESTI-ENV	MoFA, MESTI, WD, FSD

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Conduct and train project beneficiaries on the Village & loans savings association (VSLA) and book keeping	Northern Ghana		Number of beneficiaries trained					-	-	200,000	MESTI-ENV	MoFA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Establish riparian vegetation and river bank soil erosion control measures	Northern Ghana		Number of communities with established Riparian vegetation					-	-	480,000	MESTI-ENV	MoFA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Implement CREMA management plans	Northern Ghana	9 communities are currently implementing the site 1 CREMA management plan	Number of communities implementing CREMA management plans					-	-	720,000	MESTI-ENV	MoFA, EPA, MESTI, FSD
P1: Management and Administration SP1: General Administration	Establish Green fire breaks within 2 forest Reserves (Ambalara and Kulpawn)	Northern Ghana		Area of green fire breaks established					-	-	708,000	MESTI-ENV	MoFA, EPA, MESTI, WD
P1: Management and Administration SP1: General Administration	Conduct Reconnaissance survey for large scale multipurpose water system	Northern Ghana	No survey	Survey Report					-	-	240,000	MESTI-ENV	SADA, EPA, MoFA
P1: Management and Administration SP1: General Administration	Undertake audit of 2017 project Accounts	Accra and Northern Ghana	2016 audit report	2017 audit report					-	-	120,000	MESTI-ENV	FSD, EPA, WD, MoFA
P1: Management and Administration SP1: General Administration	Train 10 Staff of EPA to support implementation of the Chemical Weapons Convention			No. of Staff trained in Chemical Weapons Convention implementation.								MESTI-ENV	EPA, OPCW
P1: Management and Administration SP1: General Administration	Train 300 Officers of the Customs Division of the Ghana Revenue Authority on the Transfers Regime to support implementation			No. of Officers of the GRA-Customs Division trained in the								MESTI-ENV	EPA, OPCW, GRA-Customs,

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	of the Chemical Weapons Convention			Transfers in relation to the Chemical Weapons Convention.									
P1: Management and Administration SP1: General Administration	Develop a National Response Capability system against all chemical emergencies or incidents			A National Counter Chemical Response Capability system developed					150,000			MESTI-ENV	EPA, GAEC, NRA, CSIR, GSA, FDA, NSCS, GPS, GRA-Customs, Universities, GPS, GAF
Management and Administration	Develop a National Chemicals Policy			Policy Document					200,000			MESTI-ENV	EPA, GAEC, NRA, CSIR, GSA, FDA, NSCS, GPS, GRA-Customs, Universities, GPS, GAF
P1: Management and Administration SP1: General Administration	Review all Chemical related Conventions for which Ghana is party.			Reviewed legislations on all domesticated Chemicals Conventions					200,000			MESTI-ENV	EPA, GAEC, NRA, CSIR, GSA, FDA, NSCS, GPS, GRA-Customs, Universities, GPS, GAF
P1: Management and Administration SP1: General Administration	Pay Annual subscription fees for the Chemical Weapons Convention and all arrears			Annual subscription fees paid with arrears					366,680			MESTI-ENV	MESTI, EPA, MFA & RI
P1: Management and Administration SP1: General Administration	Participate in all annual Conferences of the States Parties (CSPs) to the Chemical Weapons Convention			Ghana Delegation participated in annual CSP					50,000			MESTI-ENV	EPA, NSCS, GPS, GRA-Customs,
P1: Management and Administration SP1: General Administration	Sensitize 1 st and 2 nd Cycle schools on chemical weapons			No. of schools sensitized					50,000			MESTI-ENV	EPA, GAEC- Nuclear Chemistry Dept, Universities-UCC Chemistry Dept
P1: Management and Administration SP1: General Administration	Sensitize Tertiary Institutions on chemical weapons			No. of Tertiary Institutions sensitized					50,000			MESTI-ENV	EPA, GAEC- Nuclear Chemistry Dept, Universities-UCC Chemistry Dept

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Sensitize chemical industries on chemical weapons			No. of chemical industries sensitized					50,000			MESTI-ENV	EPA, GAEC-Nuclear Chemistry Dept, Universities-UCC Chemistry Dept
P1: Management and Administration SP1: General Administration	Hold stakeholder consultations to Finalize draft Bill on Chemical Weapons			Draft Bill on Chemical Weapons finalized.					300,000			MESTI-ENV	EPA, GAEC, NRA, CSIR, GSA, FDA, NSCS, GPS, GRA-Customs, Universities, GPS, GAF
P1: Management and Administration SP1: General Administration	Collaborate with AG's Dept to prepare and submit a Draft Bill on Chemical Weapons Convention (CWC) to Cabinet			Cabinet Memo on CWC submitted					50,000			MESTI-ENV	Attorney General's Dept, EPA,
P1: Management and Administration SP1: General Administration	Hold three (3) meetings for sensitization of Parliamentarians prior to parliamentary consideration of draft Bill			No. of Meetings held					150,000			MESTI-ENV	Parliamentary Select-Committee,
P1: Management and Administration SP1: General Administration	Print and gazette final version of draft Bill			Enactment of legislation on Chemical Weapons Convention					25,000			MESTI-ENV	GAEC, NRA, CSIR, GSA, FDA, NSCS, GPS, GRA-Customs, Universities, GPS, GAF
P1: Management and Administration SP1: General Administration	Delegate five (5) to participate in the Biennial Conference of the Parties (COPs) to Basel, Rotterdam and Stockholm Conventions in Geneva, Switzerland			COPs Report and Action Plan					250,000			MESTI-ENV	EPA, Ghana Mission in Geneva
P1: Management and Administration SP1: General Administration	Sensitize stakeholders on Biological weapons			No. of institutions sensitized					75,000			MESTI-ENV	Selected educational institutions and the general public
P1: Management and Administration SP1: General Administration	Organize working session for Parliamentary Select Committee on Environment, Science and	Accra	Nagoya Protocol Draft NBP	Report on PSC working session Ratification of					57,000			MESTI-ENV	EPA, PSC

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Technology on Nagoya Protocol			Nagoya Protocol									
P1: Management and Administration SP1: General Administration	Organize Natural Capital Accounting Workshop for Anglophone West African Countries	Accra	Final Draft NBP	Workshop report					23,000		100,000	MESTI-ENV	MoF, GSS, CSOs, Academia,
P1: Management and Administration SP1: General Administration	Organize one (1) Experts review of the NBP	Accra	Draft NBP	Review report								MESTI-ENV	Academia, EPA, CSIR, FC, CSOs
P1: Management and Administration SP1: General Administration	Organize working session for Parliamentary Select Committee on Environment, Science and Technology to review the Final Draft NBP	Accra	Final draft NBP	Review meeting report							115,000	MESTI-ENV	EPA, PSC
P1: Management and Administration SP1: General Administration	Prepare Cabinet memo for approval of NBP	Accra	Final draft NBP	Copy of cabinet memo Approved policy document					2,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Revise the NBSAP to sync with the NBP	Koforidua	Final draft NBP 2016 NBSAP	Revised NBSAP					90,000			MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Develop National Biodiversity Policy Communication Strategy	Aburi	Final draft NBP 2016 NBSAP	Communication Strategy for the implementation of the NBP					50,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, WRC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Print and launch of NBP	Accra	Final draft NBP	NBP Document					200,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, WRC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Train 2 staff in Biodiversity Implementation National Report writing and related Biodiversity courses	Ghana, International	N/A	Standardized National reports that are accepted by the CBD Secretariat Back to office reports Capacity of staff built to deliver efficiently					25,000	-	-	MESTI-ENV	CBD approved training institutions, international training Institutions
P1: Management and Administration SP1: General Administration	Prepare 6 th National Report on Biodiversity	Accra, Koforidua	NBSAP Final Draft NBP	6 th National Report							400,000	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, WRC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Develop training manuals and guidelines for mainstreaming/ biodiversity training of MMDAs	Accra	N/A	No. of MDAs and MMDAs					80,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, WRC, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Organise national validation workshop on Biodiversity Report	Koforidua	National Biodiversity Policy, NBSAP	National Biodiversity Report % of forest loss List of endangered species					85,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Sponsor 5 staff to participate in the Biennial Conference of the Parties to the Convention on Biological Diversity	International	National Biodiversity Policy, NBSAP	COP Decisions					75,000	-	-	MESTI-ENV	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Review of NBSAP	Accra, Aburi, Koforidua	NBSAP (2016)	Revised NBSAP					65,000	-	-	MESTI-ENV	CSIR, EPA, NBA, LUSPA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Coordinate and report on the implementation of NDC readiness programmes identified	Accra	Steering Committee set-up and operational	No of NDC Readiness action being implemented					186,860			MESTI-ENV	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
P1: Management and Administration SP1: General Administration	promote the scale of biogas energy across public institutions and schools	Nation-al	10 school/institutions already using biogas	No. of Institutions establishing up biogas systems					879,340			MESTI-ENV	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
P1: Management and Administration SP1: General Administration	Review the Low Carbon Development Strategy	Accra	First Version of Strategy Developed	Low Carbon growth Strategy updated					1,353,170			MESTI-ENV	NDPC, EC, Academia
P1: Management and Administration SP1: General Administration	Conduct trend/historical analysis of the impact of climate variability on the White, Black and Oti River basins Generate climate change projections for the White and Black Volta and the Oti River basins Conduct a vulnerability analysis of communities along the White and Black	Northern, Upper West & Upper East	N/A	No. of MDAs and MMDAs						-	17,586,800	MESTI-ENV	WRC, WRI, UNDP, MLNR, NADMO, CWSA, MOFA, MOFAD, MLGRD, EPA, MMDAs, Universities, CSOs,

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Volta as well as the Oti River basins Develop Black Volta & Oti River management & investment plans Carry out an assessment of existing water management activities along the rivers Desilt dams/dug outs etc. Drill boreholes Mechanize high yielding boreholes/dugouts for irrigation Create buffer zones with fence Introduce Village Savings and Loans association (VSLA) concept to all communities Build capacity and supply of input to women groups in shea butter/groundnut oil extraction Establish/adapt community nurseries for seedling production Introduce cage fishing in constructed/rehabilitated water bodies												
P1: Management and Administration	Develop the National STI Development Plan 2019-2023	Accra	N/A	Programmes and project to implement National STI Policy outlined					50,000			MESTI-STI	R&D Institutions/ Academic Institutions/Private Sector

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	Monitoring and Evaluation of the mainstreaming programme	Accra	N/A	STI Mainstreaming Monitoring report					100,000		100,000	MESTI-STI	PACSTI/ R&D Institutions/ Academic Institutions/MoF
P1: Management and Administration	Celebrating Annual National STI Week and Scientific Renaissance day	Accra	N/A	National STI Week celebrated with wide publicity					100,00		200,000	MESTI-STI	NDPC/R&D Institutions/Academic Institutions
SP1: General Administration	Assessing STI Infrastructure Needs of Ghana	Accra	N/A	National STI Infrastructure Survey report					100,000		50,000,000	MESTI-STI	MoT/MoF/ R&D Institutions/ Academic Institutions
P1: Management and Administration	Implement the Ghana Technology Incubation Programme	Accra	N/A	10 incubation centres established					10,000,000		10,000,000	MESTI-STI	NDPC/R&D Institutions/Academic Institutions / MoT/MoF
SP1: General Administration	Establish National Foundry and Machine Tooling Centres in various parts of the country. Establish High Performance Computer (HPC) Centres	Accra	N/A	Number of Foundries established 3 HPC Centres Established					10,000,000		20,000,000	MESTI-STI	R&D Institutions/Academic Institutions/Private Sector/MoT/MoF R&D Institutions/Academic

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
													Institutions/ MoF
P1: Management and Administration	Create a Data Base of Scientists, Engineers and Technologists in the Country through the use of MIS	Accra	N/A	A national database on the profile of scientists, engineers, and technologists created.					100,000		400,000	MESTI-STI	R&D Institutions/Academic Institutions/MoF
SP1: General Administration	Promote the participation of Ghanaian STI experts in National Programmes Create a database on Ghanaian STI experts in across the world	Accra	N/A	No. of Ghanaian and African Diaspora STI experts with established working relationship with Ghanaian institutions Database of Ghanaian STI experts in 4 countries across the world established					100,000		100,000	MESTI-STI	PACSTI/ R&D Institutions/ Private Sector/MoFA/ MoF
P1: Management and Administration	/Establish and operationalize the Ghana Innovation and	Accra	N/A	GIRC-Center established and					10,000,000		10,000,000	MESTI-STI	R&D Institutions/Academic

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Research Commercialization Centre /National Innovation Agency (NIA)			operationaliz ed									Institutions/Grat is foundations/Mo F
SP1: General Administration	Development of a National Databank on Indigenous Knowledge and Technologies	Accra	N/A	Databank on indigenous knowledge and skills established					100,000		200,000	MESTI-STI	R&D Institutions/Aca demic Institutions/Grat is foundations/Mo F
P1: Management and Administration	Improving Regional, Continental and global cooperation for STI	Accra	N/A	No. of Regional, Continental and global cooperation for STI meetings attended.					400,000		200,000	MESTI-STI	MoFA/MoF
SP1: General Administration	Continue the Implementation of the SGCI	Accra	N/A	100 researchers trained in Research Management 100 Researchers Trained in measuring STI Indicators					100,000		1,000,000	MESTI-STI	Academic Institutions/ R&D Institutions/

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				5 Technologies Transfer to Private Sector									
P1: Management and Administration	Support the Ghana-South Africa Bilateral	Accra	N/A	Number of projects jointly implemented					400,000		5,000,000	MESTI-STI	MoFA/R&D Institutions/Academic Institutions
SP1: General Administration	Construction of Guest House and Fencing of Kuntunse	Accra	N/A	Guest house and fencing constructed					25,000,000			MESTI-STI	
P1: Management and Administration	Participate in international conferences, workshops, training programmess		40 international programmes attended						125,000,000			MESTI-STI	EU,AU, ECOWAS.
SP1: General Administration	Prepare National Space Policy	Accra	N/A	5 stakeholder consultation meeting organized National Space Policy approved by Cabinet					100,000		100,000	MESTI-STI	GSSTI/NDPC/Academic Institutions/MoFA/ MoF
P1: Management and Administration	Support the Implementation of the SKA/AVN Project.	Accra	N/A	8 SKA/AVN partner countries					1,000,000		1,000,000	MESTI-STI	GSSTI/ Academic Institution/MoF

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				meetings attended. One National Planetarium established at Kuntunse. 30 Astronomers and Engineers trained.									
SP1: General Administration	Establish National Space Data Centre by establishing a Satellite Ground Receiving Station	Accra	N/A	Satellite Ground receiving station constructed Space data available to institutions.					100,000,000		10,000,000	MESTI-STI	GSSTI/Academic Institutions/MoF
P1: Management and Administration	Establish a Presidential Advisory Council on Science, Technology and Innovation (PACSTI)	Accra	N/A	PACSTI council and Secretariat fully established and operational					10,000,000			MESTI-STI	R&D Institutions/Academic Institutions/MoJ /MoF

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	Establish an Inter-Ministerial Coordinating Committee to ensure the coordination of the application of STI in all sectors of the economy	Accra	N/A	Inter-ministerial coordinating committee inaugurated.					100,000			MESTI-STI	MDAS/R&D institutions/ Academic Institutions
P1: Management and Administration	Organize an annual STI consultative workshop with STI Advocacy and Professional Bodies.	Accra	N/A	4 consultative workshops organized.					200,000			MESTI-STI	R&D Institutions/ Academic Institutions/ Private Sector
SP1: General Administration	Establish the STI Fund	Accra	N/A	STI Fund established and operationalized					10,000,000			MESTI-STI	R&D institutions/Academic Institutions/Private Sector/MoF
P1: Management and Administration	Encouraging R&D by the Private Sector	Accra	N/A	Total R&D Budgets of the Private Sector					50,000		10,000,000	MESTI-STI	R&D institutions/Academic Institutions/Private Sector.
SP1: General Administration	Promote Venture Capital for Business Development in Technology Parks and Business Incubators	Accra	N/A	Venture Capital for Business Development in Technology Parks and Business Incubators					100,000			MESTI-STI	R&D institutions/Academic Institutions/Private Sector/MESTI

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Landscape management systems or technologies resilient to climate change vulnerabilities in time and space.	Bobiri, Kogyae Ankasa		No. of Technologies for Sustainable management, conservation and utilization of forest resources developed					200,000.00	250,000.00	550,000.00	CSIR-SRI	CSIR-FORIG Forestry Commission
Scientific and Industrial Research	Innovative risk management strategies that foster resilient rural livelihoods for sustainable landscape restoration.	Bobiri, Kogyae Ankasa		No. of stakeholders with capacity developed on the use of forest genetic resources/ adaptation to climate change strengthened					150,000.00	388,000.00	600,000.00	CSIR-FORIG CSIR-Head Office	CSIR-SRI CSIR-WRI CSIR-CRI CSIR-SARI
Scientific and Industrial Research	Development of Strategies to combat effect of climate change	Nation-wide		No. of strategies to combat effect of climate change					250,000.00	250,000.00	500,000.00		
Scientific and Industrial Research	Control and elimination of water and soil borne diseases	Western and Northern Regions		Operational plan developed % reduction in rate of Morbidity, Mortality and Poverty associated with NTDs.					250,000.00	250,000.00	500,000.00	CSIR-WRI CSIR-Head Office	Ghana Health Services and Liverpool School of Tropical medicine
Scientific and Industrial Research	Develop transmission indices to determine	Brong-Ahafo and Northern Regions		No. of transmission indices developed to					100,000.00	391,221.35	5,000,000.00	CSIR-WRI	Imperial College, UK

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	feasibility of eliminating diseases			determine feasibility of eliminating diseases								CSIR-Head Office	
Scientific and Industrial Research	Development of Strategies to address water, air and soil pollution	Nation wide		No. of Strategies for addressing pollution developed					100,000.00	190,441.20	500,000.00	CSIR-WRI	CSIR-SRI
Scientific and Industrial Research	Development of essential materials and industrial products using local raw materials	Kumasi		Number of products developed from local raw materials					250,000	250,000.00	500,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Development of local building materials for affordable housing delivery and provision of road construction advisory services	Kumasi Apam		No. of local building materials promoted					150,000	250,000.00	500,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Promotion of renewable Energy systems for both domestic and commercial buildings	Southern Ghana		No. of Solar energy systems installed					100,000.00	400,000.00	500,000.00	CSIR-IIR CSIR-Head Office	Energy Commission
Scientific and Industrial Research	Promote Climate – friendly bioenergy options for sustainable rural livelihoods	Nation-wide		No. of bioenergy options for sustainable rural livelihoods promoted					250,000.00	250,000.00	600,000.00	CSIR-IIR	Energy Commission
Scientific and Industrial Research	Establishment of ICT Centre for the provision of	Accra		ICT Centre established					550,000.00	480,000.00	480,000.00	CSIR-INSTI	MESTI

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	electronics and computer engineering services			No. of training sessions organized								CSIR-IIR Head Office	CSIR-IIR CSIR-STEPRI
Nuclear and Space Science Technology	Fencing of GAEC land	GAEC	NONE	Stakeholder consultations to properly map out land boundaries and secure funding for the project					1,000,000			GAEC	
Nuclear and Space Science Technology	Compensation for GAEC land	GAEC	NONE	Compensation paid					500,000			GAEC	
Nuclear and Space Science Technology	Refurbishment of central waste processing facility	GAEC	NONE	One (1) centralized waste processing facility established					1,200,000.00			GAEC	Project subject to the availability of funds
Nuclear and Space Science Technology	Using Stable Isotope Techniques to Monitor and Evaluate Vitamin A Status of Children Susceptible to Infection	GAEC Nationwide /	-Data/sample collected from 109 participants at baseline -106 at end point	Analysis report on vitamin A status of children from the Upper East region to the Ministry of Health commenced					GHC 25,000.00	-	GHC 55,200 Euros 10,000	GAEC	International laboratories in Morocco and Germany have been sub-contracted by the IAEA to conduct some sample analysis. Donor budget is towards this activity
	Safety assessment of telecommunication base stations/cell sites	Nationwide	378 base stations assessed	400 RF and FM cell sites assessed						GHC 100,000.00			Telecom Companies, EPA

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Monitoring of telecommunications masts/base stations	Nationwide	755 masts monitored	1000 masts/base stations monitored						450,000		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	National Radon Mapping project to commence - Naturally Occurring Radioactive Materials (NORMs)	Nationwide	NONE	Identified sites for NORMS monitored.					205,585.00	25,000		GAEC RPI	(conducting the project depends on the availability of funds)
Nuclear and Space Science Technology	Monitoring of occupational exposures for mine, industrial, medical, educational and educational research institution workers	Nationwide	507 occupationally exposed workers monitored. (the project stalled as a result of major breakdown of TLD reader)	500 occupationally exposed workers involved in ionizing radiation monitored						50,000.00	200,000	GAEC RPI	
Nuclear and Space Science Technology	Assessment of food/dairy products and water samples for radioactive contamination	Nationwide	Analysed 600 containers	700 containers analysed to ensure safety of food import and water are free from radioactive contamination monitored						5,000.00		GAEC	
Nuclear and Space Science Technology	Calibration of radiation detection equipment and nuclear density gauges used in medical and industrial facilities.	Nationwide	59 survey meters and 7 density gauges calibrated	Calibration of 70 survey meters and 10 density gauge completed					10,000.00	5,000.00		GAEC	The broken down Philips x-ray generator has to be fixed or replaced

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Monitoring of air for persistent organic pollutants and particulate matter.	Nationwide	Areas in Greater Accra and Eastern Region, to be monitored.	Samples collected (50%)							20,000	GAEC	EPA
Nuclear and Space Science Technology	Groundwater recharge and sustainability studies using classical and isotopic approach in the white river basin of Ghana.	Upper East Region	Preliminary Water Quality Assessment Carried out	Sampling of boreholes, hand-dug wells and dams Lab analysis of samples Publication					1,240,000.00			GAEC	WRC CWSA MMDAS
Nuclear and Space Science Technology	Assessing the effects of domestic and industrial discharges on Volta River quality	Akosombo	Field investigations and sample analysis.	Reduction in nutrient and metal levels in discharges into the Volta River. -Bumper fish catch -Improve standard of living of the people along the Volta River.						10,000		GAEC	
Nuclear and Space Science Technology	Measurement of gross alpha-beta in drinking water (bottled and sachet)	GAEC / Nationwide	578 containers of food/dairy containers and water samples were analysed for radioactive contamination	Analysis of 500 containers of food/dairy and water samples for radioactive contamination conducted.						70,000.00		GAEC	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Training of MPhil and PhD students	GAEC	41 students have been given admission									GAEC	
Nuclear and Space Science Technology	Training and public education in Radiation Safety, Radiation Protection and Nuclear Security	GAEC	150 young professionals successfully completed their training on radiation protection (PGEC)	250 occupationally exposed workers and frontline officers trained						10,000.00		GAEC	
Nuclear and Space Science Technology	Management of radioactive waste		NONE	Characterization and storage of collected radioactive waste materials completed					70,000.00			GAEC	Project subject to the availability of funds
Nuclear and Space Science Technology	Scientific assessment of the environment and human health impact of e-waste	Greater Accra Region	Contract to consult on e-waste management signed with e-waste management company	All locations in the Greater Accra mapped and fully characterized							5,000	GAEC	EPA
Nuclear and Space Science Technology	Implementation of the borehole disposal concept for Disused Sealed Radioactive Sources (DSRS) in Ghana.	GAEC	*Developed site charaterisation report for review by IAEA. *Consolidation of the 458 DSRS *Developed post closure safety assessment report for	*Site characterization report for regulatory review by NRA finalized and submitted. *Post closure safety assessment report for regulatory review					125,000.00		1,094,794.63	GAEC-RWMC	Canada, USA, IAEA

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
			reviewing by the IAEA.	finalized and submitted. *Safety case and security plan developed									
Nuclear and Space Science Technology	Initiation of cancer (tumour) biomarker service at RAMSRI	GAEC	Proposal submitted	-Proposals and SOPs prepared. -Laboratory completed -Identified persons to be trained					200,000			GAEC	
Nuclear and Space Science Technology	Strengthening activities on radiation counter measures to mitigate/ treat radiation	GAEC	i. Crude dose-response curve for gamma rays constructed ii. Some medicinal flora identified and screened for antioxidant properties	i. SOPs for predicting individual hypersensitivity completed ii. Calibration curves completed iii. Candidate radioprotectors identified iv. Database of medicinal flora with high promise for radioprotection available					70,000			GAEC	
Nuclear and Space Science Technology	National Quality Assurance Audit of radiotherapy, diagnostic radiology and nuclear	GAEC	National quality assurance audit of five diagnostic	Thirty (30) diagnostic radiology					20,000.00			GAEC	

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	medicine practice in Ghana		radiology centres in Ghana completed	centres in Ghana audited									
Nuclear and Space Science Technology	Establish a National Professional Training Institute for welding and Non-destructive testing to train and certify welders and Non-destructive Testing (NDT) professionals.	GAEC	* Clients still not identified. * Mobilizing funds for training sessions.	Sign agreement with partner(s)and begin construction of the training facility								GAEC	
Nuclear and Space Science Technology	Applying Radiation technologies to Assess Sediment Transport for the Management of Coastal Infrastructures (RAF/7/018)	Tema Port, Densu River and Volta Lake	IAEA Document	Training Courses for participating staff organized by IAEA							100,000	GAEC NNRI	VRA, Tema Port
Nuclear and Space Science Technology	Development of computed Gamma tomography for industrial process diagnostics	GAEC	-1 staff trained in computed tomography(C T) through fellowship - pieces of equipment for the CT system (Radioactive source, radiation survey monitors and beepers)	Computed tomography system installed and tested on laboratory scale							500,000	GAEC NNRI	
Nuclear and Space Science Technology	National Space policy	GSSTI	Draft space policy 50% complete	Complete the national space policy for Ghana					20,000			GSSTI	National Space policy

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	National Space Strategy	GSSTI	None	Draft national space Strategy					15,000			GSSTI	
Nuclear and Space Science Technology	Science awareness, engagement and outreach	GSSTI	Draft strategy in place	Science awareness and outreach strategy document Visit to schools report Visit to GRAO reports					40,000	10,000		GSSTI	GES, Schools, Ghana Planetarium, GAST
Nuclear and Space Science Technology	Research with Ghana Radio Telescope	GSSTI	Phase 1 of conversion complete	Working radio telescope Refereed publications Participation in space observations					500,000			GSSTI	SKA
Nuclear and Space Science Technology	Human capital development and training in space science and technology (staff and non-staff)	GSSTI	Annual training programme in place	Training programmes Summer schools Conferences and workshops					150,000	20,000	150,000	GSSTI	SKA, DARA, Royal Society, Ghana Universities
Nuclear and Space Science Technology	Establishment of spin-off ventures	GSSTI	Industry identified	Industry development Teams formed Prototypes developed Market research reports					100,000	200,000		GSSTI	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Technology	Climate research	GSSTI	Research with models and observation started	Mean and extreme climate patterns of Ghana/West Africa well understood						10,000	10,000	GSSTI	
Nuclear and Space Science Technology	Earth Observation research	GSSTI	Research on satellite applications ongoing in agriculture, water resources, and environment	Satellite data used to the advantage of Ghana						30,000		GSSTI	
Nuclear and Space Science Technology	Introduction of space science courses at SNAS	GSSTI	None	Graduate program in space science started						100,000		GSSTI	SKA, DARA, Royal Society,
Nuclear and Space Science Technology	Installation of hydrogen maser at GRAO	GSSTI	Phase 1 of conversion complete	Hydrogen Maser Equipment installed					500,000		500,000	GSSTI	SKA, DARA, Royal Society,
Nuclear and Space Science Technology	Installation of ground Satellite receiving station	GSSTI	Made enquiries with Iran and China space organizations (1%)	Mission visit to China and Iran for assessment Stakeholder engaged on Ghana's needs for satellite ground receiving station Begin feasibility studies to construct a ground					50,000 20,000 10,000			GSSTI	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				receiving station Contract signed to commence construction of ground receiving station					50,000,000				
Nuclear and Space Science Technology	Capacity building		None	Human capacity developed in remote sensing techniques, climate data analysis and GIS					10,000			GSSTI	
Nuclear and Space Science Technology	Unmanned Aerial Vehicle (UAV)/Drone training	GSSTI	Draft policy 30% complete	Unmanned Aerial Vehicle (UAV)/Drone training completed					50,000	50,000		GSSTI	Federal University of agriculture, Abeokuta Nigeria
Nuclear and Space Science Technology	Setting Up of a Standard Electrical/Electronic laboratory	GSSTI	None	Laboratory completed					300,000			GSSTI	
Nuclear and Space Science Technology	Generating, processing and making existing satellite data available	GSSTI	Potential satellite data sources identify	Satellite rainfall data generated for every 4km radius for Ghana							100,000	GSSTI	
Nuclear and Space Science Technology	Capacity building on Satellite receiving station	GSSTI	None	Human capacity developed in operation and software of					40,000			GAEC	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				ground receiving station									
Nuclear and Space Science Technology	Preferred site(s) selected and assessed taken into account geological, seismological, population density, human induced factors, environmental, water availability and quality consideration and other relevant studies.	Nationwide	Candidate areas identified	Suitable sites are available for construction of nuclear power plant					1,500,000			NPI/GAE C, Owner Operator	GNPPO stakeholders on siting
Nuclear and Space Science Technology	Organize stakeholder and public sensitization meetings on adoption of nuclear power	Nationwide	15 stakeholder meeting held on sensitization	Hold at least 20 stakeholder/meetings. Hold at least 1 editors forum to sensitise the media on nuclear power development Publish monthly newsletter on nuclear power development					90,000			NPI/GAE C, Owner Operator	NCCE, Statistical service, Media
Nuclear and Space Science Technology	Develop human resource for the implementation of Nuclear Power	Nationwide	Draft human resource development plan prepared and undergoing	Necessary knowledge and skills identified, and gaps in current					75,000			NPI/GAE C, Owner Operator	Tertiary institutions, Vocational institutions, Research &

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
			series of review	capability assessed. Training programmes developed (including the training of the personnel of the owner/operator organisation and the regulatory body)									development institutions
Nuclear and Space Science Technology	Conduct studies for national and regional grid network	Nationwide, West African Sub-Region	Preliminary national grid assessment done Draft terms of reference for detailed grid study prepared Scientific Visit to Croatia to appreciate the nature of studies to be undertaken to assess the Ghana and West African grid for incorporation of the first NPP.	First phase of national and regional grid assessment done Report prepared and evaluated					95,000			NPI/GAEC Owner Operator GRIDCo	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	*Review of environmental protection framework to include nuclear power	Nationwide	Meetings held between various stakeholders Existing environmental protection framework undergoing review	Review completed, gaps identified, assignment of responsibilities to EPA and NRA clearly established, action plan to draft EPF including regulations, guides and standards to incorporate nuclear power prepared					60, 000			NPI/GAE C	Nuclear Regulatory Authority EPA
Environmental Education, Information and Communication	Natural resource and environmental governance activities	Nationwide	3	Number of sector plans(MMDAs Plans) subjected to the SEA process						5,092,680.70		EPA	MESTI, WB, MoF
Environmental Compliance and Enforcement	Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	Nationwide	2013	Number of permits issued to ensure compliance						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Monitor all permitted projects to ensure compliance with LI1652	Nationwide	5500	Number of projects to ensure compliance with LI1652						3,592,494.84		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Environmental Compliance and Enforcement	Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	Greater Accra	14 sites	No of sites monitored and average level of particulate matter in the air at selected locations						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Sample and analyse level of pollution of Effluent quality from industries and hotels	Greater Accra	80 industries	No of industries monitored to assess the level of pollutants of effluent discharge into coastal waters and lagoons						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Review the environmental laws , regulations and guidelines to address emerging environmental issues	Nationwide	2	Number of environmental laws, regulations and guidelines reviewed.						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Develop regulations for emerging environmental issues	Nationwide	1	Number of environmental laws and regulations developed						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Monitor the marine ecosystem to ascertain the levels of pollutants	Coastal Belt	NIL	Number of monitoring exercises carried out to measure the concentrations of heavy metals and petroleum products in the						3,592,494.84		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				marine ecosystem									
Environmental Compliance and Enforcement	Ensure the use of bio-oxodegradable additives in the manufacture of flexible plastics	Nationwide	25	Number of companies using the bio-oxodegradable additives						3,592,494.84		EPA	
Environmental Protection and Management	Undertake regular audits of the oil and gas industry	Nationwide	1	Number of environmental audits conducted annually in the oil and gas industry						3,592,494.84		EPA	
Environmental Protection and Management	Undertake regular audits of mining companies to ensure compliance to permitting conditions	Nationwide	30	Number of companies audited for compliance with permit conditions						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Operationalize the National Oil Spill Contingency Plan	Nationwide	1	Number of simulation exercise performed in readiness for oil spill emergencies						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Upscale the source waste segregation programme to institutions	Nationwide	40	Number of institutions implementing the programme						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Update of pesticide register annually to indicate list of approved ,banned and pesticides for experimental purposes	Nation wide	1	Number of updates of pesticide register undertaken						3,592,494.84		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Environmental Compliance and Enforcement	Develop a system that effectively and rapidly responds and deal with chemical related emergencies nationwide	Nationwide	NIL	Development and activation of Chemical Emergency Response Plan						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Establish and operationalize e-waste collection centres	Nationwide	NIL	Number collection centres established						3,592,494.84		EPA	MESTI
Environmental Compliance and Enforcement	Establish and operationalize treatment plants for managing e-waste	Nationwide	Nil	Volume of e-waste received by e-waste treatment plants managing e-waste						3,592,494.84		EPA	
Environmental Compliance and Enforcement	Incorporate climate change issues into sector medium term plans	Nationwide	6	Number of sectors with climate change mitigation and adaptation strategies						3,592,494.84		EPA	MESTI
Environmental Compliance and Enforcement	Commit to attain 45% emission reduction goal by 2030 compared to 2010 emission levels	Nationwide	56.1MT	Level of greenhouse gas emissions in metric tonnes						3,592,494.84		EPA	MESTI
Spatial Planning and Human Settlements	Ensure institutional, technological and legal reforms in support of land use planning	Nationwide	Existing planning models and land use planning standards	Revised spatial planning models and planning standards commenced					20,000			LUSPA	EPA, NPA, GHS, GES etc.
Spatial Planning and Human Settlements	Review manuals for preparation of spatial plans	Nationwide	Spatial plan preparation manual available	Spatial plan preparation manual signed					20,000			LUSPA	MMDAs, RCCs, Sector Ministries.

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Spatial Planning and Human Settlements	Set up the Land Use Planning and Development Fund	Head office	Land Use and Development Planning Fund provisions made in Act 925	Land Use and Development Fund established					100,000			LUSPA	MoF
Spatial Planning and Human Settlements	Collect requisite data for spatial plan preparation	Nationwide	Some thematic Spatial data already available in LUPMIS	Thematic spatial data, collected and submitted to LUPMIS data base head office					10,000			LUSPA	MMDAs, MDAs
Spatial Planning and Human Settlements	Identify and design industrial parks for all 10 regions of Ghana	All regions	Tema Industrial Enclave	Number of Industrial parks identified and designed for industrial development					0			MOTI, LUSPA	GFZB, GIPC
Spatial Planning and Human Settlements	Evaluate and redesign 2 existing industrial enclaves to enhance optimization in land use	N/A	N/A	2 Number of industrial parks evaluated					0			MOTI, LUSPA, TDC, GPHA	
Spatial Planning and Human Settlements	Organize Orientation Course for Board, RSPCs, DSPCs and Technical Sub-Committees, on their mandate and roles.	Head Office, Regional and District Capitals	Venues available at National, Regional and District Levels for Training; Resource Persons identified for training	Reports on Orientation					250,000			LUSPA	MLGRD, RCCs and MMDAs
Spatial Planning and Human Settlements	Organize training programmes for 100 no. staff on new functionalities of the	Nationwide	N/A	Report on training programmes organized for					80,000			LUSPA, MLGRD	Physical Planning Department of MMDAs

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Upgraded LUPMIS particularly on, street naming, development permitting, property tax administration			100 no. staff on LUPMIS									
Spatial Planning and Human Settlements	collect quarterly permitting data from all 216 MMDAs	Nationwide	N/A	Quarterly report on permitting data collected from 216 MMDAs					0			LUSPA, MLGRD	RSPC, MMDAs
Spatial Planning and Human Settlements	Ensure 20 MMDAs prepare their SDF/ Structure plans	Nationwide	N/A	20 MMDAs structure plans/SDFs prepared					0			MLGRD	Physical Planning Department of MMDAs, LUSPA
Spatial Planning and Human Settlements	Print and disseminate 50 no GARSDFs and 50. No ARSDFS	Head office- Accra	Soft Copies of ARSDF and GARSDFs available	100 copies of GARSDF and ARSDFs distributed					100,000			LUSPA	
Spatial Planning and Human Settlements	Redesign LUSPA’s website Publicize the RSDFs on websites	Online	N/A	Number of Websites with Ashanti and Greater Accra RSDFs					5,000			LUSPA	RCCs
Spatial Planning and Human Settlements	Commence the construction of LUSPA’s head office (Fence wall construction)	Head office	N/A	% level of completion of Head office building					150,000				
Spatial Planning and Human Settlements	Publicize the GARSDFs and ARSDFs on the newly created websites	Online	N/A	GARSDF and ARSRDF available on new website					0			LUSPA	
Spatial Planning and Human Settlements	Organize 4radio programmes to publicize the ARSDFs and GASDFS	Greater Accra and Ashanti Regions	N/A	4 Number of radio programmes organized on					50,000			LUSPA	RCCs

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				GARSDF and ARSDF									
Spatial Planning and Human Settlements	Undertake 5 No. public awareness and planning education programmes on radio and television	Nationwide	N/A	No of radio and television programmes organized					50,000			LUSPA	MMDAs
Spatial Planning and Human Settlements	Assist with the siting and designing of spatial plans under One District One Factory Project	N/A	N/A	100 no. of firms properly sited based on spatial and economic analysis					0			ODOF, LUSPA, MLGRD, MOTI	RSPC and Physical Planning Department of MMDAs, LUSPA,
Biosafety Regulation	Certify biotech laboratories and institutional biosafety committees (IBC)	Accra/National	2 IBCs Certified	Number of Laboratories and IBCs certified					125,000			NBA	CSIR, GACE, Universities
Biosafety Regulation	To train NBA staff, Technical Advisory Committee members Principal Investigators and Institutional Biosafety Committee members Inspectors Journalists on biosafety issues	Accra	One (1) workshop held	Workshop reports submitted to NBA					587,500	10,000	200,000	NBA	UNEP, ABNE, PBS, ICGEB
Biosafety Regulation	Produce biosafety regulations and guidelines	Accra	Draft regulations and one guidelines prepared	Number of guidelines and regulations produced					200,000		100,000	NBA	ABNE, PBS
Biosafety Regulation	Conduct monitoring and inspection on biosafety research activities	Kumasi/Tamale	One monitoring conducted	Number of monitoring reports submitted					400,000			NBA	Biosafety Regulatory Agencies

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Biosafety Regulation	Train IBC members and principal investigators in application review	National	One workshop held	Number of workshop reports					300,000			NBA	UNEP, ABNE, ICGEB, PBS, Universities
Biosafety Regulation	Conduct ten (10) public education and awareness programmes on biosafety issues	National	Two public awareness programmes held	Reports on public awareness programmes submitted					200,000			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Maintain national GMO detection laboratory	Accra	None	One (1) annual report submitted to the NBA					1,705,000		37,000	NBA	UNEP, GSA
Biosafety Regulation	Review biosafety applications	Accra	Five (5) Applications Reviewed	Number of Permits granted					365,200			NBA	ABNE, PBS
Biosafety Regulation	Conduct Board meetings	Accra	Two meeting held	Number of minutes submitted					52,000			NBA	
Biosafety Regulation	Monthly allowance for NBA Board Members	Accra	None	Receipts/Sign sheets					63,600				
Biosafety Regulation	Conduct Appeals Tribunal meetings	Accra	One meeting held	Number of minutes submitted					9,175			NBA	
Biosafety Regulation	Conduct TAC meetings	Accra	None	Number of minutes submitted					48,000			NBA	
Biosafety Regulation	Manage NBA website	Accra	Active since 2016	Presence of a demonstrable URL					45,500			NBA	
Biosafety Regulation	Conduct sensitization programmes with farmers and local communities on biotech and biosafety	National	None	Number of Reports submitted					250,000			NBA	Biosafety Regulatory Agencies

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Biosafety Regulation	Publish articles and print educational materials on biosafety	Accra	None	Number of articles and brochures published or printed					200,000		30,000	NBA	UNEP
Biosafety Regulation	Print signages and stationary	Accra	None	Signed contract					40,000			NBA	
Biosafety Regulation	Implement project on mainstreaming biodiversity (including biosafety) in to government decision making	Accra	Project agreement signed.	one (1) mid-year and one (1) end of year reports submitted					0	0	843,700	NBA, CSIR	UNEP-WCMC
Biosafety Regulation	International Conferences	Global	Back to office reports	None					34,821			NBA	
Biosafety Regulation	Internal management of the NBA	Accra	On going	Receipts					150,468			NBA	
Biosafety Regulation	CAPEX-Landscaping and re-roofing of office building	Accra	Leaking roof and unpaved compound	Signed contracts					200,000			NBA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Accra		Draft regulations developed (6)					36,918	61,530	24,612	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) guidance document on radioactive and nuclear waste management	Accra		Draft guidance document developed(6)					15,792	26,320	10,528	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Undertake 200 regulatory inspections and 20 enforcement of facilities (mining, medical, research, construction,	Nation wide		Regulatory inspections and enforcement of					167,200	278,667	111,467	NRA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	bottling companies, industrial radiography)			220 facilities undertaken									
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Build capacity of 40 Front Line Officers (FLOs) biennially to detect and interdict illicit trafficking of nuclear and radioactive materials out of regulatory control	Accra		Capacity of Front Line Officers (FLOs) enhanced					50,080	83,467	33,387	NRA	GSA, NSC
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train 1 ICT staff to customize the Regulatory Authority Information System (RAIS) to maintain and update national register of radiation sources of practices and persons authorized to carry out any activity related to nuclear technology	Accra		4 ICT staff trained					2,150	3,583	1,433	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train 25 NRA inspectors annually on how to access and use the RAIS	Accra		NRA inspectors trained (25)					1,190	1,983	793	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Recruit additional professionals to undertake specialized functions	Worldwide		Professional staffs recruited					10,000	16,667	6,667	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train staff in specialized areas (ionizing and non-ionizing radiation, forecasting and financial management, M&E,	National and international training		Staff trained in specialized areas at local					976,000	1,626,667	650,667	NRA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	public administration management, etc.) at local and foreign institution			and foreign institution									
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Acquire 4 cross country vehicles by Dec. 2019 for regulatory inspections	Ghana		Cross country vehicles acquired					300,000	500,000	200,000	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Acquire regulatory equipment	Ghana		Regulatory equipment acquired					135,000	225,000	90,000	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	3 meetings to undertake quarterly monitoring & evaluation activities	Nation wide		Monitoring & evaluation activities undertaken					20,200	33,667	13,467	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 5 day workshop of the budget committee to revise SMTDP annually	Out station		SMTDP revised					73,813	123,022	49,209	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize annual budget activities	Out station		Annual budget prepared					73,813	123,022	49,209	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 2 days management meeting to approve SMTDP and annual budget	Accra		SMTDP and annual budget approved					5,320	8,867	3,547	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Host regional and international meetings/work-shops of nuclear regulatory bodies and international agencies	National		Meetings/work shops hosted					422,000	703,333	281,333	NRA	FNRBA,IAEA,RC F,EC'S INSC

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	on safety, security, and safeguards												
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Participate in regional and international meetings/ workshops of nuclear regulatory bodies and international agencies on safety, security, and safeguards	International		Meetings/work shops attended					865,000	1,441,667	576,667	NRA	IAEA,RCF
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Initiate the process to adopt and ratify relevant international conventions, protocols and treaties			International relations with nuclear regulatory bodies strengthened					685,000	1,141,667	456,667	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize quarterly meetings of national nuclear security committee	Accra		Quarterly meetings organized					162,000	270,000	108,000	NRA	

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare MESTI Annual Action Plan (AAP)	Accra	2017 AAP	2018 Annual Action Plan (AAP)					5,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Performance Report (APR) to OHCS	Accra	2016 APR	2017 Annual Performance Report (APR)					6,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, OHCS

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Progress Report (APR) to NDPC	Accra	2016 APR	2017 Annual Progress Report (APR)					7,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize validation workshop for finalization of APR	Accra		Minutes /Reports					5,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize Mid-year review workshop for 2017 AAP	Accra	2016 Mid-year Report	2017 Mid-year Review Report					5,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Review of MESTI SMTDP 2018 - 2021	Accra	2014 – 2017 SMTDP	SMTDP document					9,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Quarterly M&E of MESTI programmes / projects/ activities	Accra		Quarterly Progress Reports					45,457.59			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Presentation to PSC on Poverty Reduction	Accra		Presentation					6,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	2019 Budget Preparation	Accra	2018 Policy Hearing presentation	Policy Hearing presentation					46,000.00			PPME Directorate	MESTI, Agencies, MoF

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra	2018 Technical Hearing Presentation	Technical Hearing Presentation					28,000.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra	2018 Presentation to PSC on MESTI 2019 Budget	Presentation to PSC on MESTI 2019 Budget					15,000.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Recycling and Disposal of Waste of Electrical and Electronic Equipment in an Environmentally Sound Way, Phase I	Accra		Siting of Handling Over Center					50,000.00			PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra		Hiring of Project Consultant								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra		Preparation of Manual of procedure								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Provide inputs into Budget Statement	Accra	2017 INPUTS	Inputs into Budget Statement					6,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorate
Policy, Planning, Budgeting, Monitoring & Evaluation	Training for PPMED Officials	Accra		Training Report					30,000.00			PPME Directorate	MESTI-HRM, OHCS,
Policy, Planning, Budgeting, Monitoring & Evaluation	Preparation of NACAP	Accra		Annual NACAP Report					10,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA,

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
													MESTI Directorate
General Administration	Payment of Utility bills	Accra	Baseline	uninterrupted supply of utility service					33,000.00			F&A	Other Service Providers
General Administration	General Expenses	Accra		Smooth administrative running of the Ministry					3,373.07			F&A	MESTI Directorates and other stakeholders
General Administration	Material and Office Consumables	Accra		Availability of office consumables					20,000.00			F&A	Service Providers
General Administration	Training Seminar and Conference Cost	Accra		Improved Directorate staff performance and sound policy and managerial decisions					100,000.00			F&A	MESTI Directorates and Agencies, HRM, OHCS, GIMPA
General Administration	Travel and Transport	Accra		Delivery of official correspondence and staff participation in official engagements					310,000.00			F&A	MESTI Directorates and other stakeholders
General Administration	Repairs and Maintenance	Accra		Good condition of official assets					50,000.00			F&A	Other Service Providers
General Administration	General Cleaning	Accra		Clean office environs					35,000.00			F&A	Other Service Providers
General Administration	Insurance	Accra		Insured official assets					20,000.00			F&A	Other Service Providers
Human Resource	Prepare Sector Annual Performance Report	MESTI HQ		Sector APR					5,000.00			HRM, PPME	MESTI Directorates, TCPD,
Human Resource	Undertake Scheme of Service Training programme for all categories of staff	MESTI HQ	15	Number Of Staff					50,000.00			HRM	MESTI Directorates

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Human Resource	Organise Training/workshops on Performance Management for staff of the Ministry	MESTI HQ		No. of workshops organized					35,000.00			HRM	MESTI Directorates, TCPD, EPA, GAEC, CSIR
Human Resource	Organise Promotion Interviews	MESTI HQ	15	No. of staff promoted					50,000.00			HRM	MESTI Directorates
Human Resource	Organise HR Forum/ workshop with sector Agencies/Dept to discuss HR issues	MESTI HQ	1	Reports					15,000.00			HRM	MESTI Directorates and Agencies
Human Resource	Organise workshop on Civil Service Rules and Regulations	MESTI HQ	-	No. of workshops					15,000.00			HRM	MESTI Directorates, Agencies
Human Resource	Participation in local and international training conference	MESTI HQ	25	No. of officers who attended conferences					20,000.00			HRM	MESTI Directorates
Human Resource	Organize workshop on Cabinet Memo for Leadership of the Ministry	GIMPA	-	No. of workshops organized					20,352.00			HRM	Heads of Directorates
Statistics, Research, Information & Public Relations	Celebration of 4 Environmental Days	Nationwide	4	No. of celebrations held					125,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize ICT capacity training workshop for staff on the use of Information Management System	Accra	-	Training reports					20,000			MESTI-RSIM	
Statistics, Research, Information & Public Relations	Organize Capacity training programs for ICT staff	Accra	-	No. of staff trained					12,500			MESTI-RSIM	MESTI-Procurement, MoC
Statistics, Research, Information & Public Relations	Acquire modern tools and technology to enhance information flow to the public e.g. Website, software and hardware tools.	Accra	-	List of ICT tools acquired					125,000			MESTI-RSIM	MESTI-Procurement, MoC

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2018)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Statistics, Research, Information & Public Relations	Produce of brochures, half yearly journals documentaries and other publications on MESTI programs, projects and activities.	Accra	-	Copies of brochures					20,000			MESTI-RSIM	MESTI-HRM
Statistics, Research, Information & Public Relations	Provide media coverage for Minister and Dep. Minister's activities	Nationwide	10	Press releases					75,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize Meet-The-Press Series	Accra	1	Meet-The-Press presentation					37,500			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize capacity training programs for PR Officers	Accra	-	Training reports					25,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Finance	Treasury & Accounting Activities	MESTI	Financial reports	Financial reports					200,000			Accounts	All Agencies/ Directorates
Finance	Preparation of Financial reports	MESTI	Quarterly financial reports	Quarterly financial reports					100,000			Accounts	All Agencies/ Directorates
Finance	Internal Audit Operations	MESTI	Audit reports	Audit reports					200,000			IAU	All Agencies/ Directorates

Table 5.2: 2019 Annual Action Plan

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	A. Biotechnology: Germplasm collection, characterization, conservation and distribution nationwide.	Nation wide		No. of Plant Accessions collected, conserved and distributed nation					800,000.00	300,000.00	700,000.00	CSIR-PGRRI	CSIR-CRI CSIR-FRI CSIR-SARI CSIR-OPRI
Scientific and Industrial Research	B. Develop strategies to reduce field and post-harvest losses for developed varies.	Northern Ghana		Percentage reduction in Postharvest losses in cereals and legumes					180,000.00	250,000.00	80,000.00	CSIR-SARI CSIR-Head Office	CSIR-CRI CSIR-FRI
Scientific and Industrial Research	C. Development and dissemination of improved varieties. (Crops/Livestock/Poultry/ fisheries	Nationwide		No. of improved varieties (Crop/Livestock/ Fishery) developed and disseminated					500,000.00	420,000.00	420,000.00	CSIR-CRI, CSIR-FRI, CSIR-SARI, CSIR-OPRI, CSIR-ARI, CSIR-WRI	CSIR-PGRRI CSIR-SRI CSIR-FRI MoFA
Scientific and Industrial Research	D. Development of Strategies to enhance processing of Crop livestock, poultry an fishery products	Nation wide		No. of Strategies developed to enhance food processing					250,000.00	300,000.00	600,000.00	CSIR-FRI	CSIR-IIR CSIR-WRI CSIR-OPRI CSIR-ARI MOFA-WIAD
Scientific and Industrial Research	E. Conduct baseline surveys and adoption studies of released improved crop varieties	Northern Ghana		No. of baseline surveys and adoption					200,000.00	300,000.00	600,000.00	CSIR-SARI	CSIR-STEPRI

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				studies carried out								CSIR-Head Office	
Scientific and Industrial Research	Promotion of Science Agenda for Agriculture in Africa (S3A)	Nation wide		No. of sensitization and implementation workshops organized					250,000.00	300,000.00	600,000.00	CSIR-Head Office	FARA MESTI MOFA
Scientific and Industrial Research	Production of improved planting materials for commercial purposes	Kumasi Tamale Bunso Kade		No. of improved planting materials produced					300,000.00	300,000.00	600,000.00	CSIR-Head Office	CSIR-OPRI CSIR-CRI CSIR-SARI MOFA
Nuclear and Space Science Technology	Public sensitization on the benefits of using gamma irradiation			7 stakeholder meeting to increase awareness of the benefits of using GIF held by the end of the year					5,000.000	500.00		GAEC	
Nuclear and Space Science Technology	Upgrading of Gamma Irradiation Facility			Complete the signing of one MOU on the strategy to upgrade GIF source.					240,190.00	240,190.00		GAEC	
Nuclear and Space Science Technology	Establishment of cultures of plantain, pineapples, sweet potatoes, and cassava			One (1) million planting materials for farmers produced					5,000.00	500.00		GAEC	
Nuclear and Space Science Technology	Use of Gamma Irradiation Facility for the management of postharvest losses and enhancing health care delivery	GAEC		Treat over 50 tonnes of food crops to support export in the year and 15 tote boxes					30,000.00	2,000.00		GAEC	

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				of medical equipment									
Nuclear and Space Science Technology	Complete a production plant for protein bait to control fruit fly menace	GAEC		Protein bait supplied to mango farmers					200,000.00			GAEC	
Nuclear and Space Science Technology	Improving crops using mutation induction and biotechnology through a farmer participatory approach	GAEC		Mutation evaluation of mutant lines continues and Chinese yam with large tube size be released					2,500.00	200.00		GAEC	
Nuclear and Space Science Technology	Train farmers on compost making	GAEC		Train 10 farmers on composting					5,000.00	500.00		GAEC	
Nuclear and Space Science Technology	Field establishment for release of four varieties of cherry tomatoes by 2019		Cherry tomatoes successfully established	Release of four (4) varieties to farmers					25,000	2,000.00		GAEC	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Constitute working teams to develop zero draft policy strategy Organise two working group meetings to develop zero draft policy strategy	Accra	Env't'al Management Policy for Oil and Gas (EMPOG)	List of working groups Zero Policy strategy					-	-	250,000	MESTI	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Organise four stakeholder consultations on draft policy strategy		Env't'al management policy for oil and gas (EMPOG) Zero Policy strategy	Reports of stakeholder consultations Reviewed policy strategy with technical inputs					-	-	400,000	MESTI	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Organise one national validation on policy strategy		Draft policy strategy	Final policy strategy with stakeholder inputs					-	-	250,000	MESTI	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Implement Community land use plan developed	Northern Ghana		Number of farmers benefiting from implementation of the plans					-	-	5,500	MoFA	EPA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Establishment and maintenance of demonstration fields	Northern Ghana		Number of demo fields established and maintained					-	-	200,000	MoFA	EPA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Conduct and train project beneficiaries on the Village & loans savings association (VSLA) and book keeping	Northern Ghana		Number of beneficiaries trained					-	-	180,000	EPA	MoFA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Implement Natural Resource Based livelihood activities	Northern Ghana		Number of beneficiaries of the livelihood activities					-	-	400,000	MoFA	WD, MESTI, FSD
P1: Management and Administration SP1: General Administration	Establish riparian vegetation and river bank soil erosion control measures	Northern Ghana		Number of communities with established Riparian vegetation					-	-	480,000	EPA	MoFA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Implement CREMA management plans	Northern Ghana		Number of communities implementing CREMA management plans					-	-	480,000	WD	MoFA, EPA, MESTI, FSD
P1: Management and Administration SP1: General Administration	Establish Green fire breaks within 2 forest Resrves (Ambalara and Kulpawn)	Northern Ghana		Area of green fire breaks established					-	-	644,000	FSD	MoFA, EPA, MESTI, WD

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Provide water management systems	Northern Ghana		Number of water management systems developed					-	-	800,000	MoFA, WD	MESTI, EPA
P1: Management and Administration SP1: General Administration	Undertake audit of 2018 project Accounts	Accra and Northern Ghana	2017 audit report	2018 audit report					-	-	100,000	MESTI	FSD, EPA, WD, MoFA
P1: Management and Administration SP1: General Administration	Organise quarterly Biodiversity stakeholder consultations on NBSAP implementation	Accra, Kumasi, Tamale, Cape-Coast	National Biodiversity Policy NBSAP	Reports of stakeholder consultations					240,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Organise national validation workshop on national Biodiversity Implementation Report	Koforidua	National Biodiversity Policy NBSAP	National Biodiversity Report % loss of forest cover List of endangered species List of newly identified species					68,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Organise 10 training sessions MMDAs to help all actors adequately deal with biodiversity concerns that might come up while implementing various activities, projects plans and policies	National	NBP NBSAP	No. of MDAs and MMDAs					350,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Train all MDAs & MMDAs on climate change issues	National	Training Materials development ongoing	No. of MDAs & MMDAs trained on climate change issue					1,319,010	-	-	MESTI/E PA	MOF, NDPC, EC, Academia
P1: Management and Administration	Review and enact new policy actions to stimulate	Accra	N/A	Relevant Policies reviewed to					879,340	-	-	MESTI/E PA	MDAs, NDPC, EC, Academia, CSOs

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	investment mobilization, capacity and R&D			stimulate finance mobilization and capacity building									
P1: Management and Administration SP1: General Administration	Coordinate and report on the implementation of NDC readiness programmes identified	Accra	Steering Committee set-up and operational	No of NDC Readiness action being implemented					1,319,010	-	-	MESTI/E PA	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
P1: Management and Administration SP1: General Administration	Promote the scale of biogas energy across public institutions and schools	Nation-al	10 school/institutions already using biogas	No. of Institutions establishing up biogas systems					879,340	-	-	MESTI/E PA	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
P1: Management and Administration SP1: General Administration	Develop tailored training packages and train MDAs & MMDAs on how to access funds locally and globally for climate change actions	National	N/A	Training packages and capacity on mechanisms to access resources locally and globally developed					1,319,010	-	-	MESTI/E PA	MDAs, NDPC, EC, Academia
P1: Management and Administration SP1: General Administration	Sectoral NDC MRV systems developed and a centralized MRV process established in line with the UNFCCC reporting structures for two highest priority NDC sectors	Accra	A generalized national MRV system for climate change available	A Central NDC MRV systems established in line with UNFCCC reporting structures					-	-	439,670	MESTI/E PA	MDAs, NDPC, EC, Academia
P1: Management and Administration SP1: General Administration	Conduct trend/historical analysis of the impact of climate variability on the White, Black and Oti River basins Generate climate change projections for the White and Black Volta and the Oti River basins Conduct a vulnerability analysis of communities	Northern, Upper West & Upper East	N/A	No. of MDAs and MMDAs					-	-	8,793,400	MESTI	WRC, WRI, UNDP, MLNR, NADMO, CWSA, MOFA, MOFAD, MLGRD, EPA, MMDAs, Universities, CSOs

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	along the White and Black Volta as well as the Oti River basins Develop Black Volta & Oti River management & investment plans Carry out an assessment of existing water management activities along the rivers Desilt dams/dug outs etc. Drill boreholes Mechanize high yielding boreholes/dugouts for irrigation Create buffer zones with fence Introduce Village Savings and Loans association (VSLA) concept to all communities Build capacity and supply of input to women groups in shea butter/groundnut oil extraction Establish/adapt community nurseries for seedling production Introduce cage fishing in constructed/rehabilitated water bodies												
P1: Management and Administration	Establish National Foundry and Machine Tooling Centres in	Accra	N/A	Number of Foundries established					100,000.00		0	MESTI	R&D Institutions/Academic Institutions/Private Sector/MoT/ MoF

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	various parts of the country.												
SP1: General Administration	Establish and operationalize the Ghana Innovation and Research Commercialization Centre	Accra	N/A	GIRC Center established					200,000.00		900,000.00	MESTI	R&D Institutions/Academic Institutions/Gratis Foundations/MoF
P1: Management and Administration	Support the operations of the Presidential Advisory Council on Science Technology and Innovation (PACSTI)	Accra	Stakeholder meeting of the establishment of the PACSTI organized	PACSTI established					200,000		300,000	MESTI	R&D Institutions/Academic/MoF
SP1: General Administration	Support the operation of the National Science, Technology and Innovation Research Fund	Accra	Stakeholder of the establishment of the Fund organized	Number of grants awarded to researchers					50,000,000.00		4,000,000	MESTI	R&D Institutions/Academic/MoF
P1: Management and Administration	Support the National High-Performance Computer (HPC) Centre	Accra	N/A	1 HPC Centre Established					300,000.00		900,000.00	MESTI	R&D Institutions/Academic/MoF
SP1: General Administration	Celebrating Annual National STI Week and Scientific Renaissance day	Accra	N/A	National STI Week celebrated with wide publicity					50,000.00		100,000	MESTI	NDPC/R&D Institutions/Academic Institutions
P1: Management and Administration	Assessing STI Infrastructure Needs of Ghana	Accra	N/A	National STI Infrastructure Survey report					100,000.00		100,000.00	MESTI	R&D Institutions/Academic Institutions
SP1: General Administration	Develop Science and Technology Parks	Accra	N/A	2 Science and Technology Parks developed					200,000.00		500,000.00	MESTI	MoT/MoF/ R&D Institutions/Academic Institutions
P1: Management and Administration	Prepare bi-Annual National STI Report	Accra	N/A	Report on the Current status of the national innovation system					100,000.00			MESTI	NDPC/ PACSTI/ R&D Institutions/Academic Institutions

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	Improving Regional, Continental and global cooperation for STI	Accra	N/A	No. of Regional, Continental and global cooperation for STI meetings attended.					100,000.00		50,000.00	MESTI	MoFA/MoF
P1: Management and Administration	Support the Implementation of the SGCI	Accra	N/A	100 researchers trained in Research Management 100 Researchers Trained in measuring STI Indicators 5 Technologies Transfer to Private Sector					30,000.00		50,000.00	MESTI	Academic Institutions/ R&D Institutions
SP1: General Administration	Support the Ghana-South Africa Bilateral	Accra	N/A	Number of projects jointly implemented					100,000.00			MESTI	MoFA/R&D Institutions/Academic Institutions
P1: Management and Administration	Support the Implementation of the EU H2020 NCPs Project	Accra	N/A	-							100,000.00	MESTI	R&D Institutions/Academic Institutions
SP1: General Administration	Participate in international conferences, workshops, training programess		40 international programmes attended						50,000.00			MESTI	EU, AU, ECOWAS.
P1: Management and Administration	Prepare National Space Policy	Accra	N/A	5 stakeholder consultation meeting organized					100,000			MESTI	GSSTI/NDPC/Academic Institutions/MoFA/MoF

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				National Space Policy approved by Cabinet									
SP1: General Administration	Support the Implementation of the SKA/AVN Project.	Accra	N/A	8 SKA/AVN partner countries meetings attended. One National Planetarium established at Kuntunse. 30 Astronomers and Engineers trained.					20,000.00		2500,000.00	MESTI	GSSTI/ Academic Institutions/MoF/D ST-South Africa/MoFA
P1: Management and Administration	Establish National Space Data Centre by establishing a Satellite Ground Receiving Station.	Accra	N/A	Satellite Ground receiving station constructed Space data available to institutions.					100,000.00		2,500,000.00	MESTI	GSSTI/Academic Institutions/ MoF
SP1: General Administration	Organize an annual STI consultative workshop with STI Advocacy and Professional Bodies.	Accra	N/A	4 consultative workshops organized					50,000.00		50,000.00	MESTI	R&D Institutions/ Academic Institutions/ Private Sector
P1: Management and Administration	Encouraging R&D by the Private Sector	Accra	N/A	Total R&D Budgets of the Private Sector					12,500,000.00		2,500,000.00	MESTI	R&D institutions/Academic Institutions/Private Sector.

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Landscape management systems or technologies resilient to climate change vulnerabilities in time and space.	Bobiri, Kogyae Ankasa		No. of Technologies for Sustainable management, conservation and utilization of forest resources developed					250,000.00	300,000.00	600,000.00	CSIR-SRI	CSIR-FORIG Forestry Commission
Scientific and Industrial Research	Innovative risk management strategies that foster resilient rural livelihoods for sustainable landscape restoration.	Bobiri, Kogyae Ankasa		No. of stakeholders with capacity developed on the use on the use of forest genetic resources/ adaptation to climate change strengthened					250,000.00	300,000.00	600,000.00	CSIR-FORIG CSIR-Head Office	CSIR-SRI CSIR-WRI CSIR-CRI CSIR-SARI
Scientific and Industrial Research	Development of Strategies to combat effect of climate change	Nation-wide		No. of strategies to combat effect of climate change					250,000.00	450,000.00	720,000.00		
Scientific and Industrial Research	Control and elimination of water and soil borne diseases	Western and Northern Regions		Operational plan developed % reduction in rate of Morbidity, Mortality and Poverty associated with NTDs.					300,000.00	300,000.00	600,000.00	CSIR-WRI CSIR-Head Office	Ghana Health Services and Liverpool School of Tropical medicine
Scientific and Industrial Research		Brong-Ahafo and Northern Regions		No. of transmission indices developed to determine feasibility of eliminating diseases					200,000.00	300,000.00	600,000.00	CSIR-WRI CSIR-Head Office	Imperial College, UK

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Development of Strategies to address water, air and soil pollution	Nation wide		No. of Strategies for addressing pollution developed					300,000.00	300,000.00	600,000.00	CSIR-WRI	CSIR-SRI
Scientific and Industrial Research	Development of essential materials and industrial products using local raw materials	Kumasi		Number of products developed from local raw materials					180,000.00	450,000.00	5,500,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Development of local building materials for affordable housing delivery and provision of road construction advisory services	Kumasi Apam		No. of local building materials promoted					180,000.00	273,290.37	650,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Promotion of renewable Energy systems for both domestic and commercial buildings	Southern Ghana		No. of Solar energy systems installed					300,000.00	300,000.00	650,000.00	CSIR-IIR CSIR-Head Office	Energy Commission
Scientific and Industrial Research	Promote Climate – friendly bioenergy options for sustainable rural livelihoods	Nation-wide		No. of bioenergy options for sustainable rural livelihoods promoted					190,000.00	300,000.00	650,000.00	CSIR-IIR	Energy Commission
Scientific and Industrial Research	Establishment of ICT Centre for the provision of electronics and computer engineering services	Accra		ICT Centre established No. of training sessions organized					180,000.00	480,000.00	650,000.00	CSIR-INSTI CSIR-IIR Head Office	MESTI CSIR-IIR CSIR-STEPRI

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Fencing of GAEC land	GAEC		Commencement of fencing					1,000,000			GAEC	
Nuclear and Space Science Technology	Compensation for GAEC land	GAEC		Compensation paid					500,000			GAEC	
Nuclear and Space Science Technology	Using Stable Isotope Techniques to Monitor and Evaluate Vitamin A Status of Children Susceptible to Infection	GAEC / Nationwide		Analysis report on vitamin A status of children completed (50%)					20,000		-	GAEC	
Nuclear and Space Science Technology	Safety assessment of telecommunication base stations/cell sites	Nationwide	378 base stations assessed	400 RF and FM cell sites assessed						120,000.00		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	Monitoring of telecommunications masts/base stations	Nationwide	755 masts monitored	1000 masts/base stations monitored						500,000		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	National Radon Mapping project to commence - Naturally Occurring Radioactive Materials (NORMs)	Nationwide		Monitored 3 sites for NORMS.						100,000		RPI	
Nuclear and Space Science Technology	Monitoring of occupational exposures for mine, industrial, medical, educational and educational research institution workers		507 occupationally exposed workers monitored.	700 occupationally exposed workers involved in ionizing radiation monitored						50,000.00	200,000	RPI	
	Assessment of food/dairy products and water samples for radioactive contamination		Analysed 600 containers	800 containers analysed to ensure safety of food import and water are free from						10,000.00			

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				radioactive contamination monitored									
Nuclear and Space Science Technology	Calibration of radiation detection equipment and nuclear density gauges used in medical and industrial facilities.	Nationwide	59 survey meters and 7 density gauges calibrated	Calibration of 70 survey meters and 10 density gauge completed					10,000.00	5,000.00		GAEC	The broken down Philips x-ray generator has to be fixed or replaced
Nuclear and Space Science Technology	Monitoring of air for persistent organic pollutants and particulate matter.	Nationwide	Central, Western and Ashanti Regions to be monitored.	Samples collected (100%)							25,000	GAEC	EPA
Nuclear and Space Science Technology	Groundwater flow dynamics in the Sakumono Basin of Ghana; Model-setting scenario and isotopic approach	Greater Accra	Preliminary Water Quality Assessment Carried out. Drilled logs data obtained. GIS shape files created	Sampling of boreholes, hand-dug wells and wetlands Lab analysis of samples Publication Lab analysis of samples					118,260.00			GAEC	WRC CWSA MMDAS
Nuclear and Space Science Technology	Assessing the effects of domestic and industrial discharges on Volta River quality	Akosombo	Field investigation and sample analysis	Reduction in nutrient and metal levels in discharges into the Volta River.						GHC 15,000		GAEC	
Nuclear and Space Science Technology	Measurement of gross alpha-beta in drinking water (bottled and sachet)	GAEC / Nationwide		Analysis of 700 containers of food/dairy and water samples for radioactive contamination conducted.						90,000.00			

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Training and public education in Radiation Safety, Radiation Protection and Nuclear Security	GAEC	150 young professionals successfully completed their training on radiation protection (PGEC)	270 occupationally exposed workers and frontline officers trained						30,000.00		GAEC	
Nuclear and Space Science Technology	Scientific assessment of the environment and human health impact of e-waste	Greater Accra Region		Collection and analysis of samples 50% completed							5,000	GAEC	EPA
Nuclear and Space Science Technology	Implementation of the borehole disposal concept for Disused Sealed Radioactive Sources (DSRS) in Ghana.	GAEC	*Developed site characterisation report for review by IAEA. *Consolidation of the 458 DSRS *Developed post closure safety assessment report for reviewing by the IAEA.	*Safety case and security plan reviewed by IAEA and NRA. *600 DSRS conditioned. *Regulatory license for construction the disposal borehole obtained.					85,000		EUROS 75,000	GAEC	Canada, USA, IAEA
Nuclear and Space Science Technology	Initiation of cancer (tumour) biomarker service at RAMSRI	GAEC		-Laboratory completed (50%) -Training for persons commenced					250,000				

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Strengthening activities on radiation counter measures to mitigate/ treat radiation	GAEC	i. Crude dose-response curve for gamma rays constructed ii. Some medicinal flora identified and screened for antioxidant properties	i. SOPs for predicting individual hypersensitivity completed ii. Calibration curves completed iii. Candidate radioprotectors identified iv. Database of medicinal flora with high promise for radioprotection available					85,000			GAEC	
Nuclear and Space Science Technology	National Quality Assurance Audit of radiotherapy, diagnostic radiology and nuclear medicine practice in Ghana	GAEC	National quality assurance audit of five diagnostic radiology centres in Ghana completed	Thirty (30) diagnostic radiology centres in Ghana audited					30,000.00			GAEC	
Nuclear and Space Science Technology	Applying Radiation technologies to Assess Sediment Transport for the Management of Coastal Infrastructures (RAF/7/018)	Tema Port, Densu River and Volta Lake	IAEA Document	Equipment Purchase							100,000	NNRI	VRA, Tema Port
Nuclear and Space Science Technology	Development of computed Gamma tomography for industrial process diagnostics		-Trained staff in CT	Computed tomography developed for						50,000	10,000	NNRI	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
			- stakeholders meeting reports -Seminar presentations, stakeholders meeting reports -Laboratory scale experimental data	industrial applications									
Nuclear and Space Science Technology	National Space Strategy	GSSTI	None	National space strategy completed					15,000			GSSTI	
Nuclear and Space Science Technology	Science awareness, engagement and outreach	GSSTI	Strategy document in place	Science awareness and outreach strategy document Visit to schools report Visit to GRAO reports					40,000	10,000	50,000	GSSTI	GES, Schools, Ghana Planetarium, GAST
Nuclear and Space Science Technology	Research with Ghana Radio Telescope	GSSTI	Phase 2 of conversion complete	Working radio telescope Refereed publications Participation in space observations					500,000			GSSTI	SKA,

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Human capital development and training in space science and technology (staff and non-staff)	GSSTI	Annual training programme in place	Training programmes Summer schools Conferences and workshops					250,000	20,000	250,000	GSSTI	SKA, DARA, Royal Society, Ghana Universities
Nuclear and Space Science Technology	Establishment of spin-off ventures	GSSTI	Prototypes developed	Prototypes developed Market research reports						200,000		GSSTI	
Nuclear and Space Science Technology	Climate research	GSSTI	Research with models and observation started	Mean and extreme climate patterns of Ghana/West Africa well understood					10,000	10,000	10,000	GSSTI	
Nuclear and Space Science Technology	Earth Observation research	GSSTI	Research on satellite applications ongoing in agriculture, water resources, and environment	Satellite data used to the advantage of Ghana					10,000	30,000		GSSTI	
Nuclear and Space Science Technology	Assessment of space science courses at SNAS	SNAS	Graduate program in space science taught at SNAS	Improvement in the graduate program in space science started						30,000		GSSTI	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Installation of automatic weather and seismic station at GRAO	GSSTI	Phase 2 of conversion complete	Automatic weather and seismic station installed					500,000		500,000	GSSTI	SKA, DARA, Royal Society,
Nuclear and Space Science Technology	Installation of ground receiving satellite station	GSSTI	Construction of ground receiving station 20% completed	Ground receiving station installed Ground receiving station commissioned by the President					40,000				
Nuclear and Space Science Technology	Capacity building	GSSTI	Staff received intermediary training in relevant areas	Human capacity developed in remote sensing techniques, climate data analysis, image processing and GIS					10,000	50,000		GSSTI	
Nuclear and Space Science Technology	Capacity building on Satellite receiving station	GSSTI	Staff received basic training in operation and software of ground receiving station	Human capacity developed in operation and software of ground receiving station					40,000				
Nuclear and Space Science Technology	Preferred site(s) selected and assessed taken into account geological, seismological, population density, human induced factors,	Nationwide	Candidate areas identified	Preferred site(s) selected					1,345,000			NPI/GAE C, Owner Operator	GNPPO stakeholders on siting

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	environmental, water availability and quality consideration and other relevant studies.												
Nuclear and Space Science Technology	Organize stakeholder and public sensitization meetings on adoption of nuclear power	Nationwide	15 stakeholder meeting held on sensitization	Hold at least 25 stakeholder/meetings. Hold at least 2 editors forum to sensitise the media on nuclear power development Publish monthly newsletter on nuclear power development					120,000			NPI/GAE C, Owner Operator	NCCE, Statistical service, Media
Nuclear and Space Science Technology	Develop human resource for the implementation of Nuclear Power	Nationwide	Draft human resource development plan prepared and undergoing series of review	Recruitment strategy planned, adopted and implemented Human resource training commenced					250,000			NPI/GAE C, Owner Operator	Tertiary institutions, Vocational institutions, Research & development institutions
Nuclear and Space Science Technology	Conduct studies for national and regional grid network	Nationwide, West African Sub-Region		Second phase of national and regional grid					150,000		GAEC	NPI/GAE C	Conduct studies for national and

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				assessment done Report prepared and evaluated								Owner Operator GRIDCo	regional grid network
Environmental Education, Information and Communication	Natural resource and environmental governance activities	Nationwide	3	Number of sector plans(MMDAs Plans) subjected to the SEA process						5,621,685.61		EPA	MESTI, WB, MoF
Environmental Compliance and Enforcement	Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	Nationwide	2013	Number of permits issued to ensure compliance						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Monitor all permitted projects to ensure compliance with LI1652	Nationwide	5500	Number of projects to ensure compliance with LI1652						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	Greater Accra	14 sites	No of sites monitored and average level of particulate matter in the air at selected locations						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Sample and analyse level of pollution of Effluent	Greater Accra	80 industries	No of industries monitored to assess the level						3,971,481.16		EPA	

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	quality from industries and hotels			of pollutants of effluent discharge into coastal waters and lagoons									
Environmental Compliance and Enforcement	Review the environmental laws , regulations and guidelines to address emerging environmental issues	Nationwide	2	Number of environmental laws, regulations and guidelines reviewed.						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Develop regulations for emerging environmental issues	Nationwide	1	Number of environmental laws and regulations developed						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Monitor the marine ecosystem to ascertain the levels of pollutants	Coastal Belt	NIL	Number of monitoring exercises carried out to measure the concentrations of heavy metals and petroleum products in the marine ecosystem						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Ensure the use of bio-oxodegradable additives in the manufacture of flexible plastics	Nationwide	25	Number of companies using the bio-oxodegradable additives						3,971,481.16		EPA	
Environmental Protection and Management	Undertake regular audits of the oil and gas industry	Nationwide	1	Number of environmental audits conducted annually in the						3,971,481.16		EPA	

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				oil and gas industry									
Environmental Protection and Management	Undertake regular audits of mining companies to ensure compliance to permitting conditions	Nationwide	30	Number of companies audited for compliance with permit conditions						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Operationalize the National Oil Spill Contingency Plan	Nationwide	1	Number of simulation exercise performed in readiness for oil spill emergencies						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Upscale the source waste segregation programme to institutions	Nationwide	40	Number of institutions implementing the programme						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Update of pesticide register annually to indicate list of approved ,banned and pesticides for experimental purposes	Nation wide	1	Number of updates of pesticide register undertaken						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Develop a system that effectively and rapidly responds and deal with chemical related emergencies nationwide	Nationwide	NIL	Development and activation of Chemical Emergency Response Plan						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Establish and operationalize e-waste collection centres	Nationwide	NIL	Number collection centres established						3,971,481.16		EPA	MESTI

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Environmental Compliance and Enforcement	Establish and operationalize treatment plants for managing e-waste	Nationwide	Nil	Volume of e-waste received by e-waste treatment plants managing e-waste						3,971,481.16		EPA	
Environmental Compliance and Enforcement	Incorporate climate change issues into sector medium term plans	Nationwide	6	Number of sectors with climate change mitigation and adaptation strategies						3,971,481.16		EPA	MESTI
Environmental Compliance and Enforcement	Commit to attain 45% emission reduction goal by 2030 compared to 2010 emission levels	Nationwide	56.1MT	Level of greenhouse gas emissions in metric tonnes						3,971,481.16		EPA	MESTI
Spatial Planning and Human Settlements	Revise the planning models, and planning standards for land use planning.	Nationwide	Existing planning models and land use planning standards	Revised spatial planning models and planning standards completed					250,000			LUSPA	MESTI, MLGRD, NDPC
Spatial Planning and Human Settlements	Review manuals for preparation of spatial plans	Nationwide	Old Spatial planning manual available	Spatial plan preparation manual reviewed and distributed					250,000			LUSPA	Relevant MDAs and MMDAs
Spatial Planning and Human Settlements	Complete the construction of LUSPA’s Head office	Accra	5 % completed	50% completed					15,000,000			LUSPA	Procurement Authority
Spatial Planning and Human Settlements	Recruit 100 no. spatial planners for the Authority and MMDAs without planners	Nationwide		Number of spatial planners recruited					560,000			LUSPA	MLGRD

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Spatial Planning and Human Settlements	Organize orientation for RSPCs and DSPCs	Nationwide	0	Number of Orientation programmes organized with reports					80,000			LUSPA	
Spatial Planning and Human Settlements	Prepare SDF and structure plan for 15 Municipal Assemblies (secondary cities programme)	Nationwide	0	Number of SDFs and Structure plans prepared for Municipal Assemblies							22,050,000	LUSPA	World Bank MLGRD,
Spatial Planning and Human Settlements	Undertake 2 No. public education on urban planning on World Town Planning Day	Nationwide	0	Number of radio programmes organized on planning education									
Spatial Planning and Human Settlements	Prepare RSDF for Central Region	Central Region	0	RSDF completed for Central region					2,000,000				
Spatial Planning and Human Settlements	Prepare spatial plan for 1 Regional Industrial Park to support the Industrial Transformation Agenda	Brong Ahafo	0	Spatial Plan for Industrial Park completed					700,000			MOTI, LUSPA, GIPC, GFZA	
Spatial Planning and Human Settlements	Organize 2 No. Public awareness and education programme on radio and television	Nationwide	0	Number of public awareness programmes organized					100,000			LUSPA	GIP
Spatial Planning and Human Settlements	Organize GIS training to 216 on the application of LUPMIS on property addressing, street naming and property tax administration	All regional capitals	About 40% of planners have knowledge on LUPMIS	Training report of GIS training					200,000			LUSPA	MLGRD, RCC,

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Spatial Planning and Human Settlements	Publicize completed MMDA SDFs on LUSPA's website	Nationwide	NSDF, RSDFs available	Number of MMDA SDFs publicized on website					0			LUSPA	NITA
Spatial Planning and Human Settlements	Train MMDAs on new permitting guidelines and collect permit data	Nationwide	0	Number of Training organized on new permitting guidelines with reports								LUSPA (FUNDIN G TIED TO SPATIAL PLG GUIDELINES)	MLGRD, RCCs
Spatial Planning and Human Settlements	Redesign LUSPA's website	Head office	Existing website	LUSPA's Web site redesigned					5000			LUSPA	
Spatial Planning and Human Settlements	Sponsor 2 No. staff for short courses in specialized urban planning area	Nationwide	0	Number of staff sponsored on short courses					80,000			LUSPA	
Spatial Planning and Human Settlements	Sponsor 10 No. staff for training at GIMPA on relevant programmes	Head office	0	Number of staff with training from GIMPA					100,000			LUSPA	GIMPA. OHCS
Spatial Planning and Human Settlements	Sponsor 15 No. technical and administrative staff to pursue relevant programmes	Nationwide	0	Number of technical and administrative staff trained					70,000			LUSPA	
Spatial Planning and Human Settlements	Sponsor 10 no. staff for postgraduate training in urban and regional planning	Nationwide	0	Number of staff sponsored					200,000			LUSPA	
Biosafety Regulation	Certify biotech laboratories and institutional biosafety committees (IBC)	Accra/National	2 IBCs Certified	Number of Laboratories and IBCs certified					131,250			NBA	CSIR, GACE, Universities

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Biosafety Regulation	To train NBA staff, Technical Advisory Committee members, Principal Investigators and Institutional Biosafety Committee members Inspectors Journalists on biosafety issues	Accra	Three (3) workshop held	Workshop reports submitted to NBA					616,875	10,000	200,000	NBA	UNEP, ABNE, PBS, ICGB
Biosafety Regulation	Produce biosafety guidelines	Accra	Four guidelines prepared	Number of guidelines produced					140,000		40,000	NBA	ABNE, PBS
Biosafety Regulation	Conduct monitoring and inspection on biosafety research activities	Kumasi/Tamale	Four monitoring conducted	Number of monitoring reports submitted					420,000			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Train IBC members and principal investigators in application review	National	One workshop held	Number of workshop reports					180,000			NBA	UNEP, ABNE, ICGB, PBS, Universities
Biosafety Regulation	Conduct ten (10) public education and awareness programmes on biosafety issues	National	Two public awareness programmes held	Reports on public awareness programmes submitted					210,000			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Preparation and airing of Graphical Animation of Biosafety Regulatory Practice	Accra/National	None	CDs of the Animations produced					20,000			NBA	
Biosafety Regulation	Maintain National GMO Detection Laboratory	Accra	One Laboratory Established	Periodic report submitted to the NBA					1,790,250	10,000		NBA	GSA

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Biosafety Regulation	Review biosafety applications	Accra	Six (6) Applications Reviewed	Number of Permits granted					383,460	18,000		NBA	ABNE, PBS
Biosafety Regulation	Conduct Board meetings	Accra	Two meeting held	Number of minutes submitted					54,600			NBA	
Biosafety Regulation	Monthly allowance for NBA Board Members	Accra	None	Receipts/Sign sheets					63,600				
Biosafety Regulation	Conduct Appeals Tribunal meetings	Accra	One meeting held	Number of minutes submitted					9,634			NBA	
Biosafety Regulation	Conduct TAC meetings	Accra	None	Number of minutes submitted					50,400			NBA	
Biosafety Regulation	Manage NBA website	Accra	Active since 2016	Presence of a demonstrable URL					47,775			NBA	
Biosafety Regulation	Conduct sensitization programmes with farmers and local communities on biotech and biosafety	National	One program conducted	Number of Reports submitted					262,500			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Print official and educational materials on biosafety	Accra	None	Number of materials printed					30,000			NBA	
Biosafety Regulation	Implement project on mainstreaming biodiversity (including biosafety) in to government decision making	Accra	Project agreement signed.	one (1) mid-year and one (1) end of year reports submitted					0	0	843,700	NBA, CSIR	UNEP-WCMC
Biosafety Regulation	International Conferences	Global	Back to office reports	None					36,562			NBA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Biosafety Regulation	Internal management of the NBA	Accra	On going	Receipts					157,991			NBA	
Biosafety Regulation	CAPEX-Vehicles (one Saloon and two Hilux Pick-up)	Accra	No Official Vehicle	Signed contracts					670,500			NBA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Accra		Draft regulations developed (6)					40,610	67,683	27,073	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) guidance document on radioactive and nuclear waste management	Accra		Draft guidance document developed(6)					17,371	28,952	11,581	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Hold Stakeholders workshop on draft regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials			Stakeholders workshop held					43,998	73,330	29,332	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Hold Stakeholders workshop on Draft guidance document on radioactive and nuclear waste management	Nation wide		Stakeholders workshop held					43,998	73,330	29,332	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Sensitize the licensees on regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Nation wide		Licensee sensitized					109,500	182,500	73,000	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Undertake 200 regulatory inspections and 20 enforcement of facilities (mining, medical, research, construction, bottling companies, industrial radiography)	Nation wide		Regulatory inspections and enforcement of 220 facilities undertaken					183,920	306,533	122,613	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train 25 NRA inspectors annually on how to access and use the RAIS	Accra		NRA inspectors trained (25)					1,309	2,182	873	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train four hundred (400) Radiation Protection Officers (RPO) on how to access and use the RAIS	Northern and southern sectors		RPOs trained					284,000	473,333	189,333	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Recruit additional professionals to undertake specialized functions	Worldwide		Professional staffs recruited					8,000	13,333	5,333	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train staff in specialized areas (ionizing and non-ionizing radiation, forecasting and financial management, M&E, public administration management, etc.) at local and foreign institution	National and international training		Staff trained in specialized areas at local and foreign institution					1,073,600	1,789,333	715,733	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Engage an architect to design the office complex	Accra		Office complex designed					30,000	50,000	20,000	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Acquire 4 cross country vehicles by Dec. 2019 for regulatory inspections	Ghana		Cross country vehicles acquired					300,000	500,000	200,000	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	3 meetings to undertake quarterly monitoring & evaluation activities	Nation wide		Monitoring & evaluation activities undertaken					22,220	37,033	14,813	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 5 day workshop of the budget committee to revise SMTDP annually	Out station		SMTDP revised					81,194	135,323	54,129	NRA	
	Organize annual budget activities	Out station		Annual budget prepared					81,194	135,323	54,129	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 2 days management meeting to approve SMTDP and annual budget	Accra		SMTDP and annual budget approved					5,852	9,753	3,901	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Host regional and international meetings/work-shops of nuclear regulatory bodies and international agencies on safety, security, and safeguards	National		Meetings/work shops hosted					464,200	773,667	309,467	NRA	FNRBA,IAEA,RC F,EC'S INSC
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Participate in regional and international meetings/workshops of nuclear regulatory bodies and international agencies on	International		Meetings/work shops attended					951,500	1,585,833	634,333	NRA	IAEA,RCF

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	safety, security, and safeguards												
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Initiate the process to adopt and ratify relevant international conventions, protocols and treaties			International relations with nuclear regulatory bodies strengthened					753,500	1,255,833	502,333	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize quarterly meetings of national nuclear security committee	Accra		Quarterly meetings organized					178,200	297,000	118,800	NRA	

Goal: Maintain a stable, united and safe society														
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies		
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating	
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare MESTI Annual Action Plan (AAP)	Accra	2018 AAP	2019 Annual Action Plan (AAP)					5,500.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorates	GAEC, NRA, NBA
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Performance Report (APR) to OHCS	Accra	2017 APR	2018 Annual Performance Report (APR)					6,600.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorates, OHCS	GAEC, NRA, NBA

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Progress Report (APR) to NDPC	Accra	2017 APR	2018 Annual Progress Report (APR)					7,700.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize validation workshop for finalization of APR	Accra		Minutes /Reports					5,500.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize Mid-year review workshop for 2018 AAP	Accra	2017 Mid-year Report	Mid-year Review Report					5,500.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Review of MESTI SMTDP 2018 - 2021	Accra	2014 – 2017 SMTDP	SMTDP document					42,900.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Quarterly M&E of MESTI programmes / projects/ activities	Accra		Quarterly Progress Reports					50,003.35			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Presentation to PSC on Poverty Reduction	Accra		Presentation					6,600.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	2020 Budget Preparation	Accra	2019 Policy Hearing presentation	Policy Hearing presentation					17,600.00			PPME Directorate	MESTI, Agencies, MoF

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra	2019 Technical Hearing Presentation	Technical Hearing Presentation					30,800.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra	2019 Presentation to PSC on MESTI 2019 Budget	Presentation to PSC on MESTI 2020 Budget					16,500.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Recycling and Disposal of Waste of Electrical and Electronic Equipment in an Environmentally Sound Way, Phase I			Siting of Handling Over Center					55,000.00			PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation				Hiring of Project Consultant								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation				Preparation of Manual of procedure								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Preparation of Sector Strategic Plan 2018 – 2022	Accra	2018 INPUTS	MESTI Strategic Plan					33,000.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Provide inputs into Budget Statement	Accra		Inputs into Budget Statement					6,600.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorate
Policy, Planning, Budgeting,	Training for PPMED Officials	Accra		Training Report								PPME Directorate	MESTI-HRM, OHCS,

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Monitoring & Evaluation													
Policy, Planning, Budgeting, Monitoring & Evaluation	Preparation of NACAP	Accra		Annual NACAP Report					11,000.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorate, GAEC, NRA, NBA,
General Administration	Payment of Utility bills	Accra	Baseline	uninterrupted supply of utility service					49,500.00			F&A	Other Service Providers
General Administration	General Expenses	Accra		Smooth administrative running of the Ministry					5,059.61			F&A	MESTI Directorates and other stakeholders
General Administration	Material and Office Consumables	Accra		Availability of office consumables					30,000.00			F&A	Service Providers
General Administration	Training Seminar and Conference Cost	Accra		Improved Directorate staff performance and sound policy and managerial decisions					150,000.00			F&A	MESTI Directorates and Agencies, HRM, OHCS, GIMPA
General Administration	Travel and Transport	Accra		Delivery of official correspondence and staff participation in official engagements					465,000.00			F&A	MESTI Directorates and other stakeholders
General Administration	Repairs and Maintenance	Accra		Good condition of official assets					75,000.00			F&A	Other Service Providers
General Administration	General Cleaning	Accra		Clean office environs					52,500.00			F&A	Other Service Providers
General Administration	Insurance	Accra		Insured official assets					30,000.00			F&A	Other Service Providers

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Human Resource	Prepare Sector Annual Performance Report	MESTI HQ		Sector APR					7,500.00			HRM, PPME	MESTI Directorates, TCPD,
Human Resource	Undertake Scheme of Service Training programme for all categories of staff	MESTI HQ	15	Number Of Staff					75,000.00			HRM	MESTI Directorates
Human Resource	Organise Training/workshops on Performance Management for staff of the Ministry	MESTI HQ		No. of workshops organized					52,500.00			HRM	MESTI Directorates, TCPD, EPA, GAEC, CSIR
Human Resource	Organise Promotion Interviews	MESTI HQ	15	No. of staff promoted					75,000.00			HRM	MESTI Directorates
Human Resource	Organise HR Forum/workshop with sector Agencies/Dept to discuss HR issues	MESTI HQ	1	Reports					22,500.00			HRM	MESTI Directorates and Agencies
Human Resource	Organise workshop on Civil Service Rules and Regulations	MESTI HQ	-	No. of workshops					22,500.00			HRM	MESTI Directorates, Agencies
Human Resource	Participation in local and international training conference	MESTI HQ	25	No. of officers who attended conferences					30,000.00			HRM	MESTI Directorates
Human Resource	Organize workshop on Cabinet Memo for Leadership of the Ministry	GIMPA	-	No. of workshops organized					30,528.00			HRM	Heads of Directorates
Statistics, Research, Information & Public Relations	Celebration of 4 Environmental Days	Nationwide	4	No. of celebrations held					125,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize ICT capacity training workshop for staff on the use of Information Management System	Accra	-	Training reports					20,000			MESTI-RSIM	
Statistics, Research, Information & Public Relations	Organize Capacity training programs for ICT staff	Accra	-	No. of staff trained					12,500			MESTI-RSIM	MESTI-Procurement, MoC

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2019)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Statistics, Research, Information & Public Relations	Acquire modern tools and technology to enhance information flow to the public e.g. Website, software and hardware tools.	Accra	-	List of ICT tools acquired					125,000			MESTI-RSIM	MESTI-Procurement, MoC
Statistics, Research, Information & Public Relations	Produce of brochures, half yearly journals documentaries and other publications on MESTI programs, projects and activities.	Accra	-	Copies of brochures					20,000			MESTI-RSIM	MESTI-HRM
Statistics, Research, Information & Public Relations	Provide media coverage for Minister and Dep. Minister's activities	Nationwide	10	Press releases					75,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize Meet-The-Press Series	Accra	1	Meet-The-Press presentation					37,500			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize capacity training programs for PR Officers	Accra	-	Training reports					25,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Finance	Treasury & Accounting Activities	MESTI	Financial reports	Financial reports					200,000			Accounts	All Agencies/ Directorates
Finance	Preparation of Financial reports	MESTI	Quarterly financial reports	Quarterly financial reports					100,000			Accounts	All Agencies/ Directorates
Finance	Internal Audit Operations	MESTI	Audit reports	Audit reports					200,000			IAU	All Agencies/ Directorates

Table 5.3: 2020 Annual Action Plan

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	A. Biotechnology: Germplasm collection, characterization, conservation and distribution nationwide.	Nation-wide		No. of Plant Accessions collected, conserved and distributed nation					850,000.00	350,000.00	750,000.00	CSIR-PGRRI	CSIR-CRI CSIR-FRI CSIR-SARI CSIR-OPRI
Scientific and Industrial Research	B. Develop strategies to reduce field and post-harvest losses for developed varies.	Northern Ghana		Percentage reduction in Postharvest losses in cereals and legumes					200,000.00	300,000.00	85,000.00	CSIR-SARI CSIR-Head Office	CSIR-CRI CSIR-FRI
Scientific and Industrial Research	C. Development and dissemination of improved varieties. (Crops/Livestock/Poultry/ fisheries)	Nationwide		No. of improved varieties (Crop/Livestock/ Fishery) developed and disseminated					550,000.00	470,000.00	470,000.00	CSIR-CRI, CSIR-FRI, CSIR-SARI, CSIR-OPRI CSIR-ARI CSIR-WRI	CSIR-PGRRI CSIR-SRI CSIR-FRI MoFA
Scientific and Industrial Research	D. Development of Strategies to enhance processing of Crop livestock, poultry and fishery products	Nationwide		No. of Strategies developed to enhance food processing					300,000.00	350,000.00	650,000.00	CSIR-FRI	CSIR-IIR CSIR-WRI CSIR-OPRI CSIR-ARI MOFA-WIAD
Scientific and Industrial Research	E. Conduct baseline surveys and adoption studies of released improved crop varieties	Northern Ghana		No. of baseline surveys and adoption studies carried out					250,000.00	350,000.00	650,000.00	CSIR-SARI	CSIR-STEPRI

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
												CSIR-Head Office	
Scientific and Industrial Research	Promotion of Science Agenda for Agriculture in Africa (S3A)	Nation wide		No. of sensitization and implementation workshops organized					300,000.00	350,000.00	650,000.00	CSIR-Head Office	FARA MESTI MOFA
Scientific and Industrial Research	Production of improved planting materials for commercial purposes	Kumasi Tamale Bunso Kade		No. of improved planting materials produced					350,000.00	350,000.00	650,000.00	CSIR-Head Office	CSIR-OPRI CSIR-CRI CSIR-SARI MOFA
Nuclear and Space Science Technology	Public sensitization on the benefits of using gamma irradiation	GAEC		7 stakeholder meeting to increase awareness of the benefits of using GIF held by the end of the year					5,500.00	500.00		GAEC	
Nuclear and Space Science Technology	Upgrading of Gamma Irradiation Facility	GAEC		Complete the signing of one MOU on the strategy to upgrade GIF source.					360,285.00	360,285.00		GAEC	
Nuclear and Space Science Technology	Establishment of cultures of plantain, pineapples, sweet potatoes, and cassava	GAEC		One (1) million planting materials for farmers produced					10,000.00	500.00		GAEC	
Nuclear and Space Science Technology	Improving crops using mutation induction and biotechnology through a farmer participatory approach	GAEC		Mutation evaluation of mutant lines continues and Chinese yam with large tube size be released					5,000.00	300.00		GAEC	

Goal: Build a Prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Train farmers on compost making	GAEC		Train 15 farmers on composting					10,000.00	500.00		GAEC	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Constitute technical teams to develop implementation Plan for environmental management of oil and gas	Accra	Policy Strategy	List of working teams					-	-	500	MESTI	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Organise two working group meetings to develop implementation Plan for environmental management of oil and gas	Accra	Policy Strategy	Reports of working group meetings consultations with inputs					-	-	149,500	MESTI	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Organise two stakeholder consultations for implementation plan	Accra	Policy Strategy	Reports of stakeholder consultations with inputs					-	-	350,000	MESTI	MoEn, EC, GNPC, PC, CSIR, GAEC, EPA, LUSPA, CSOs, MMDAs, Academia
P1: Management and Administration SP1: General Administration	Implement Community land use plan developed	Northern Ghana		Number of farmers benefiting from implementation of the plans					-	-	1,175,000	MoFA	EPA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Conduct and train project beneficiaries on the Village & loans savings association (VSLA) and book keeping	Northern Ghana		Number of beneficiaries trained					-	-	120,000	EPA	MoFA, MESTI, WD, FSD

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Implement Natural Resource Based livelihood activities	Northern Ghana		Number of beneficiaries of the livelihood activities					-	-	240,000	MoFA	WD, MESTI, FSD
P1: Management and Administration SP1: General Administration	Establish riparian vegetation and river bank soil erosion control measures	Northern Ghana		Number of communities with established Riparian vegetation					-	-	120,000	EPA	MoFA, MESTI, WD, FSD
P1: Management and Administration SP1: General Administration	Implement CREMA management plans	Northern Ghana		Number of communities implementing CREMA management plans					-	-	480,000	WD	MoFA, EPA, MESTI, FSD
P1: Management and Administration SP1: General Administration	Undertake audit of 2019 project Accounts	Accra and Northern Ghana	2018 audit report	2019 audit report					-	-	120,000	MESTI	FSD, EPA, WD, MoFA
P1: Management and Administration SP1: General Administration	Generate a budget code for biodiversity for fiscal compliance by MMDAs	Accra	N/A	Budget code CoA National biodiversity expenditure					2,000	-	-	MESTI	MoF, CAGD
P1: Management and Administration SP1: General Administration	Organise quarterly Biodiversity stakeholder consultations on biodiversity policy implementation	Koforidua	National Biodiversity Policy NBSAP	Reports of stakeholder consultations					220,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Organise national validation workshop on national Biodiversity Implementation Report	Aburi	National Biodiversity Policy NBSAP	National Biodiversity Report					80,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration	Sponsor 5 staff to participate in the Biennial Conference of the Parties	International	National Biodiversity Policy, NBSAP	COP Decisions					75,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC,

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	to the Convention on Biological Diversity												MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Mainstream biodiversity into all sectors of the economy	National	National Biodiversity Policy, NBSAP						400,000	-	-	MESTI	CSIR, EPA, NBA, MoFA, MLNR, FC, MC, MOFAD, MLGRD, NDPC, MMDAs, Academia, Private Sector, CSOs
P1: Management and Administration SP1: General Administration	Coordinate and report on the implementation of NDC phase I activities as identified by the Investment Strategy	National	N/A	No. of NDC phase I action being Implemented					659,510	-	-	MESTI/E PA	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
P1: Management and Administration	Monitoring and Evaluation of the mainstreaming programme	Accra	N/A	STI Mainstreaming Monitoring report					25,000.00		25,000.00	MESTI	PACSTI/ R&D Institutions/ Academic Institutions/MoF
SP1: General Administration	Celebrating Annual National STI Week and Scientific Renaissance day	Accra	N/A	National STI Week celebrated with wide publicity					50,000.00		100,000.00	MESTI	NDPC/R&D Institutions/Academic Institutions
P1: Management and Administration	Develop Science and Technology Parks	Accra	N/A	2 Science and Technology Parks developed					250,000,000.00		12,500,000.00	MESTI	MoT/MoF/R&D Institutions/ Academic Institutions
SP1: General Administration	Establish National Foundry and Machine Tooling Centres in various parts of the country.	Accra	N/A	Number of Foundries established					12,500,000.00		12,500,000.00	MESTI	R&D Institutions/Academic Institutions/Private Sector/MoT/ MoF
P1: Management and Administration	Establish High Performance Computer (HPC) Centres	Accra	N/A	3 HPC Centres Established					1,250,000.00		1,250,000.00		R&D Institutions/ Academic Institutions/ MoF
SP1: General Administration	Create a Data Base of Scientists, Engineers and	Accra	N/A	A national database on the profile of					50,000.00		125,000.00	MESTI	R&D Institutions/Academic

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Technologists in the Country through the use of MIS			scientists, engineers, and technologists created.									mic Institutions/MoF
P1: Management and Administration	Promote the participation of Ghanaian STI experts in National Programmes <												

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	Improving Regional, Continental and global cooperation for STI	Accra	N/A	No. of Regional, Continental and global cooperation for STI meetings attended.					100,000.00		50,000.00	MESTI	MoFA/MoF
P1: Management and Administration	Continue the Implementation of the SGCI	Accra	N/A	100 researchers trained in Research Management 100 Researchers Trained in measuring STI Indicators 5 Technologies Transfer to Private Sector					25,000.00		250,000.00	MESTI	Academic Institutions/ R&D Institutions/
SP1: General Administration	Support the Ghana-South Africa Bilateral								100,000		1,250,000.00		MoFA/R&D Institutions/Academic Institutions
P1: Management and Administration	Support the Ghana –Cote d'Ivoire Bilateral								25,000.00		25,000.00		MoFA/R&D Institutions/Academic Institutions
SP1: General Administration	Support the Ghana-Colombia Bilateral								25,000.00		50,000.00		MoFA/R&D Institutions/Academic Institutions
P1: Management and Administration	Support the Implementation of the EU H2020 NCPs Project	Accra	N/A						25,000.00		100,000.00		R&D Institutions/Academic Institutions

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	Participate in international conferences, workshops, training programess		40 international programmes attended						125,000,000			MESTI	EU,AU, ECOWAS.
P1: Management and Administration	Support the Implementation of the SKA/AVN Project.	Accra	N/A	Number of projects jointly implemented					250,000.00		250,000.00	MESTI	GSSTI/ Academic Institutions/MoF
SP1: General Administration	Establish National Space Data Centre by establishing a Satellite Ground Receiving Station.	Accra	N/A	Number of projects jointly implemented					250,000,000.00		2,500,000.00	MESTI	GSSTI/Academia/ MoF
P1: Management and Administration	Establish an Inter-Ministerial Coordinating Committee to ensure the coordination of the application of STI in all sectors of the economy	Accra	N/A	Inter-ministerial coordinating committee inaugurated					100,000.00				Office of the President/All MDAs/Academic Institutions
SP1: General Administration	Organize an annual STI consultative workshop with STI Advocacy and Professional Bodies.	Accra	N/A	4 consultative workshops organized.					50,000.00		50,000.00	MESTI	R&D Institutions/ Academic Institutions/ Private Sector
P1: Management and Administration	Encouraging R&D by the Private Sector	Accra	N/A	Total R&D Budgets of the Private Sector					12,500,000.00		2,500,000.00	MESTI	R&D institutions/Academic Institutions/Private Sector.
SP1: General Administration	Promote Venture Capital for Business Development in Technology Parks and Business Incubators	Accra	N/A	Venture Capital for Business Development in Technology Parks and Business Incubators					10,000.00			MBD	R&D institutions/Academic Institutions/Private Sector/MESTI

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Landscape management systems or technologies resilient to climate change vulnerabilities in time and space.	Bobiri, Kogyae Ankasa		No. of Technologies for Sustainable management, conservation and utilization of forest resources developed					300,000.00	500,000.00	760,000.00	CSIR-SRI	CSIR-FORIG Forestry Commission
Scientific and Industrial Research	Innovative risk management strategies that foster resilient rural livelihoods for sustainable landscape restoration.	Bobiri, Kogyae Ankasa		No. of stakeholders with capacity developed on the use on the use of forest genetic resources/ adaptation to climate change strengthened					250,000.00	350,000.00	650,000.00	CSIR-FORIG CSIR-Head Office	CSIR-SRI CSIR-WRI CSIR-CRI CSIR-SARI
Scientific and Industrial Research	Development of Strategies to combat effect of climate change	Nation-wide		No. of strategies to combat effect of climate change					300,000.00	350,000.00	650,000.00		
Scientific and Industrial Research	Control and elimination of water and soil borne diseases	Western and Northern Regions		Operational plan developed % reduction in rate of Morbidity, Mortality and Poverty associated with NTDs.					350,000.00	350,000.00	650,000.00	CSIR-WRI CSIR-Head Office	Ghana Health Services and Liverpool School of Tropical medicine
Scientific and Industrial Research		Brong-Ahafo and Northern Regions		No. of transmission indices developed to determine					240,000.00	310,000.00	650,000.00	CSIR-WRI	Imperial College, UK

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				feasibility of eliminating diseases								CSIR-Head Office	
Scientific and Industrial Research	Development of Strategies to address water, air and soil pollution	Nation wide		No. of Strategies for addressing pollution developed					210,000.00	470,000.00	5,500,000.00	CSIR-WRI	CSIR-SRI
Scientific and Industrial Research	Development of essential materials and industrial products using local raw materials	Kumasi		Number of products developed from local raw materials					240,000.00	317,053.22	680,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Development of local building materials for affordable housing delivery and provision of road construction advisory services	Kumasi Apam		No. of local building materials promoted					300,000.00	310,000.00	680,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Promotion of renewable Energy systems for both domestic and commercial buildings	Southern Ghana		No. of Solar energy systems installed					300,000.00	310,000.00	680,000.00	CSIR-IIR CSIR-Head Office	Energy Commission
Scientific and Industrial Research	Promote Climate – friendly bioenergy options for sustainable rural livelihoods	Nation-wide		No. of bioenergy options for sustainable rural livelihoods promoted					200,000.00	500,000.00	680,000.00	CSIR-IIR	Energy Commission
Scientific and Industrial Research	Establishment of ICT Centre for the provision of electronics and computer engineering services	Accra		ICT Centre established No. of training sessions organized					200,000.00	500,000.00	680,000.00	CSIR-INSTI, CSIR-	MESTI CSIR-IIR CSIR-STEPRI

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
												IIR,, Head Office	
Nuclear and Space Science Technology	Fencing of GAEC land	GAEC		Percentage completion of fencing					1,000,000			GAEC	
Nuclear and Space Science Technology	Compensation for GAEC land	GAEC		Compensation paid					250,000			GAEC	
Nuclear and Space Science Technology	Using Stable Isotope Techniques to Monitor and Evaluate Vitamin A Status of Children Susceptible to Infection	GAEC / Nationwide		Analysis report on vitamin A status of children from the Upper East region to the Ministry of Health presented					10,000		-	GAEC	
Nuclear and Space Science Technology	Safety assessment of telecommunication base stations/cell sites	Nationwide	378 base stations assessed	450 RF and FM cell sites assessed						130,000.00		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	Monitoring of telecommunications masts/base stations	Nationwide	755 masts monitored	1000 masts/base stations monitored						550,000		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	National Radon Mapping project to commence - Naturally Occurring Radioactive Materials (NORMs)	Nationwide		Monitored 5 sites for NORMS.						150,000		RPI	
Nuclear and Space Science Technology	Monitoring of occupational exposures for mine, industrial, medical, educational and educational research institution workers			700 occupationally exposed workers involved in ionizing						80,000	250,000	RPI	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				radiation monitored									
Nuclear and Space Science Technology	Assessment of food/dairy products and water samples for radioactive contamination		Analysed 600 containers	900 containers analysed to ensure safety of food import and water are free from radioactive contamination monitored						15,000.00		GAEC	
Nuclear and Space Science Technology	Calibration of radiation detection equipment and nuclear density gauges used in medical and industrial facilities.	Nationwide	59 survey meters and 7 density gauges calibrated	Calibration of 70 survey meters and 10 density gauge completed					15,000.00	10,000.00		GAEC	
Nuclear and Space Science Technology	Monitoring of air for persistent organic pollutants and particulate matter.	Nationwide	The three Northern Regions and Brong Ahafo to be monitored.	Samples analyzed							C30,000	GAEC	EPA
Nuclear and Space Science Technology	Application of dual isotope approach (δ15N-NO3-, δ18O-NO3-) to determine origin of nitrate contamination in the Lower Volta Basin	Greater Accra and Volta Region	Preliminary Water Quality Assessment Carried out.	Sampling of boreholes, hand-dug wells and dams Lab analysis of samples Publication					85000			GAEC	WRC, CWSA MMDAS
Nuclear and Space Science Technology	Assessing the effects of domestic and industrial discharges on Volta River quality	Akosombo	Consultaions with stakeholders	-Bumper fish catch						GHC 13,000		GAEC	
Nuclear and Space Science Technology	Measurement of gross alpha-beta in drinking water (bottled and sachet)	GAEC / Nationwide		Analysis of 1000 containers of food/dairy and						100,000.00			

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				water samples for radioactive contamination conducted.									
Nuclear and Space Science Technology	Training and public education in Radiation Safety, Radiation Protection and Nuclear Security	GAEC	150 young professionals successfully completed their training on radiation protection (PGEC)	280 occupationally exposed workers and frontline officers trained						50,000.00		GAEC	
Nuclear and Space Science Technology	Scientific assessment of the environment and human health impact of e-waste	Greater Accra Region		Collection and analysis of soil and air samples completed							10,000	GAEC	EPA
Nuclear and Space Science Technology	Implementation of the borehole disposal concept for Disused Sealed Radioactive Sources (DSRS) in Ghana.	Nationwide	*Developed site characterisation report for review by IAEA. *Consolidation of the 458 DSRS *Developed post closure safety assessment report for reviewing by the IAEA.	*Regulatory approval of the Disposal borehole granted. *Emplacement of the solidified DSRS completed.					45,000		EUROS 65,000	GAEC	Canada, USA, IAEA
Nuclear and Space Science Technology	Initiation of cancer (tumour) biomarker service at RAMSRI	GAEC		-Laboratory completed (100%)					250,000			GAEC	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	National Quality Assurance Audit of radiotherapy, diagnostic radiology and nuclear medicine practice in Ghana	GAEC	National quality assurance audit of five diagnostic radiology centres in Ghana completed	Forty (40) diagnostic radiology centres in Ghana audited					50,000.00			GAEC	
Nuclear and Space Science Technology	Computed Gamma tomography for process flow research		CT system, Experimental data,	Publications, Conference presentations						50000	10000	NNRI	
Nuclear and Space Science Technology	Science awareness, engagement and outreach	GSSTI	Strategy document implemented	➤ Visit to schools report Visit to GRAO reports					40,000	10,000	50,000	GSSTI	GES, Schools, Ghana Planetarium, GAST
Nuclear and Space Science Technology	Research with Ghana Radio Telescope	GSSTI	Conversion complete	➤ Working radio telescope ➤ Refereed publications 3 Participat ion in space observati ons					600,000			GSSTI	SKA,
Nuclear and Space Science Technology	Human capital development and training in space science and technology (staff and non-staff)	GSSTI	Annual training programme in place	➤ Training program mes ➤ Summer schools 4 Conferen ces and worksho ps					250,000	20,000	250,000	GSSTI	SKA, DARA, Royal Society, Ghana Universities

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Establishment of spin-off ventures	GSSTI	Products in market	5 Products in use						300,000		GSSTI	
Nuclear and Space Science Technology	Climate research	GSSTI	Work continuation from the previous year	6 Produce climate prediction over Ghana					10,000	5,000	30,000	GSSTI	
Nuclear and Space Science Technology	Earth Observation research	GSSTI	Work continuation from the previous year	More detailed research 7						20,000		GSSTI	
Nuclear and Space Science Technology	Graduate program at SNAS		Continuation of programs	Improvement in programs						10,000		GSSTI	
Nuclear and Space Science Technology	Capacity building	GSSTI		Human capacity developed in remote sensing techniques, climate modeling techniques, image processing and GIS						10,000		GSSTI	
Nuclear and Space Science Technology	Orbital space mission utilizing SNC's Dream Chaser® space vehicle.		None	Ground Station Development, data acquisition and motoring of illegal gold mining.					250,000	100,000		GAEC	UNOOSA
Nuclear and Space Science Technology	Organize stakeholder and public sensitization meetings on adoption of nuclear power	Nationwide	15 stakeholder meeting held on sensitization	Hold at least 30 stakeholder/meetings.					150,000			NPI/GAEC, Owner Operator	NCCE, Statistical service, Media

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				Hold at least 3 editors forum to sensitise the media on nuclear power development 									

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Assessment (EA) regulations												
Environmental Compliance and Enforcement	Monitor all permitted projects to ensure compliance with LI1652	Nationwide	5500	Number of projects to ensure compliance with LI1652						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	Greater Accra	14 sites	No of sites monitored and average level of particulate matter in the air at selected locations						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Sample and analyse level of pollution of Effluent quality from industries and hotels	Greater Accra	80 industries	No of industries monitored to assess the level of pollutants of effluent discharge into coastal waters and lagoons						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Review the environmental laws , regulations and guidelines to address emerging environmental issues	Nationwide	2	Number of environmental laws, regulations and guidelines reviewed.						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Develop regulations for emerging environmental issues	Nationwide	1	Number of environmental laws and regulations developed						4,388,366.12		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Environmental Compliance and Enforcement	Monitor the marine ecosystem to ascertain the levels of pollutants	Coastal Belt	NIL	Number of monitoring exercises carried out to measure the concentrations of heavy metals and petroleum products in the marine ecosystem						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Ensure the use of bio-Oxo degradable additives in the manufacture of flexible plastics	Nationwide	25	Number of companies using the bio-oxodegradable additives						4,388,366.12		EPA	
Environmental Protection and Management	Undertake regular audits of the oil and gas industry	Nationwide	1	Number of environmental audits conducted annually in the oil and gas industry						4,388,366.12		EPA	
Environmental Protection and Management	Undertake regular audits of mining companies to ensure compliance to permitting conditions	Nationwide	30	Number of companies audited for compliance with permit conditions						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Operationalize the National Oil Spill Contingency Plan	Nationwide	1	Number of simulation exercise performed in readiness for						4,388,366.12		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				oil spill emergencies									
Environmental Compliance and Enforcement	Upscale the source waste segregation programme to institutions	Nationwide	40	Number of institutions implementing the programme						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Update of pesticide register annually to indicate list of approved ,banned and pesticides for experimental purposes	Nation wide	1	Number of updates of pesticide register undertaken						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Develop a system that effectively and rapidly responds and deal with chemical related emergencies nationwide	Nationwide	NIL	Development and activation of Chemical Emergency Response Plan						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Establish and operationalize e-waste collection centres	Nationwide	NIL	Number collection centres established						4,388,366.12		EPA	MESTI
Environmental Compliance and Enforcement	Establish and operationalize treatment plants for managing e-waste	Nationwide	Nil	Volume of e-waste received by e-waste treatment plants managing e-waste						4,388,366.12		EPA	
Environmental Compliance and Enforcement	Incorporate climate change issues into sector medium term plans	Nationwide	6	Number of sectors with climate change mitigation and adaptation strategies						4,388,366.12		EPA	MESTI

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					1st	2nd	3rd	4th	GoG	IGF	Donor	Lead	Collaborating
Environmental Compliance and Enforcement	Commit to attain 45% emission reduction goal by 2030 compared to 2010 emission levels	Nationwide	56.1MT	Level of greenhouse gas emissions in metric tonnes						4,388,366.12		EPA	MESTI
Spatial Planning and Human Settlements	Publicize revised zoning regulations, planning standards and spatial plan preparation manual on LUSPA website	Nationwide	Existing zoning regulations, planning standards and spatial plan preparation manual	Zoning regulations, planning standards and spatial plan preparation manual publicized on LUSPA website								LUSPA	MESTI, MLGRD, NDPC
Spatial Planning and Human Settlements	Complete the construction of LUSPA's Head office	Accra	50 % completed	100% completed					20,000,000			LUSPA	Procurement Authority
Spatial Planning and Human Settlements	Formulate a human settlements policy	Nationwide	Human settlement Study available	Human Settlements policy completed					150,000			LUSPA	Relevant MDAs and MMDAs
Spatial Planning and Human Settlements	Train officers on the new spatial planning modules and guidelines	Nationwide	0	Number of officers trained on the new spatial					100,000			LUSPA	
Spatial Planning and Human Settlements	Formulate human settlement policy	Accra	Human policy study available	Human settlement Policy commenced					150,000			LUSPA	NDPC, MLGRD
Spatial Planning and Human Settlements	Recruit 100 no. spatial planners for the Authority and MMDAs without planners	Nationwide		Number of spatial planners recruited					560,000			LUSPA	MLGRD

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Spatial Planning and Human Settlements	Prepare 15 SDF/ structure plans 15 Municipal Assemblies (secondary cities programme)	Nationwide	0	Number of SDFs and Structure plans prepared for Municipal Assemblies							22,050,000	LUSPA	World Bank MLGRD,
Spatial Planning and Human Settlements	Undertake 2 No. public education on urban planning on World Town Planning Day	Nationwide	0	Number of radio programmes organized on planning education								LUSPA	
Spatial Planning and Human Settlements	Prepare RSDF for Volta Region	Volta l Region	0	RSDF completed for Central region					2,000,000			LUSPA	
Spatial Planning and Human Settlements	Prepare spatial plan for 1 Regional Industrial Park to support the Industrial Transformation Agenda	Brong Ahafo	0	Spatial Plan for Industrial Park completed					700,000		MOTI, LUSPA, GIPC, GF ZA	LUSPA	
Spatial Planning and Human Settlements	Organize 2 No. Public awareness and education programme on radio and television	Nationwide	0	Reports on public lecture organized					100,000			LUSPA	GIP
Spatial Planning and Human Settlements	Organize GIS training to 216 on the application of LUPMIS on property addressing, street naming and property tax administration	All regional capitals	About 40% of planners have knowledge on LUPMIS	Training report of GIS training					200,000			LUSPA	MLGRD, RCC,
Spatial Planning and Human Settlements	Publicize completed MMDA SDFs on LUSPA's website	Nationwide	NSDF, RSDFs available	Number of MMDA SDFs publicized on website					0			LUSPA	NITA

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					1st	2nd	3rd	4th	GoG	IGF	Donor	Lead	Collaborating
Spatial Planning and Human Settlements	Train officers on new/revised spatial planning guidelines	Nationwide	0	Number of officers trained on the revised spatial planning guidelines					500,000			LUSPA	
Spatial Planning and Human Settlements	Organize GIS training to 216 on the application of LUPMIS on property addressing, street naming and property tax administration	All regional capitals	About 40% of planners have knowledge on LUPMIS	Training report of GIS training					200,000			LUSPA	MLGRD, RCC,
Spatial Planning and Human Settlements	Sponsor 2 No. staff for short courses in specialized urban planning area	Nationwide	0	Number of staff sponsored on short courses					80,000			LUSPA	
Spatial Planning and Human Settlements	Sponsor 10 No. staff for training at GIMPA on relevant programmes	Head office	0	Number of staff with training from GIMPA					100,000			LUSPA	GIMPA. OHCS
Spatial Planning and Human Settlements	Sponsor 15 No. technical and administrative staff to pursue relevant programmes	Nationwide	0	Number of technical and administrative staff trained					70,000			LUSPA	
Spatial Planning and Human Settlements	Sponsor 10 no. staff for postgraduate training in urban and regional planning	Nationwide	0	Number of staff sponsored					200,000			LUSPA	
Biosafety Regulation	To train NBA staff, Technical Advisory Committee members, Principal Investigators and Institutional Biosafety Committee members Inspectors	Accra	Three (3) workshop held	Workshop reports submitted to NBA					647,720	10,000	200,000	NBA	UNEP, ABNE, PBS, ICGEB

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	Journalists on biosafety issues												
Biosafety Regulation	Conduct monitoring and inspection on biosafety research activities	Kumasi/Tamale	Four monitoring conducted	Number of monitoring reports submitted					441,000			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Train IBC members and principal investigators in application review	National	One workshop held	Number of workshop reports					189,000			NBA	UNEP, ABNE, ICGEB, PBS, Universities
Biosafety Regulation	Conduct ten (10) public education and awareness programmes on biosafety issues	National	Two public awareness programmes held	Reports on public awareness programmes submitted					220,500			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Preparation and airing of Graphical Animation of Biosafety Regulatory Practice	Accra/National	None	CDs of the Animations produced					21,000			NBA	
Biosafety Regulation	Maintain National GMO Detection Laboratory	Accra	One Laboratory Established	Periodic report submitted to the NBA					1,879,764	15,000		NBA	GSA
Biosafety Regulation	Review biosafety applications	Accra	Six (6) Applications Reviewed	Number of Permits granted					402,632	36,000		NBA	ABNE, PBS
Biosafety Regulation	Conduct Board meetings	Accra	Two meeting held	Number of minutes submitted					57,332			NBA	
Biosafety Regulation	Monthly allowance for NBA Board Members	Accra	None	Receipts/Sign sheets					63,600			NBA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Biosafety Regulation	Conduct Appeals Tribunal meetings	Accra	One meeting held	Number of minutes submitted					10,116			NBA	
Biosafety Regulation	Conduct TAC meetings	Accra	None	Number of minutes submitted					52,920			NBA	
Biosafety Regulation	Manage NBA website	Accra	Active since 2016	Presence of a demonstrable URL					47,775			NBA	
Biosafety Regulation	Conduct sensitization programmes with farmers and local communities on biotech and biosafety	National	One program conducted	Number of Reports submitted					275,624			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Print official and educational materials on biosafety	Accra	Four Pull-ups and brochures	Number of materials printed					31,500			NBA	
Biosafety Regulation	Implement project on mainstreaming biodiversity (including biosafety) in to government decision making	Accra	Project agreement signed.	one (1) mid-year and one (1) end of year reports submitted					0	0	843,700	NBA, CSIR	UNEP-WCMC
Biosafety Regulation	International Conferences	Global	Back to office reports	None					38,390			NBA	
Biosafety Regulation	Internal management of the NBA	Accra	On going	Receipts					165,892			NBA	
Biosafety Regulation	CAPEX-Vehicle (Coaster Bus)	Accra	Two Pick-up and a saloon available	Signed contracts					360,000			NBA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Accra		Draft regulations developed (6)					44,671	74,452	29,781	NRA	GAEC,EPA,GHS, FDA,GSA

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) guidance document on radioactive and nuclear waste management	Accra		Draft guidance document developed(6)					19,108	31,847	12,739	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Hold Stakeholders workshop on draft regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials			Stakeholders workshop held					48,398	80,663	32,265	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Hold Stakeholders workshop on Draft guidance document on radioactive and nuclear waste management	Nation wide		Stakeholders workshop held					48,398	80,663	32,265	NRA	GAEC,EPA,GHS, FDA,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Sensitize the licensees on regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Nation wide		Licensee sensitized					120,450	200,750	80,300	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Undertake 200 regulatory inspections and 20 enforcement of facilities (mining, medical, research, construction, bottling companies, industrial radiography)	Nation wide		Regulatory inspections and enforcement of 220 facilities undertaken					202,312	337,187	134,875	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Build capacity of 40 Front Line Officers (FLOs) biennially to detect and interdict illicit trafficking of nuclear and radioactive materials out of regulatory control	Accra		Capacity of Front Line Officers (FLOs) enhanced					60,096	100,160	40,064	NRA	GSA, NSC
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train 1 ICT staff to customize the Regulatory Authority Information System (RAIS) to maintain and update national register of radiation sources of practices and persons authorized to carry out any activity related to nuclear technology	Accra		4 ICT staff trained					2580	4,300	1,720	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train 25 NRA inspectors annually on how to access and use the RAIS	Accra		NRA inspectors trained (25)					1,440	2,400	960	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train four hundred (400) Radiation Protection Officers (RPO) on how to access and use the RAIS	Northern and southern sectors		RPOs trained					284,000	473,333	189,333		
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Recruit additional professionals to undertake specialized functions	Worldwide		Professional staffs recruited					6,000	10,000	4,000	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train staff in specialized areas (ionizing and non-ionizing radiation, forecasting and financial management, M&E, public administration management, etc.) at local and foreign institution	National and international training		Staff trained in specialized areas at local and foreign institution					1,180,960	1,968,267	787,307	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Acquire regulatory equipment	Ghana		Regulatory equipment acquired					162,000	270,000	108,000	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	3 meetings to undertake quarterly monitoring & evaluation activities	Nation wide		Monitoring & evaluation activities undertaken					24,442	40,737	16,295	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 5 day workshop of the budget committee to revise SMTDP annually	Out station		SMTDP revised					89,314	148,857	59,543	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize annual budget activities	Out station		Annual budget prepared					89,314	148,857	59,543	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 2 days management meeting to approve SMTDP and annual budget	Accra		SMTDP and annual budget approved					6,437	10,728	4,291	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Host regional and international meetings/work-shops of nuclear regulatory bodies and international agencies	National		Meetings/work shops hosted					510,620	851,033	340,413	NRA	FNRBA,IAEA,RC F,EC'S INSC

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	on safety, security, and safeguards												
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Participate in regional and international meetings/ workshops of nuclear regulatory bodies and international agencies on safety, security, and safeguards	International		Meetings/work shops attended					1,046,650	1,744,417	697,767	NRA	IAEA,RCF
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Initiate the process to adopt and ratify relevant international conventions, protocols and treaties			International relations with nuclear regulatory bodies strengthened					828,850	1,381,417	552,567	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize quarterly meetings of national nuclear security committee	Accra		Quarterly meetings organized					196,020	326,700	130,680	NRA	

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare MESTI Annual Action Plan (AAP)	Accra	2019 AAP	2020 Annual Action Plan (AAP)					6,050.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Performance Report (APR) to OHCS	Accra	2018 APR	2019 Annual Performance Report (APR)					7,260.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
													Directorates, OHCS
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Progress Report (APR) to NDPC	Accra	2018 APR	2019 Annual Progress Report (APR)					8,470.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize validation workshop for finalization of APR	Accra		Minutes /Reports					6,050.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize Mid-year review workshop for 2020 AAP	Accra	2019 Mid-year Report	Mid-year Review Report					6,050.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Review of MESTI SMTDP 2018 - 2021	Accra	2014 – 2017 SMTDP	SMTDP document					10,890.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Quarterly M&E of MESTI programmes / projects/ activities	Accra		Quarterly Progress Reports					55,003.68			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Presentation to PSC on Poverty Reduction	Accra		Presentation					7,260.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorates

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	2021 Budget Preparation	Accra	2019 Policy Hearing presentation	Policy Hearing presentation					19,360.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra	2019 Technical Hearing Presentation	Technical Hearing Presentation					70,180.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra	2019 Presentation to PSC on MESTI 2019 Budget	Presentation to PSC on MESTI 2021 Budget					18,150.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Recycling and Disposal of Waste of Electrical and Electronic Equipment in an Environmentally Sound Way, Phase I			Siting of Waste Handling Over Center					60,500.00			PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation				Hiring of Project Consultant								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation				Preparation of Manual of procedure								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Provide inputs into Budget Statement	Accra	2019 INPUTS	Inputs into Budget Statement					7,260.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorate
Policy, Planning, Budgeting, Monitoring & Evaluation	Training for PPMED Officials	Accra		Training Report					36,300.00			PPME Directorate	MESTI-HRM, OHCS,

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	Preparation of NACAP	Accra		Annual NACAP Report					12,100.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorate
General Administration	Payment of Utility bills	Accra	Baseline	uninterrupted supply of utility service					66,000.00			F&A	Other Service Providers
General Administration	General Expenses	Accra		Smooth administrative running of the Ministry					6,746.14			F&A	MESTI Directorates and other stakeholders
General Administration	Material and Office Consumables	Accra		Availability of office consumables					40,000.00			F&A	Service Providers
General Administration	Training Seminar and Conference Cost	Accra		Improved Directorate staff performance and sound policy and managerial decisions					200,000.00			F&A	MESTI Directorates and Agencies, HRM, OHCS, GIMPA
General Administration	Travel and Transport	Accra		Delivery of official correspondence and staff participation in official engagements					620,000.00			F&A	MESTI Directorates and other stakeholders
General Administration	Repairs and Maintenance	Accra		Good condition of official assets					100,000.00			F&A	Other Service Providers
General Administration	General Cleaning	Accra		Clean office environs					70,000.00			F&A	Other Service Providers
General Administration	Insurance	Accra		Insured official assets					40,000.00			F&A	Other Service Providers
Human Resource	Prepare Sector Annual Performance Report	MESTI HQ		Sector APR					11,250.00			HRM, PPME	MESTI Directorates, TCPD,
Human Resource	Undertake Scheme of Service Training	MESTI HQ	15	Number Of Staff					112,500.00			HRM	MESTI Directorates

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	programme for all categories of staff												
Human Resource	Organise Training/workshops on Performance Management for staff of the Ministry	MESTI HQ		No. of workshops organized					78,750.00			HRM	MESTI Directorates, TCPD, EPA, GAEC, CSIR
Human Resource	Organise Promotion Interviews	MESTI HQ	15	No. of staff promoted					112,500.00			HRM	MESTI Directorates
Human Resource	Organise HR Forum/ workshop with sector Agencies/Dept to discuss HR issues	MESTI HQ	1	Reports					33,750.00			HRM	MESTI Directorates and Agencies
Human Resource	Organise workshop on Civil Service Rules and Regulations	MESTI HQ	-	No. of workshops					33,750.00			HRM	MESTI Directorates, Agencies
Human Resource	Participation in local and international training conference	MESTI HQ	25	No. of officers who attended conferences					45,000.00			HRM	MESTI Directorates
Human Resource	Organize workshop on Cabinet Memo for Leadership of the Ministry	GIMPA	-	No. of workshops organized					45,792.00			HRM	Heads of Directorates
Statistics, Research, Information & Public Relations	Celebration of 4 Environmental Days	Nationwide	4	No. of celebrations held					125,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize ICT capacity training workshop for staff on the use of Information Management System	Accra	-	Training reports					20,000			MESTI-RSIM	
Statistics, Research, Information & Public Relations	Organize Capacity training programs for ICT staff	Accra	-	No. of staff trained					12,500			MESTI-RSIM	MESTI-Procurement, MoC
Statistics, Research, Information & Public Relations	Acquire modern tools and technology to enhance information flow to the public e.g. Website,	Accra	-	List of ICT tools acquired					125,000			MESTI-RSIM	MESTI-Procurement, MoC

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2020)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	software and hardware tools.												
Statistics, Research, Information & Public Relations	Produce of brochures, half yearly journals documentaries and other publications on MESTI programs, projects and activities.	Accra	-	Copies of brochures					20,000			MESTI-RSIM	MESTI-HRM
Statistics, Research, Information & Public Relations	Provide media coverage for Minister and Dep. Minister's activities	Nationwide	10	Press releases					75,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize Meet-The-Press Series	Accra	1	Meet-The-Press presentation					37,500			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize capacity training programs for PR Officers	Accra	-	Training reports					25,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Finance	Treasury & Accounting Activities	MESTI	Financial reports	Financial reports					200,000			Accounts	All Agencies/ Directorates
Finance	Preparation of Financial reports	MESTI	Quarterly financial reports	Quarterly financial reports					100,000			Accounts	All Agencies/ Directorates
Finance	Internal Audit Operations	MESTI	Audit reports	Audit reports					200,000			IAU	All Agencies/ Directorates

Table 5.4: 2021 Annual Action Plan

Goal: Build a prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	A. Biotechnology: Germplasm collection, characterization, conservation and distribution nationwide.	Nation wide		No. of Plant Accessions collected, conserved and distributed nation					900,000.00	400,000.00	800,000.00	CSIR-PGRRI	CSIR-CRI CSIR-FRI CSIR-SARI CSIR-OPRI
Scientific and Industrial Research	B. Develop strategies to reduce field and post-harvest losses for developed varies.	Northern Ghana		Percentage reduction in Postharvest losses in cereals and legumes					250,000.00	350,000.00	90,000.00	CSIR-SARI CSIR-Head Office	CSIR-CRI CSIR-FRI
Scientific and Industrial Research	C. Development and dissemination of improved varieties. (Crops/Livestock/Poultry/fisheries)	Nationwide		No. of improved varieties (Crop/Livestock / Fishery) developed and disseminated					600,000.00	500,000.00	500,000.00	CSIR-CRI CSIR-FRI CSIR-SARI CSIR-OPRI CSIR-ARI CSIR-WRI	CSIR-PGRRI CSIR-SRI CSIR-FRI MoFA
Scientific and Industrial Research	D. Development of Strategies to enhance processing of Crop livestock, poultry an fishery products	Nation wide		No. of Strategies developed to enhance food processing					350,000.00	400,000.00	700,000.00	Csir-fri	CSIR-IIR CSIR-WRI CSIR-OPRI CSIR-ARI MOFA-WIAD
Scientific and Industrial Research	E. Conduct baseline surveys and adoption	Northern Ghana		No. of baseline surveys and					300,000.00	400,000.00	700,000.00	CSIR-SARI	CSIR-STEPRI

Goal: Build a prosperous Society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	studies of released improved crop varieties			adoption studies carried out								CSIR-Head Office	
Scientific and Industrial Research	Promotion of Science Agenda for Agriculture in Africa (S3A)	Nation wide		No. of sensitization and implementation workshops organized					350,000.00	400,000.00	700,000.00	CSIR-Head Office	FARA MESTI MOFA
Scientific and Industrial Research	Production of improved planting materials for commercial purposes	Kumasi Tamale Bunso Kade		No. of improved planting materials produced					400,000.00	400,000.00	700,000.00	CSIR-Head Office	CSIR-OPRI CSIR-CRI CSIR-SARI MOFA
Nuclear and Space Science Technology	Public sensitization on the benefits of using gamma irradiation	GAEC		10 stakeholder meeting to increase awareness of the benefits of using GIF held by the end of the year					7,000.00	500.00		GAEC	
Nuclear and Space Science Technology	Upgrading of Gamma Irradiation Facility	GAEC		Complete the signing of one MOU on the strategy to upgrade GIF source.					USD 75,000.00	USD 75,000.00		GAEC	
Nuclear and Space Science Technology	Establishment of cultures of plantain, pineapples, sweet potatoes, and cassava	GAEC		One (1) million planting materials for farmers produced					10,000.00	500.00		GAEC	
Nuclear and Space Science Technology	Improving crops using mutation induction and biotechnology through a farmer	GAEC		Mutation evaluation of mutant lines continues and Chinese vam					10,000.00	300.00		GAEC	

Goal: Build a prosperous Society													
MDA Programmes and Sub-programmes	Activities/Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	participatory approach			with large tube size be released									
Nuclear and Space Science Technology	Train farmers on compost making	GAEC		Train 20 farmers on composting					20,000.00	500.00			

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Organise two stakeholder consultations for implementation plan for EMPOG	Accra	Policy strategy Draft implementati on plan	Reports of stakeholder consultations with inputs					-	-	100,000	MESTI	
P1: Management and Administration SP1: General Administration	National stakeholder consultation on	Accra	Draft implementati on plan	Final implementation plan					-	-	120,000	MESTI	
P1: Management and Administration SP1: General Administration	Printing of implementation strategy for EMPOG	Accra	Finalized implementation on plan	Final implementation plan					-	-	180,000	MESTI	
P1: Management and Administration SP1: General Administration	Organise quarterly Biodiversity stakeholder consultations on biodiversity policy implementation	Koforidua	National Biodiversity Policy NBSAP	Reports of stakeholder consultations					240,000	-	-	MESTI	CSIR, EPA, NBA MoFA, MLNR, FC MC, MOFAD MLGRD, NDPC MMDAs, Academia Private Sector , CSOs
P1: Management and Administration SP1: General Administration	Organise national validation workshop on national Biodiversity Implementation Report	Aburi	National Biodiversity Policy NBSAP	National Biodiversity Report validated					100,000	-	-	MESTI	CSIR, EPA, NBA MoFA, MLNR, FC MC, WRC, MOFAD MLGRD, NDPC MMDAs, Academia Private Sector, CSOs

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration SP1: General Administration	Coordinate and report on the implementation of NDC phase I activities as identified by the Investment Strategy	National	N/A	No. of NDC phase I action being Implemented					659,510	-	-	MESTI/E PA	MDAs, MMDAs, Private Sector, CSOs, EC, Academia
P1: Management and Administration SP1: General Administration	Monitoring and Evaluation of the mainstreaming programme	Accra	N/A	STI Mainstreaming Monitoring report					25,000.00		25,000.00	MESTI	PACSTI/ R&D Institutions/ Academic Institutions/MoF
P1: Management and Administration	Celebrating Annual National STI Week and Scientific Renaissance day	Accra	N/A	National STI Week celebrated with wide publicity					50,000.00		100,000	MESTI	NDPC/R&D Institutions/Academic Institutions
SP1: General Administration	Develop Science and Technology Parks	Accra	N/A	2 Science and Technology Parks developed					250,000,000.00		12,500,000.00	MESTI	MoT/MoF/ R&D Institutions/ Academic Institutions.
P1: Management and Administration	Establish National Foundry and Machine Tooling Centres in various parts of the country.	Accra	N/A	Number of Foundries established					12,500,000.00		12,500,000.00	MESTI	R&D Institutions/Academic Institutions/Private Sector/MoT/ MoF
SP1: General Administration	Establish High Performance Computer (HPC) Centres			3 HPC Centres Established					1,250,000.00		1,250,000.00	MESTI	R&D Institutions/ Academic Institutions/ MoF
P1: Management and Administration	Create a Data Base of Scientists, Engineers and Technologists in	Accra	N/A	A national database on the profile of scientists, engineers, and					50,000.00		125,000.00	MESTI	R&D Institutions/Academic Institution/MoF

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	the Country through the use of MIS			technologists created.									
SP1: General Administration	Promote the participation of Ghanaian STI experts in National Programmes Create a database on Ghanaian STI experts in across the world	Accra	N/A	No. of Ghanaian and African Diaspora STI experts with established working relationship with Ghanaian institutions Database of Ghanaian STI experts in 4 countries across the world established					25,000.00		25,000.00	MESTI	PACSTI/ R&D Institutions/ Private Sector/MoFA/ MoF
P1: Management and Administration	Prepare bi-Annual National STI Report	Accra	N/A	Report on the Current status of the national innovation system					100,000			MESTI	NDPC/ PACSTI/ R&D Institutions/Academic Institutions.
SP1: General Administration	Provide support for the Ghana Innovation and Research Commercialization Centre /National Innovation Agency	Accra	N/A	Number of technologies commercialized					2,500,000.00		2,500,000.00	MESTI	R&D Institutions/Academic Institutions/Grassroots foundations/MoF

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	(NIA)/National Innovation Agency (NIA)												
P1: Management and Administration	Development of a National Databank on Indigenous Knowledge and Technologies	Accra	N/A	Databank on indigenous knowledge and skills established					25,000.00		50,000.00	MESTI	R&D Institutions/Academic Institutions/Gratis foundations/MoF
SP1: General Administration	Improving Regional, Continental and global cooperation for STI	Accra	N/A	No. of Regional, Continental and global cooperation for STI meetings attended.					100,000		50,000.00	MESTI	MoFA/MoF
P1: Management and Administration	Continue the Implementation of the SGCI	Accra	N/A	100 researchers trained in Research Management 100 Researchers Trained in measuring STI Indicators 5 Technologies Transfer to Private Sector.					25,000.00		250,000.00	MESTI	Academic Institutions/ R&D Institutions/
SP1: General Administration	Support the Ghana-South Africa Bilateral	Accra	N/A	Number of projects jointly implemented					100,000		1,250,000.00		MoFA/R&D Institutions/Academic Institutions

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
P1: Management and Administration	Support the Ghana –Cote d'Ivoire Bilateral	Accra	N/A	Number of projects jointly implemented					50,000.00		50,000.00		MoFA/R&D Institutions/Academic Institutions
SP1: General Administration	Support the Ghana-Colombia Bilateral	Accra	N/A	Number of projects jointly implemented					50,000.00		100,000.00		MoFA/R&D Institutions/Academic Institutions
P1: Management and Administration	Support the implementation of the EU H2020 NCPs Project	Accra	N/A	-					25,000.00		100,000.00	MESTI	R&D Institutions/Academic Institutions
SP1: General Administration	Participate in international conferences, workshops, training programess		40 international programmes attended						125,000,000			MESTI	EU,AU, ECOWAS.
P1: Management and Administration	Support the Implementation of the SKA/AVN Project.	Accra	N/A	8 SKA/AVN partner countries meetings attended. One National Planetarium established at Kuntunse. 30 Astronomers and Engineers trained.					250,000.00		250,000.00	MESTI	GSSTI/ Academic Institutions/MoF

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
SP1: General Administration	Establish National Space Data Centre by establishing a Satellite Ground Receiving Station.	Accra	N/A	Satellite Ground receiving station constructed Space data available to institutions.					250,000,000.00		2,500,000.00	MESTI	GSSTI/Academic Institutions/MoF
P1: Management and Administration	Establish an Inter-Ministerial Coordinating Committee to ensure the coordination of the application of STI in all sectors of the country	Accra	N/A	Inter-Ministerial coordinating committee inaugurated					100,000.00			MESTI	Office of the President/All MDAs/Academic Institutions
SP1: General Administration	Organize an annual STI consultative workshop with STI Advocacy and Professional Bodies.	Accra	N/A	4 consultative workshops organized.					50,000.00		50,000.00	MESTI	R&D Institutions/Academic Institutions/ Private Sector
P1: Management and Administration	Encouraging R&D by the Private Sector	Accra	N/A	Total R&D Budgets of the Private Sector					12,500.00		2,500,000.00	MESTI	R&D institutions/Academic Institutions /Private Sector.
SP1: General Administration	Promote Venture Capital for Business Development in Technology Parks and Business Incubators	Accra	N/A	Venture Capital for Business Development in Technology Parks and Business Incubators					10,000.00			MBD	R&D institutions/Academic Institutions/Private Sector/MESTI

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MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Scientific and Industrial Research	Landscape management systems or technologies resilient to climate change vulnerabilities in time and space.	Bobiri, Kogyae Ankasa		No. of Technologies for Sustainable management, conservation and utilization of forest resources developed					350,000.00	400,000.00	700,000.00	CSIR-SRI	CSIR-FORIG Forestry Commission
Scientific and Industrial Research	Innovative risk management strategies that foster resilient rural livelihoods for sustainable landscape restoration.	Bobiri, Kogyae Ankasa		No. of stakeholders with capacity developed on the use on the use of forest genetic resources/ adaptation to climate change strengthened					350,000.00	550,000.00	800,000.00	CSIR-FORIG CSIR-Head Office	CSIR-SRI CSIR-WRI CSIR-CRI CSIR-SARI
Scientific and Industrial Research	Development of Strategies to combat effect of climate change	Nation-wide		No. of strategies to combat effect of climate change					400,000.00	400,000.00	700,000.00		
Scientific and Industrial Research	Control and elimination of water and soil borne diseases	Western and Northern Regions		Operational plan developed % reduction in rate of Morbidity, Mortality and Poverty associated with NTDs.					300,000.00	400,000.00	700,000.00	CSIR-WRI CSIR-Head Office	Ghana Health Services and Liverpool School of Tropical medicine
Scientific and Industrial Research		Brong-Ahafo and Northern Regions		No. of transmission indices developed to determine					400,000.00	400,000.00	700,000.00	CSIR-WRI	Imperial College, UK

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				feasibility of eliminating diseases								CSIR-Head Office	
Scientific and Industrial Research	Development of Strategies to address water, air and soil pollution	Nation wide		No. of Strategies for addressing pollution developed					400,000.00	400,000.00	700,000.00	CSIR-WRI	CSIR-SRI
Scientific and Industrial Research	Development of essential materials and industrial products using local raw materials	Kumasi		Number of products developed from local raw materials					250,000.00	500,000.00	6,000,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Development of local building materials for affordable housing delivery and provision of road construction advisory services	Kumasi Apam		No. of local building materials promoted					270,000.00	317,053.22	700,000.00	CSIR-BRRI	CSIR-IIR
Scientific and Industrial Research	Promotion of renewable Energy systems for both domestic and commercial buildings	Southern Ghana		No. of Solar energy systems installed					350,000.00	350,000.00	700,000.00	CSIR-IIR CSIR-Head Office	Energy Commission
Scientific and Industrial Research	Promote Climate –	Nation-wide		No. of bioenergy					270,000.00	350,000.00	700,000.00	CSIR-IIR	Energy Commission

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	friendly bioenergy options for sustainable rural livelihoods			options for sustainable rural livelihoods promoted									
Scientific and Industrial Research	Establishment of ICT Centre for the provision of electronics and computer engineering services	Accra		ICT Centre established No. of training sessions organized					250,000.00	550,000.00	700,000.00	CSIR-INSTI CSIR-IIR Head Office	MESTI CSIR-IIR CSIR-STEPRI
Nuclear and Space Science Technology	Fencing of GAEC land	GAEC							1,000,000			GAEC	
Nuclear and Space Science Technology	Compensation for GAEC land	GAEC		Compensation paid					250,000			GAEC	
Nuclear and Space Science Technology	Safety assessment of telecommunication base stations/cell sites	Nationwide	378 base stations assessed	500 RF and FM cell sites assessed						150,000.00		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	Monitoring of telecommunication masts/base stations	Nationwide	755 masts monitored	1200 masts/base stations monitored						600,000		GAEC	Telecom Companies, EPA
Nuclear and Space Science Technology	National Radon Mapping project to commence - Naturally Occurring Radioactive Materials (NORMs)	Nationwide		Monitored 8 sites for NORMS.						300,000		GAEC	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Monitoring of occupational exposures for mine, industrial, medical, educational and educational research institution workers		(the project stalled as a result of major breakdown of TLD reader)	1000 occupationally exposed workers involved in ionizing radiation monitored						108,000.00	350,0000	GAEC	
Nuclear and Space Science Technology	Assessment of food/dairy products and water samples for radioactive contamination		Analysed 600 containers	1000 containers analysed to ensure safety of food import and water are free from radioactive contamination monitored						21,890.00		GAEC	
Nuclear and Space Science Technology	Calibration of radiation detection equipment and nuclear density gauges used in medical and industrial facilities.	Nationwide	59 survey meters and 7 density gauges calibrated	Calibration of 70 survey meters and 10 density gauge completed					34,900.00	20,000.00		GAEC	
Nuclear and Space Science Technology	Monitoring of air for persistent organic pollutants and particulate matter.	Nationwide	Compilation of National data	Samples analyzed							C75,000	GAEC	EPA
Nuclear and Space Science Technology	Improve safe & sustainable management of groundwater resources in the three northern	GAEC Northern Region	Preliminary Water Quality Assessment Carried out	Stakeholder engagement Sampling of boreholes, hand-						125000	150,000 Euros (Equipment)	GAEC	WRC, CWSA MMDAS

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	regions as well as aquifer trans boundary to enhance water supply in the rural communities.			dug wells and dams Lab analysis of samples Publication									
Nuclear and Space Science Technology	Assessing the effects of domestic and industrial discharges on Volta River quality	Akosombo	Compilation of results	-Improve standard of living of the people along the Volta River.						GHC 2,000		GAEC	
Nuclear and Space Science Technology	Measurement of gross alpha-beta in drinking water (bottled and sachet)	GAEC / Nationwide		Analysis of 1500 containers of food/dairy and water samples for radioactive contamination conducted.						120,000.00		GAEC	
Nuclear and Space Science Technology	Training and public education in Radiation Safety, Radiation Protection and Nuclear Security	GAEC	150 young professionals successfully completed their training on radiation protection (PGEC)	300 occupationally exposed workers and frontline officers trained						70,000.00		GAEC	
Nuclear and Space Science Technology	Scientific assessment of the environment and human health impact of e-waste	Greater Accra Region		Data compiled							15,000	GAEC	EPA
Nuclear and Space Science Technology	Implementation of the borehole	Nationwide	*Developed site	*Closure of the disposal					20,000		EUROS 25,000	GAEC	Canada, USA, IAEA

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	disposal concept for Disused Sealed Radioactive Sources (DSRS) in Ghana.		charaterisation report for review by IAEA. *Consolidation of the 458 DSRS *Developed post closure safety assessment report for reviewing by the IAEA.	borehole completed. *Environmental monitoring of the borehole disposal site conducted.									
Nuclear and Space Science Technology	Initiation of cancer (tumour) biomarker service at RAMSRI	GAEC		-Laboratory functional -Persons trained					200,000			GAEC	
Nuclear and Space Science Technology	National Quality Assurance Audit of radiotherapy, diagnostic radiology and nuclear medicine practice in Ghana	GAEC	National quality assurance audit of five diagnostic radiology centres in Ghana completed	Fortty (40) diagnostic radiology centres in Ghana audited					55,000.00			GAEC	
Nuclear and Space Science Technology	Science awareness, engagement and outreach	GSSTI	Science awareness, engagement and outreach on-going	➤ Visit to schools report Visit to GRAO reports					40,000	10,000	50,000	GSSTI	GES, Schools, Ghana Planetarium, GAST

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Research with Ghana Radio Telescope	GSSTI	Working radio telescope in place	➤ Refereed publications 6 Participati on in space observatio ns					600,000			GSSTI	SKA,
Nuclear and Space Science Technology	Human capital development and training in space science and technology (staff and non-staff)	GSSTI	Skilled human capital available	➤ Training programm es ➤ Summer schools 10. Conf eren ces and work shop s					250,000	20,000	250,000	GSSTI	SKA, DARA, Royal Society, Ghana Universities
Nuclear and Space Science Technology	Establishment of spin-off ventures	GSSTI	Products in market	➤ Products in use 9. Prod ucts impr oved						300,000		GSSTI	
Nuclear and Space Science Technology	Climate research	GSSTI	Work continuation from the previous year	• Produce climate prediction over Ghana					10,000	5,000	30,000	GSSTI	
Nuclear and Space Science Technology	Earth Observation research	GSSTI	Work continuation from the previous year	More detailed research •						20,000			
Nuclear and Space Science Technology	Graduate program at SNAS		Continuation of programs	Improvement in programs						10,000		GSSTI	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Nuclear and Space Science Technology	Capacity building	GSSTI		Human capacity developed in remote sensing techniques, climate modeling techniques, image processing and GIS						10,000			
Nuclear and Space Science Technology	CubeSat Deployment program	GSSTI	None	Ground Station Development, data acquisition and motoring of illegal gold mining					250,000	130,000		GSSTI	UNOOSA and the Japan Aerospace Exploration Agency (JAXA)
Nuclear and Space Science Technology	Organize stakeholder and public sensitization meetings on adoption of nuclear power	Nationwide	15 stakeholder meeting held on sensitization	Hold at least 30 stakeholder/mee tings. Hold at least 4 editors forum to sensitise the media on nuclear power development Publish monthly newsletter on nuclear power development					160, 000			NPI/GAE C, Owner Operator	NCCE, Statistical service, Media
Nuclear and Space Science Technology	Conduct studies for national and regional grid network	Nationwide, West African Sub-Region		Detailed national and regional grid assessment completed					65,000			NPI/GAE C Owner Operator	Conduct studies for national and regional grid network

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
												GRIDCo	
Environmental Education, Information and Communication	Natural resource and environmental governance activities	Nationwide	3	Number of sector plans(MMDAs Plans) subjected to the SEA process						6,843,686.96		EPA	MESTI, WB, MoF
Environmental Compliance and Enforcement	Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	Nationwide	2,013	Number of permits issued to ensure compliance						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Monitor all permitted projects to ensure compliance with LI1652	Nationwide	5,500	Number of projects to ensure compliance with LI1652						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Monitor selected sites for air quality and pollutants, including PM10, CO, NO ₂ , SO ₂	Greater Accra	14 sites	No of sites monitored and average level of particulate matter in the air at selected locations						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Sample and analyse level of pollution of Effluent quality from industries and hotels	Greater Accra	80 industries	No of industries monitored to assess the level of pollutants of effluent discharge into						4,846,939.57		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				coastal waters and lagoons									
Environmental Compliance and Enforcement	Review the environmental laws, regulations and guidelines to address emerging environmental issues	Nationwide	2	Number of environmental laws, regulations and guidelines reviewed.						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Develop regulations for emerging environmental issues	Nationwide	1	Number of environmental laws and regulations developed						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Monitor the marine ecosystem to ascertain the levels of pollutants	Coastal Belt	NIL	Number of monitoring exercises carried out to measure the concentrations of heavy metals and petroleum products in the marine ecosystem						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Ensure the use of bio-oxodegradable additives in the manufacture of flexible plastics	Nationwide	25	Number of companies using the bio-oxodegradable additives						4,846,939.57		EPA	
Environmental Protection and Management	Undertake regular audits of the oil and gas industry	Nationwide	1	Number of environmental audits conducted annually in the						4,846,939.57		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
				oil and gas industry									
Environmental Protection and Management	Undertake regular audits of mining companies to ensure compliance to permitting conditions	Nationwide	30	Number of companies audited for compliance with permit conditions						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Operationalize the National Oil Spill Contingency Plan	Nationwide	1	Number of simulation exercise performed in readiness for oil spill emergencies						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Upscale the source waste segregation programme to institutions	Nationwide	40	Number of institutions implementing the programme						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Update of pesticide register annually to indicate list of approved ,banned and pesticides for experimental purposes	Nation wide	1	Number of updates of pesticide register undertaken						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Develop a system that effectively and rapidly responds	Nationwide	NIL	Development and activation of Chemical						4,846,939.57		EPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	and deal with chemical related emergencies nationwide			Emergency Response Plan									
Environmental Compliance and Enforcement	Establish and operationalize e-waste collection centres	Nationwide	NIL	Number collection centres established						4,846,939.57		EPA	MESTI
Environmental Compliance and Enforcement	Establish and operationalize treatment plants for managing e-waste	Nationwide	Nil	Volume of e-waste received by e-waste treatment plants managing e-waste						4,846,939.57		EPA	
Environmental Compliance and Enforcement	Incorporate climate change issues into sector medium term plans	Nationwide	6	Number of sectors with climate change mitigation and adaptation strategies						4,846,939.57		EPA	MESTI
Environmental Compliance and Enforcement	Commit to attain 45% emission reduction goal by 2030 compared to 2010 emission levels	Nationwide	56.1MT	Level of greenhouse gas emissions in metric tonnes						4,846,939.57		EPA	MESTI
Spatial Planning and Human Settlements	Sponsor 2 No. staff for short courses in specialized urban planning area	Nationwide	0	Number of staff sponsored on short courses					80,000			LUSPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Spatial Planning and Human Settlements	Sponsor 10 No. staff for training at GIMPA on relevant programmes	Head office	0	Number of staff with training from GIMPA					100,000			LUSPA	GIMPA. OHCS
Spatial Planning and Human Settlements	Sponsor 15 No. technical and administrative staff to pursue relevant programmes	Nationwide	0	Number of technical and administrative staff trained					70,000			LUSPA	
Spatial Planning and Human Settlements	Sponsor 10 no. staff for postgraduate training in urban and regional planning	Nationwide	0	Number of staff sponsored					200,000			LUSPA	
Biosafety Regulation	Publicize human settlements policy on LUSPA's website	Head office, Accra	Human settlement	Human Settlements policy completed					150,000			LUSPA	Relevant MDAs and MMDAs
	Recruit 100 no. spatial planners for the Authority and MMDAs without planners	Nationwide		Number of spatial planners recruited					560,000			LUSPA	MLGRD
Biosafety Regulation	Prepare SDF for 19 Municipal Assemblies (secondary cities programme)	Nationwide	0	Number of SDFs and Structure plans prepared for Municipal Assemblies							22,050,000	LUSPA	World Bank MLGRD,

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Biosafety Regulation	Prepare RSDF for Brong Ahafo Region	Volta l Region	0	RSDF completed for Central region					2,000,000			LUSPA	
Biosafety Regulation	Prepare spatial plan for 1 Regional Industrial Park to support the Industrial Transformation Agenda	Brong Ahafo	0	Spatial Plan for Industrial Park completed					700,000		MOTI, LUSPA, GIPC,GF ZA	LUSPA	
Biosafety Regulation	Organize 2 No. Public awareness and education programme on radio and television	Nationwide	0	Reports on public lecture organized					100,000			LUSPA	GIP
Biosafety Regulation	Organize GIS training to 216 on the application of LUPMIS on property addressing, street naming and property tax administration	All regional capitals	About 80% of planners have knowledge on LUPMIS	Training report of GIS training					200,000			LUSPA	MLGRD, RCC,
Biosafety Regulation	Publicize completed MMDA SDFs on LUSPA’s website	Nationwide	NSDF, RSDFs available	Number of MMDA SDFs publicized on website					0			LUSPA	NITA
Biosafety Regulation	Publicize analyzed permit data on	Head office, Accra	Earlier analyzed data publicized	Publicized information on permit data available on					0			LUSPA	

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	LUSPA's website			LUSPA's website									
Biosafety Regulation	Evaluate all DSDFs prepared by MMDAs	Regional Offices and Head Office, Accra	0	Evaluated DSDFs publicized on LUSPA's website					0			LUSPA	
Biosafety Regulation	Sponsor 2 No. staff for short courses in specialized urban planning area	Nationwide	0	Number of staff sponsored on short courses					80,000			LUSPA	
Biosafety Regulation	Sponsor 10 No. staff for training at GIMPA on relevant programmes	Head office	0	Number of staff with training from GIMPA					100,000			LUSPA	GIMPA. OHCS
Biosafety Regulation	Sponsor 15 No. technical and administrative staff to pursue relevant programmes	Nationwide	0	Number of technical and administrative staff trained					70,000			LUSPA	
Biosafety Regulation	Sponsor 10 no. staff for postgraduate training in urban and regional planning	Nationwide	0	Number of staff sponsored					200,000			LUSPA	
Biosafety Regulation	To train NBA staff, Technical Advisory Committee members, Principal Investigators	Accra	Three (3) workshop held	Workshop reports submitted to NBA					680,106	10,000	200,000	NBA	UNEP, ABNE, PBS, ICGB

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					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	and Institutional Biosafety Committee members Inspectors Journalists on biosafety issues												
Biosafety Regulation	Conduct monitoring and inspection on biosafety research activities	Kumasi/Tamale	Four monitoring conducted	Number of monitoring reports submitted					463,052			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Conduct twelve (12) public education and awareness programmes on biosafety issues	National	Two public awareness programmes held	Reports on public awareness programmes submitted					231,524			NBA	Biosafety Regulatory Agencies
Biosafety Regulation	Maintain National GMO Detection Laboratory	Accra	One Laboratory Established	Periodic report submitted to the NBA					1,973,740	15,000		NBA	GSA
Biosafety Regulation	Review biosafety applications	Accra	Six (6) Applications Reviewed	Number of Permits granted					422,764	36,000		NBA	ABNE, PBS
Biosafety Regulation	Conduct Board meetings	Accra	Two meeting held	Number of minutes submitted					60,200			NBA	
Biosafety Regulation	Monthly allowance for	Accra	None	Receipts/Sign sheets					63,600			NBA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	NBA Board Members												
Biosafety Regulation	Conduct Appeals Tribunal meetings	Accra	One meeting held	Number of minutes submitted					10,622			NBA	
Biosafety Regulation	Conduct TAC meetings	Accra	None	Number of minutes submitted					55,568			NBA	
Biosafety Regulation	Manage NBA website	Accra	Active since 2016	Presence of a demonstrable URL					50,164			NBA	
Biosafety Regulation	Print official and educational materials on biosafety	Accra	Four Pull-ups and brochures	Number of materials printed					33,076			NBA	
Biosafety Regulation	Implement project on mainstreaming biodiversity (including biosafety) in to government decision making	Accra	Project agreement signed.	one (1) mid-year and one (1) end of year reports submitted					0	0	843,700	NBA, CSIR	UNEP-WCMC
Biosafety Regulation	International Conferences	Global	Back to office reports	None					40,310			NBA	
Biosafety Regulation	Internal management of the NBA	Accra	On going	Receipts					174,188			NBA	
Biosafety Regulation	CAPEX- Office Complex	Accra	NBA Temporarily Accommodated	Signed contract					2,000,000		3,400,000	NBA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Accra		Draft regulations developed (6)					44,671	74,452	29,781	NRA	GAEC,EPA,GHS,FD A,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Draft six (6) guidance document on radioactive and nuclear waste management	Accra		Draft guidance document developed(6)					21,019	35,032	14,013	NRA	GAEC,EPA,GHS,FD A,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Hold Stakeholders workshop on draft regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials			Stakeholders workshop held					53,238	88,730	35,492	NRA	GAEC,EPA,GHS,FD A,GSA
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Hold Stakeholders workshop on Draft guidance document on radioactive and	Nation wide		Stakeholders workshop held					53,238	88,730	35,492	NRA	GAEC,EPA,GHS,FD A,GSA

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
	nuclear waste management												
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Sensitize the licensees on regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Nation wide		Licensee sensitized					132,465	220,775	88,310	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Undertake 200 regulatory inspections and 20 enforcement of facilities (mining, medical, research, construction, bottling companies, industrial radiography)	Nation wide		Regulatory inspections and enforcement of 220 facilities undertaken					222,543	370,905	148,362	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train 25 NRA inspectors annually on how to access and use the RAIS	Accra		NRA inspectors trained (25)					1,584	2,640	1,056	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Recruit additional professionals to undertake specialized functions	Worldwide		Professional staffs recruited					4,000	6,667	2,667	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Train staff in specialized areas (ionizing and non-ionizing radiation, forecasting and financial management, M&E, public administration management, etc.) at local and foreign institution	National and international training		Staff trained in specialized areas at local and foreign institution					1,299,056	2,165,093	866,037	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	3 meetings to undertake quarterly monitoring & evaluation activities	Nation wide		Monitoring & evaluation activities undertaken					26,887	44,812	17,925	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 5 day workshop of the budget committee to revise SMTDP annually	Out station		SMTDP revised					98,245	163,742	65,497	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize annual budget activities	Out station		Annual budget prepared					98,245	163,742	65,497	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize 2 days management meeting to approve SMTDP and annual budget	Accra		SMTDP and annual budget approved					7,080	11,800	4,720	NRA	
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Host regional and international meetings/workshops of nuclear regulatory bodies and international agencies on safety, security, and safeguards	National		Meetings/works hops hosted					561,682	936,137	374,455	NRA	FNRBA,IAEA,RCF, EC’S INSC
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Participate in regional and international meetings/workshops of nuclear regulatory bodies and international agencies on safety, security, and safeguards	International		Meetings/works hops attended					1,151,315	1,918,858	767,543	NRA	IAEA,RCF
Enforcement and Compliance of	Initiate the process to adopt and ratify relevant			International relations with nuclear regulatory					911,735	1,519,558	607,823	NRA	

Goal: Safeguard the Natural Environment and Ensure a Resilient, Built Environment													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Ionizing and Non-Ionizing Radiation	international conventions, protocols and treaties			bodies strengthened									
Enforcement and Compliance of Ionizing and Non-Ionizing Radiation	Organize quarterly meetings of national nuclear security committee	Accra		Quarterly meetings organized					215,622	359,370	143,748	NRA	

Goal: Maintain a stable, united and safe society														
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies		
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating	
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare MESTI Annual Action Plan (AAP)	Accra	2020 AAP	2021 Annual Action Plan (AAP)					6,655.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI	GAEC, NRA, NBA, Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Performance Report (APR) to OHCS	Accra	2019 APR	2020 Annual Performance Report (APR)					7,986.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI	GAEC, NRA, NBA, Directorates, OHCS
Policy, Planning, Budgeting, Monitoring & Evaluation	Prepare Annual Progress Report (APR) to NDPC	Accra	2019 APR	2020 Annual Progress Report (APR)					9,317.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI	GAEC, NRA, NBA, Directorates, NDPC
Policy, Planning, Budgeting,	Organize validation workshop for finalization of APR	Accra		Minutes /Reports					6,655.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI	GAEC, NRA, NBA, MESTI

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Monitoring & Evaluation													Directorates, NDPC
Policy, Planning, Budgeting, Monitoring & Evaluation	Organize Mid-year review workshop for 2020 AAP	Accra		Mid-year Review Report					6,655.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Review of MESTI SMTDP 2018 - 2021	Accra	2018 – 2021 SMTDP	SMTDP document					11,979.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Quarterly M&E of MESTI programmes / projects/ activities	Accra		Quarterly Progress Reports					60,504.05			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	Presentation to PSC on Poverty Reduction	Accra		Presentation					7,986.00			PPME Directorate	CSIR, EPA, LUSPA, MESTI Directorates
Policy, Planning, Budgeting, Monitoring & Evaluation	2022 Budget Preparation	Accra		Policy Hearing presentation					21,296.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra		Technical Hearing Presentation					37,268.00 39,930.00			PPME Directorate	MESTI, Agencies, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation		Accra		Presentation to PSC on MESTI 2022 Budget					19,965.00			PPME Directorate	MESTI, Agencies, MoF

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Policy, Planning, Budgeting, Monitoring & Evaluation	Recycling and Disposal of Waste of Electrical and Electronic Equipment in an Environmentally Sound Way, Phase I			Siting of Handing Over Center					66,550.00			PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation				Hiring of Project Consultant								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation				Preparation of Manual of procedure								PPME Directorate	EPA, KFW, MoF
Policy, Planning, Budgeting, Monitoring & Evaluation	Provide inputs into Budget Statement	Accra		Inputs into Budget Statement					7,986.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorate
Policy, Planning, Budgeting, Monitoring & Evaluation	Training for PPMED Officials	Accra		Training Report					39,930.00			PPME Directorate	MESTI-HRM, OHCS,
Policy, Planning, Budgeting, Monitoring & Evaluation	Preparation of NACAP	Accra		Annual NACAP Report					13,310.00			PPME Directorate	CSIR, GAEC, EPA, NRA, LUSPA, NBA, MESTI Directorate
General Administration	Payment of Utility bills	Accra	Baseline	uninterrupted supply of utility service					82,500.00			F&A	Other Service Providers
General Administration	General Expenses	Accra		Smooth administrative running of the Ministry					8,432.68			F&A	MESTI Directorates and other stakeholders
General Administration	Material and Office Consumables	Accra		Availability of office consumables					50,000.00			F&A	Service Providers

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
General Administration	Training Seminar and Conference Cost	Accra		Improved Directorate staff performance and sound policy and managerial decisions					250,000.00			F&A	MESTI Directorates and Agencies, HRM, OHCS, GIMPA
General Administration	Travel and Transport	Accra		Delivery of official correspondence and staff participation in official engagements					775,000.00			F&A	MESTI Directorates and other stakeholders
General Administration	Repairs and Maintenance	Accra		Good condition of official assets					125,000.00			F&A	Other Service Providers
General Administration	General Cleaning	Accra		Clean office environs					87,500.00			F&A	Other Service Providers
General Administration	Insurance	Accra		Insured official assets					50,000.00			F&A	Other Service Providers
Human Resource	Prepare Sector Annual Performance Report	MESTI HQ		Sector APR					16,875.00			HRM, PPME	MESTI Directorates, TCPD,
Human Resource	Undertake Scheme of Service Training programme for all categories of staff	MESTI HQ	15	Number Of Staff					168,750.00			HRM	MESTI Directorates
Human Resource	Organise Training/workshops on Performance Management for staff of the Ministry	MESTI HQ		No. of workshops organized					168,750.00			HRM	MESTI Directorates, TCPD, EPA, GAEC, CSIR
Human Resource	Organise Promotion Interviews	MESTI HQ	15	No. of staff promoted					168,750.00			HRM	MESTI Directorates
Human Resource	Organise HR Forum/workshop with sector Agencies/Dept to discuss HR issues	MESTI HQ	1	Reports					50,625.00			HRM	MESTI Directorates and Agencies

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Human Resource	Organise workshop on Civil Service Rules and Regulations	MESTI HQ	-	No. of workshops					50,625.00			HRM	MESTI Directorates, Agencies
Human Resource	Participation in local and international training conference	MESTI HQ	25	No. of officers who attended conferences					67,500.00			HRM	MESTI Directorates
Human Resource	Organize workshop on Cabinet Memo for Leadership of the Ministry	GIMPA	-	No. of workshops organized					68,688.00			HRM	Heads of Directorates
Statistics, Research, Information & Public Relations	Celebration of 4 Environmental Days	Nationwide	4	No. of celebrations held					125,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize ICT capacity training workshop for staff on the use of Information Management System	Accra	-	Training reports					20,000			MESTI-RSIM	
Statistics, Research, Information & Public Relations	Organize Capacity training programs for ICT staff	Accra	-	No. of staff trained					12,500			MESTI-RSIM	MESTI-Procurement, MoC
Statistics, Research, Information & Public Relations	Acquire modern tools and technology to enhance information flow to the public e.g. Website, software and hardware tools.	Accra	-	List of ICT tools acquired					125,000			MESTI-RSIM	MESTI-Procurement, MoC
Statistics, Research, Information & Public Relations	Produce of brochures, half yearly journals documentaries and other publications on MESTI programs, projects and activities.	Accra	-	Copies of brochures					20,000			MESTI-RSIM	MESTI-HRM
Statistics, Research, Information & Public Relations	Provide media coverage for Minister and Dep. Minister's activities	Nationwide	10	Press releases					75,000			MESTI-RSIM	All other Directorates, Agencies under MESTI

Goal: Maintain a stable, united and safe society													
MDA Programmes and Sub-programmes	Activities/ Operations	Location	Baseline	Output Indicators	Quarterly Time Schedule (2021)				Indicative Budget			Implementing Agencies	
					1 st	2 nd	3 rd	4 th	GoG	IGF	Donor	Lead	Collaborating
Statistics, Research, Information & Public Relations	Organize Meet-The-Press Series	Accra	1	Meet-The-Press presentation					37,500			MESTI-RSIM	All other Directorates, Agencies under MESTI
Statistics, Research, Information & Public Relations	Organize capacity training programs for PR Officers	Accra	-	Training reports					25,000			MESTI-RSIM	All other Directorates, Agencies under MESTI
Finance	Treasury & Accounting Activities	MESTI	Financial reports	Financial reports					200,000			Accounts	All Agencies/ Directorates
Finance	Preparation of Financial reports	MESTI	Quarterly financial reports	Quarterly financial reports					100,000			Accounts	All Agencies/ Directorates
Finance	Internal Audit Operations	MESTI	Audit reports	Audit reports					200,000			IAU	All Agencies/ Directorates

CHAPTER SIX

IMPLEMENTATION, MONITORING AND EVALUATION

1.1. Introduction

MESTI and its Agencies in partnership with their Development Partners dedicate considerable funds to implement its development interventions as spelt out in the Sector Medium Term Development Plan (2018-2021).

The relevance of monitoring in the implementation of strategic plans, programmes and projects cannot be over emphasized. Monitoring and Evaluation (M&E) ensures that at each stage of implementation of a project or programme, the required inputs are delivered on time, used as intended and is producing the desired results. It also provides the necessary feedback to inform policy and subsequent programme/project planning.

Consequently, in the implementation of programmes and projects in this document, the Ministry's Policy, Planning, Monitoring and Evaluation (PPME) Directorate will be responsible for the overall Monitoring and Evaluation of the plan. However, specific project monitoring and evaluation is the responsibility of Sector Agencies implementing these projects. In the implementation arrangement, the roles and responsibilities of the various actors have been clearly spelt out. In most instances, the Ministry plays a facilitating role while the Agencies actually do the implementation of the programmes and projects. The Ministry will therefore send monitoring requests to the Agencies/Department/Directorates to provide monitoring reports to reflect and complete the implementation process. The individual PPMEDs of the Ministry and its Agencies/Department shall periodically monitor projects according to the NDPC prescribed formats.

Monitoring and evaluation reports generated from all these arrangements shall be coordinated by the PPMED and presented to the Ministry periodically.

To measure the level of achievement for each goal and policy objective, indicators were developed using the activities of the Ministry and its Agencies/Department as basis. These are shown in the M&E matrix below.

Following from this, the M&E Matrix has been developed to guide and track the implementation of planned activities contained in the Sector Medium Term Development Plan. The main aim of the Sector M&E plan is to monitor the implementation of the SMTDP and also ensure that set goals and objectives are achieved.

1.2. Monitoring Matrix

One of the critical steps in the preparation of an M&E Plan is the development of appropriate indicators and realistic targets that are achievable over the plan period and directly related to the

SMTDP goals and objectives. Indicators are necessary for measuring progress, while targets are the milestones that will lead to the sector goal and objectives.

The specific indicators for monitoring the goals and objectives are shown in the matrix below:

Table 6.1: M&E Matrix

GOAL: Build a Prosperous Society										
POLICY OBJECTIVE 1: Enhance the Application of Science, Technology and Innovation										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
No. of Plant Accessions collected, conserved and distributed nation	Biotechnology: Plant germplasm collection, characterization, conservation and distribution nationwide.	Output	11500	12500	13500	15000	16500	By 3 ecological zones (Northern, Transition & Southern)	Half yearly	CSIR-PGRRI
Percentage reduction in Postharvest losses in cereals and legumes	Percentage of difference between previous and current quantity of cereals and legumes harvested	Output	7%	10%	12%	15%	17 %	By type of cereals and legumes	Half yearly	CSIR-SARI CSIR-Head Office
No. of improved varieties (Crop/Livestock/ Fishery) developed and disseminated	Development and dissemination of improved varieties. (Crops/Livestock/Poultry/ fisheries	Output	13	15	17	20	22	By type of variety of crops, livestock and fishery	Half yearly	CSIR-CRI CSIR-SARI CSIR-OPRI CSIR-ARI CSIR-WRI
No. of Strategies developed to enhance food processing	Development of Strategies to enhance processing of Crop livestock, poultry and fishery products	Output	3	5	7	10	15	By Crop, Livestock, Poultry & Fishery	Half yearly	CSIR-FRI
No. of baseline surveys and adoption studies carried out	Conduct baseline surveys and adoption studies of released improved crop varieties	Output	2	3	4	5	6	By types of crops	Half yearly	CSIR-SARI CSIR-Head office
No. of sensitization and implementation workshops organized	Promotion of Science Agenda for Agriculture in Africa (S3A)	Output	3	3	4	5	7	Nil	Half yearly	CSIR-Head Office
No. of improved planting materials produced	Production of improved planting materials for commercial purposes	Output	120,000 & 100,000	140,000 & 120,000	160,000 & 140,000	180,000 & 160,000	200,000 & 180,000	By Germinated seeds and seedlings	Half yearly	Director CSIR-OPRI Director CSIR-PGRRI Director CSIR-CRI Director
Number of crops irradiated	Use of Gamma Irradiation Facility for the management of postharvest losses and enhancing health care delivery	Output	30 tonnes of food crops irradiated	20	30	40	50	GAEC / BNARI	Quarterly	GAEC/BNAR I
One factory completed and in operation	Complete a production plant for protein bait to control fruit fly menace	Outcome	Factory 90% completed	Production plant 85%	Complete production plant	1,000 litres of protein bait	1,500 litres of protein bait	GAEC / BNARI	Quarterly	GAEC/BNAR I

GOAL: Build a Prosperous Society										
POLICY OBJECTIVE 1: Enhance the Application of Science, Technology and Innovation										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
				completed						
Number of farmers trained on compost making	Train farmers on compost making	Output	Expansion works going on at compost facility (70%)	Completion of expansion works	5	10	15	GAEC / BNARI	Quarterly	GAEC/BNARI

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 2: Ensure Sustainable Extraction Mineral Resources										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Level of compliance of companies to permit conditions	Undertake regular audits of mining companies to ensure compliance to permitting conditions	Outcome	85%	88%	92%	95%	98%	Nationwide	Semi-Annually	EPA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 3: Reduce Environmental Pollution										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Number of companies compliant with permit conditions	Give approval (EA and EMP permits) to companies for them to comply with Environmental Assessment (EA) regulations	Output	4,638	5,102	5,612	6,173	6790	Nationwide(all districts and regions)	Annually	EPA
Level of compliance of companies to permit conditions	Monitor all permitted projects to ensure compliance with LI1652	Outcome	45%	55%	65%	75%	80%	Nationwide(all districts and regions)	Semi-Annually	EPA
Trends in pollution levels of selected locations in relation to WHO guideline level	Monitor selected sites for air quality and pollutants, including PM ₁₀ , CO, NO ₂ , SO ₂	Output	14 sites	16 sites	18 sites	20 sites	22 sites	Selected districts	Annually	EPA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 3: Reduce Environmental Pollution										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Number of companies compliant with effluent quality guideline level	Sample and analyse level of pollution of effluent quality from industries and hotels	Outcome	80 industries	85 industries	90 industries	95 industries	100 industries	Selected districts across the country	Semi-annually	EPA
Percentage of environmental laws, regulations and guidelines reviewed	Review the environmental laws , regulations and guidelines to address emerging environmental issues	Outcome	3%	6%	10%	15%	20%	All sectors	Annually	EPA
Level of completion of development of environmental laws and regulations	Develop regulations for emerging environmental issues	Output	10%	30%	50%	70%	100%	All sectors	Annually	EPA
Level of completion of the updating of the coastal sensitivity map (Trends in the concentrations of heavy metals and petroleum products in the marine ecosystem)	Monitor the marine ecosystem to ascertain the levels of pollutants (Coastal Sensitivity Mapping)	Output	NIL	5%	20%	90%	100%	Marine ecosystem	Quadrennial	EPA
Percentage of companies using the bio-oxodegradable additives	Ensure the use of bio-oxodegradable additives in the manufacture of flexible Plastics	Outcome	80%	85%	90%	95%	98%	Nationwide	Annually	EPA
Level of compliance of institutions to the piloted source waste segregation programme	Upscale the source waste segregation programme to institutions	Outcome	50%	60%	70%	80%	90%	Nationwide	Semi-annually	EPA
Level of compliance with importation of approved chemicals	Update of pesticide register annually to indicate list of approved ,banned and pesticides for experimental purposes	Outcome	100%	100%	100%	100%	100%	Nationwide	Annually	EPA
Level of development and implementation of Chemical Emergency Response Plan	Develop a system that effectively and rapidly responds and deal with chemical related emergencies nationwide	Outcome	10%	50% complete	100% complete	Activate plan	Continue implementation and review	Nationwide	Annually	EPA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 3: Reduce Environmental Pollution										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
No. of collection centres established	Establish and operationalise e-waste collection centres	Output	NIL	2	2	2	2	Selected districts	Annually	EPA
Volume of e-waste treated by plants	Establish and operationalise treatment plants for managing e-waste	Outcome	Nil	140,000 metric tonnes	160,000 metric tonnes	200,000 metric tonnes	280,000 metric tonnes	Selected districts	Annually	EPA
Number of Regulations drafted	Draft regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials annually	Output	5	6	6	6	6		Bi-annually	NRA
Number of facilities inspected	Inspection of ionizing radiation facilities to ensure compliance with regulatory requirements	Output	200	250	300	350	400		Annually	NRA
Number of authorizations granted	Authorization of ionizing radiation facilities to ensure compliance with regulatory requirements	Output	350	350	360	370	380		Annually	NRA
Number of base stations monitored	Monitoring and inspection of base stations compliance with regulatory requirements	Output	-	500	500	700	700		Annually	NRA
Number of Stakeholder engagement workshop held	Hold Stakeholder engagement workshop on draft regulations on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Output	-	6	6	6	6		Bi-annually	NRA
Number of Stakeholder engagement workshop held	Hold Stakeholder engagement workshop on draft guides on nuclear materials and facilities, radiation emitting devices, and radioactive materials	Output	-	2	2	2	2		Bi-annually	NRA
Number of meetings and workshops organized	Organize meetings/workshops for internal and external organizations to ensure implementation of Ghana's international obligations	Output	4	4	8	10	10		Annually	NRA
Number of public awareness creation activities	Organize stakeholders engagement activities	Output	4	4	8	10	10		Annually	NRA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 4: Enhance Climate Change Resilience										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Land area where SLWM technologies are implemented	Land area prepared and farm inputs given to farmers to implement technologies in hectares (ha)	output	7256 ha	10,000	14,000	15,000	-	Regional	Semi-Annually	Environment
Land users adopting sustainable land management practices as a result of the project.	Number of farmers supported to implement the subprojects	output	18,246	20,000	28,000	30,000	-	Regional	Semi-Annually	Environment
Number of Community Resource Management Area (CREMA) management plans developed and implemented	CREMA management plans that have been developed with the communities and implemented	Output	6	6	6	6	-	Regional	Quarterly	Environment
No of NDC Readiness action being implemented	Coordinate and report on the implementation of NDC readiness programmes identified	output	Draft GH-NDC implementation plan developed to prioritize readiness activities	50%	50%			National	Quarterly	MESTI/EPA/MoSWR
No. of Institutions establishing up biogas systems	promote the scale of biogas energy nationwide	Output	Biogas deployed in 10 senior high school at various stages of development	5%	10%	10%	10%	National	Quarterly	MESTI/EPA/MoSWR
No. of NDC phase I action being Implemented	Coordinate and report on the implementation of NDC phase I activities	Output	Draft GH-NDC implementation plan developed to			20%	20%	National	Annual	MESTI

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 4: Enhance Climate Change Resilience										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
			prioritize phase 1 activities							
Central NDC MRV systems developed and a centralised MRV process established in line with UNFCCC reporting structures	A centralized NDC -MRV established in line with the UNFCCC reporting structures for two highest priority NDC sectors	Output	National MRV System operation but does not include GH-NDC	50%	50%			National	Quarterly	MESTI/EPA
NDC indicators integrated into annual progress report	Integrate NDC indicators into the Annual progress report (APR)	Outcome	APR system has climate change indicators but not specific to NDC targets	50%	50%			National	Biannual	MESTI/EPA/NDPC
Number of sectors with climate change mitigation and adaptation strategies	Incorporate climate change issues into sector medium term plans	Output	6	7	7	8	9	Nationwide	Annually	EPA
Trends in level of reduction of greenhouse gas emissions in metric tonnes	Commit to attain 45% emission reduction goal by 2030 compared to 2010 emission levels	Output	56.1MT	60.1MT	65.3	68.2	70.1	Nationwide	Annually	EPA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 5: Reduce Greenhouse Gases										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
NCA incorporated into national economic planning and budgeting	Number of persons trained in NCA	Output	-	12	20	20	20		Annually	MESTI/MOF/ GSS
6th National Biodiversity Report	Status of biodiversity conservation and utilisation in Ghana	Output						Sectoral	Annually	MESTI
Cabinet approved NBP	Level of completing the NBP	Output	30%	100%				Sectoral	Quarterly	Environment Directorate
Approved NBSAP	Level of reviewing NBSAP	Output	2016 NBSAP	50%	100%			Sectoral	Quarterly	Environment Directorate
Communication Strategy for the implementation of the NBP developed	Level of completing the communication strategy	Output	Draft NBP	30%	100%			Sectoral	Once	Environment Directorate
Biodiversity mainstreamed into the national development planning process	% of MDAs/MMDAs covered for mainstreaming No. of MDAs/MMDAs trained on biodiversity relating to activities, projects plans and policies	Output			30%	70%	100%	Sectoral	Annually	MESTI/NDPC

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Level of preparation of the National STI Policy	Status of preparation of National STI Policy	Outcome	Stakeholder workshop on the review of the policy organized	100%				Number of sector specific policies	Quarterly	MESTI and R&D Institutions/Academic Institutions/Private Sector
Number of Programmes and project outlined in the National STI Policy for implementation	Count of projects outlined in the Nation STI Development Plan	Output	Stakeholder workshop on the National STI Developme	17 programmes 84 projects				Number of projects and programmes	Quarterly	R&D institutions/Academic institutions/Private Sector/MoF

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
			nt Plan organized							
Level of preparation of the National STI investment document	Status of the National STI investment document	Output	N/A		100%				Quarterly	MESTI and NDPC/MoF/R &D Institutions/Academic Institutions/MoF
Level of preparation of STI Mainstreaming Monitoring report	Status of the STI Mainstreaming report	Output	N/A	100%	100%	100%	100%		Quarterly	MESTI and PACSTI/ R&D Institutions/Academic Institutions/MoF
Level of preparation National STI Week celebrations with wide publicity	Status of organizing the National STI week celebrations	Output	N/A	100%	100%	100%	100%		Annually	MESTI and NDPC/R&D Institutions/Academic Institutions
Level of preparation of the National STI Infrastructure Survey report	Status of the National STI infrastructure report	Output	N/A	50%	100%				Quarterly	MESTI and R&D Institutions/Academic Institutions
Level of establishment of the 2 Science and Technology Parks (STPs)	Status of establishment of the 2 STPs.	Output	N/A	25%	50%	75%	100%	Regional	Quarterly	MESTI and MoT/MoF/R&D Institutions/Academic Institutions
Level of establishment of 10 incubation centres established	Status of establishment of the 10 incubation centers	Output	N/A	25%	50%	75%	100%	Regional	Quarterly	MESTI and NDPC/R&D Institutions/Academic Institutions/MoT/MoF
Level of establishment of Foundries	Status of the establishment foundries	Outcome		25%	50%	75%	100%	regional	Quarterly	MESTI/R&D Institutions/Academic Institutions/Private Sector/MoT/MoF

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Level of work completion on the establishment of 3 HPC Centres	Status of work on the establishment of 3 HPC centres	Output	Renovation works on-going on the establishment of 1 HPC center at CSIR.	25%	50%	75%	100%	Institutional	Quarterly	MESTI/R&D Institutions/Academic Institutions/MoF/DST-South Africa
Level of work on the creation of a national database on the profile of scientists, engineers, and technologists	Status of work on the creation the database for on the profile of scientists, engineers, and technologists	Output	N/A	25%	50%	75%	100%	Gender, scientist, engineers,	Annually	MESTI/R&D Institutions/Academic Institutions/MoF
No. of Ghanaian and African Diaspora STI experts with established working relationship with Ghanaian institutions Level of work done on the Database of Ghanaian STI experts in 4 countries across the world	Number of Ghanaian and African Diaspora STI experts with established working relationship with Ghanaian institutions Status of work done of Database of Ghanaian STI experts in 4 countries across the world	Output	N/A	50 25%	100 50%	150 75%	200 100%	Country, gender, institutions	Quarterly	MESTI/PACSTI/R&D Institutions/Academic Institutions/Private Sector/MoFA/MoF
Level of preparation of bi-Annual National STI Report	Status of preparation of bi-Annual National STI Report	Output	N/A		100%		100%		Quarterly	MESTI/NDPC/PACSTI/R&D Institutions/Academic Institutions
Level of work on the establishment of the GIRC-Center/NIA	Status of the establishment of the GIRC-Center/NIA	Output	N/A	25%	50%	75%	100%		Quarterly	MESTI/ R&D Institutions/Academia/MoF
Level of work on the creation of a Databank on indigenous knowledge and skills	Status of work on the creation of a Databank on indigenous knowledge and skills	Output	N/A	25%	50%	75%	100%		Quarterly	MESTI/R&D Institutions/Academic Institutions/Grat is foundations/MoF
No. of Regional, Continental and global cooperation for STI meetings attended.	Status of Regional, Continental and global cooperation for STI established	Output	N/A	25%	50%	75%	100%		Quarterly	MESTI/MoFA/MoF

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
100 researchers trained in Research Management under Science Granting Council Initiative (SGCI)	Number of researchers trained in research management and STI indicators under SGCI;	Output	20 researchers trained in research management and measuring of STI Indicators under SGCI	20 researchers	20 researchers	30 researchers	30 researchers	Gender	Annually	MESTI, SARIMA, NEPAD
5 Technologies Transfer to Private Sector under SGCI	status of technologies transferred to private sector			2 technologies transferred	1 technologies transferred	1 technologies transferred	1 technologies transferred			
Number of projects jointly implemented under the Ghana South Africa Bilateral agreement	Status of completion of the projects jointly implemented under the Ghana South Africa Bilateral agreement	Output	N/A	5 projects	7 projects	5 projects	6 projects	Institutional	Quarterly	MoFA/R&D Institutions/Academic institutions/DS T-SA
Number of projects jointly implemented under Ghana-Colombia-Bilateral agreement	Status completion of the projects jointly implemented under the Ghana-Colombia Bilateral agreement	Output	N/A	2 projects	1 project	1 project	1 project	Institutional	Quarterly	MoFA/R&D Institutions/Academic Institutions/Ministry of Science and Technology, Cote d'Ivoire
Number of projects jointly implemented under Ghana Cote d'Ivoire agreement	Status on completion of projects jointly implemented under Ghana Cote d'Ivoire agreement	Output	N/A	1 project	2 projects	4 projects	2 projects		Quarterly	MoFA/R&D Institutions/Academic Institutions
Number of proposals submitted under EU Horizon 2020	Status on proposals submitted under EU Horizon 2020	Output	N/A	2 projects	2 projects	3 projects	4 projects		Quarterly	MESTI and R&D Institutions/Academic Institutions
Number of projects implemented under EU H2020	Status on completion of projects implemented under EU H2020									
5 stakeholder consultation meeting organized on National Space Policy organized	Number of stakeholder consultation meeting organized on National Space Policy	Output	N/A	2 stakeholders workshop organized	3 stakeholders workshop organized			Regional	Annually	MESTI and GSSTI/NDPC/Academia/MoFA/ MoF
Level of preparation and submission of National	Status of preparation and submission of National Space Policy for cabinet approval	Output	N/A	50%	100%				Quarterly	MESTI/GSSTI/NDPC/Academia/MoFA/ MoF

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Space Policy for cabinet approval										
8 SKA/AVN partner countries meetings attended. One National Planetarium established at Kuntunse. 30 Astronomers and Engineers trained.	Status of work done in the implementation of the SKA projects	Output	SKA Ministerial meeting hosted in Ghana Ghana Radio Astronomy Observatory launched by the President.	2 meetings attended 1 planetarium established	2 meetings attended	2 meetings attended	2 meetings attended		Quarterly	MESTI and GSSTI/ Academic Institutions/MoF/DST-South Africa/ MoFA.
Level of work on the construction of the Satellite Ground receiving station Space data available to institutions.	Status of work on the construction of the Satellite Ground receiving station	Output	N/A	25%	50%	75%	100%	Institutions	Quarterly	MESTI and GSSTI/Academic Institutions/MoF
Level of establishment and operationalizing of the PACSTI and Secretariat.	Status of establishment of the PACSTI and Secretariat fully established and operational	Output	Stakeholder workshop on the establishment of the PACSTI organized Cabinet Memo submitted for approval	25%	50%	100%			Quarterly	MESTI and Office of the President/ Academia/MoJ/ MoF
Level of establishment of the Inter-ministerial coordinating committee	Status of establishment of the Inter-ministerial coordinating committee	Output	N/A	100%					Quarterly	MESTI and Office of the President/ All MDAS/ Academic Institutions
4 consultative workshops organized with STI Advocacy and Professional Bodies.	Status of organizing the consultative workshops with STI Advocacy and Professional Bodies.	Output	N/A	1 consultative	1 consultative	1 consultative	1 consultative	Regional	Quarterly	MESTI and R&D Institutions/ Academic

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
				workshop organized	workshop organized	workshop organized	workshop organized			Institutions/ Private Sector
STI Fund established and operationalized	Level of the establishment of STI Fund	Outcome	Stakeholder consultations have been organized	50%	100%				Quarterly	R&D institutions/Academic Institutions/Private Sector/MoF/MoE
Total R&D Budgets of the Private Sector	Level of R&D Budgets of the Private Sector	Outcome	N/A	25%	25%	25%	25%		Quarterly	R&D institutions/Academic Institutions/Private Sector.
Venture Capital for Business Development in Technology Parks and Business Incubators		Output							Quarterly	R&D institutions/Academic Institutions/Private Sector/MESTI/MOTI/MDU
No. of Technologies for Sustainable management, conservation and utilization of forest resources developed	Landscape management systems or technologies resilient to climate change vulnerabilities in time and space.	Output	2	3	5	7	10	Nil	Half yearly	CSIR-SRI
No. of stakeholders with capacity developed on the use on the use of forest genetic resources/ adaptation to climate change strengthened	Innovative risk management strategies that foster resilient rural livelihoods for sustainable landscape restoration.	Output	500	600	650	700	750	By Gender	Half yearly	CSIR-FORIG CSIR-Head Office
No. of strategies developed to combat the effect of climate change	Development of Strategies to combat effect of climate change	Output	5	7	9	11	13	Nil	Half yearly	CSIR-FORIG
% reduction in rate of Morbidity, Mortality and Poverty associated with NTDs.	Control and elimination of water and soil borne diseases	Output	3	5	10	15	20	By type of water and soil borne diseases	Half yearly	CSIR-WRI CSIR-Head Office
No. of transmission indices developed to determine feasibility of eliminating diseases	Control and elimination of water and soil borne diseases	Output	5	7	8	9	10	By type of diseases	Half yearly	CSIR-WRI

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Number of products developed from local raw materials	Development of essential materials and industrial products using local raw materials	Output	2	4	6	8	10	By type of local building materials	Half yearly	CSIR-BRRI
No. of local building materials promoted No. of road construction advisory services provided	Development of local building materials for affordable housing delivery and provision of road construction advisory services	Output	2	4	6	8	10	By road and housing delivery services	Half yearly	CSIR-BRRI
No. of Solar energy systems installed	Promotion of renewable Energy systems for both domestic and commercial buildings	Output	10	15	20	25	30	By Domestic and commercial buildings	Half yearly	CSIR-IIR
No. of bioenergy options for sustainable rural livelihoods promoted	Promote Climate – friendly bioenergy options for sustainable rural livelihoods	Output	5	10	15	20	25	By type of alternative sources of energy provided.	Half yearly	CSIR-IIR
ICT Centre established No. of training sessions organized	Establishment of ICT Centre for the provision of electronics and computer engineering services. Organizing ICT Training sessions	Output	0 2	1 3	0 4	0 5	1 7	By Location By Gender	Yearly Quarterly	CSIR-INSTI CSIR-IIR
Number of sites assessed	Conducting pre-installation and post installation assessment of mobile phone sites.	Output	378 sites have been monitored (as at the end of the 3rd quarter).	400	400	450	500	GAEC / RPI	Quarterly	GAEC/RPI/NCA
Number of telephone masts monitored	Monitoring of telephone masts and base stations	Output	775 / 1000 stations had been monitored	1000	1000	1000	1200	GAEC / RPI	Quarterly	GAEC/RPI/NCA
Number of occupationally exposed workers monitored	Monitoring of occupational exposures for mine, industrial, medical, educational and educational research institution workers	Output	507 / 600 workers monitored	500	700	700	1000	GAEC / RPI	Quarterly	GAEC/RPI/NCA
Number of food/dairy products and water samples analysed for radioactive contamination	Assessment of food/dairy products and water samples for radioactive contamination	Output	578 containers / samples were analysed	500	700	1000	1500	GAEC / RPI	Quarterly	GAEC/RPI/NCA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 6: Mainstream Science, Technology and Innovation in all socio-economic Activities										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Number of individuals trained	Training and public education in Radiation Safety, Radiation Protection and Nuclear Security	Output	29 professionals	25	25	30	30	GAEC/RPI	Quarterly	GAEC/RPI
Completed National Space Science policy	Completion of the National Space policy	Output	15% completed	20% completed	40%	75%	100%	GAEC/GSSTI	Quarterly	GAEC/GSSTI
Number of PhD and MPhil students trained	Training of MPhil and PhD students	Output	9 PhD and 29 MPhil students trained successfully	20 MPhil students 10 PhD	20 MPhil 10 PhD	25 MPhil 10 PhD	30 MPhil 10 PhD	GAEC/ SNAS	Half yearly	GAEC/SNAS
Number of children screened	Evaluating the Vitamin A status of children	Output	Data collection is ongoing within the Upper East Region					GAEC/RAMSRI	Quarterly	GAEC/RAMSRI
Number of reports completed	Scientific assessment of the environment and human health impact of e-waste	Output	Analysis of field survey results ongoing	5 reports published	7 reports published	8 reports published	8 reports published	GAEC/NNRI/Zoomlion	Quarterly	GAEC/NNRI/Zoomlion
Number of Laboratories and IBCs certified	Count of certified laboratories	Output	None	1	1	1	2	By Region	Annually	NBA
Draft regulations and one guidelines prepared	count regulations and guidelines prepared	Output	None	1	1	1	1		Annually	NBA
Number of monitoring reports submitted	Monitoring reports	Output	None	1	2	2	2	By Region	Mid-Year	NBA
Number of Permits granted	Count of permits granted in a year	Output	None	3	3	3	3	By Region	Annually	NBA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 7: Ensure availability of clean, affordable and accessible energy										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Identify suitable site for Nuclear Power Project	Preferred site(s) selected and assessed taking into account geological, seismological, population density, human induced factors, environmental, water availability and quality consideration and other relevant studies.	Output	Reconnaissance reports for two (2) sites, 90% completed .							GAEC
Number of stakeholder and public sensitization meetings held on adoption of nuclear power	Organize stakeholder and public sensitization meetings on adoption of nuclear power	Output	Five (5) stakeholder meetings have been held this year	10 stakeholder sensitization meetings held	10	10	15	GAEC/ NPI	Quarterly	GAEC/NPI/GN PPO

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 8: Minimize potential environmental impacts of oil and gas industry										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Adopted policy	Draft policy at the consultative stages before cabinet approval.	Output	-	60%	100%	-	-	Regional	Quarterly	Environment
Policy strategy approved by cabinet	Draft Policy strategy at development stages	output	-	20%	50%	100%		Regional	Quarterly	Environment
Implementation plan developed and mainstreamed into sectoral plans	Development of plan and mainstreaming in progress	Output	-	40%	40%	100%		Regional	Quarterly	Environment
Level of compliance of companies to permit conditions in the oil and gas industry	Undertake regular audits of the oil and gas industry	Outcome	100%	100%	100%	100%	100%	Nationwide	Annually	EPA
Level of preparedness to oil spill emergencies	Operationalize the National Oil Spill Contingency Plan	Outcome	70%	75%	80%	85%	90%	Nationwide	Annually	EPA

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 9: Promote Sustainable, Spatially Integrated, Balanced and Orderly Development of Human Settlements										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Number (%) of MMDAs with spatial planners/ Spatial planner to population ratio	The number of MMDAs that have professional spatial/physical planners expressed as a percentage of the total number of MMDAs	Output	132	150	250	300	350	Disaggregated at MMDA level	Annually	LUSPA and MLGRD
Number of MMDAs with DSDFs	The number of MMDAs with SDF	Output	-	5	50	100	150	Disaggregated at MMDA level	Annually	LUSPA and MLGRD
Number of MMDAs with structure plans	The number of MMDAs with structure plans (could be expressed as a percentage of total number of MMDAs)	Output	-	10	50	100	200	Disaggregated at MMDA level	Annually	LUSPA and MLGRD
% level of conformity to Structure Plans/ local plans	The level of how physical development conforms with structure plan or local plan	Outcome	-	30	40	50	60	Disaggregated at MMDA level	Annually	LUSPA and MLGRD
Land consumption to population growth rate ratio	The ratio of built-up land use expansion rate to population growth rate	Outcome	-					Disaggregated at MMDA level	Annually	LUSPA, GSS & Forestry Commission

GOAL: : Safeguard the Natural Environment and Ensure a Resilient Built Environment										
POLICY OBJECTIVE 10: Enhance capacity for policy formulation and coordination										
INDICATORS	INDICATOR DEFINITION	INDICATOR TYPE	BASELINE 2017	TARGETS (2018-2021)				DISAGGREGATION	MONITORING FREQUENCY	RESPONSIBILITY
				2018	2019	2020	2021			
Percentage of districts plans subjected to SEA process	Natural resource and environmental governance activities	Outcome	85%	90%	95%	100%	100%	Nationwide	Annually	EPA
No. of monitoring reports of MESTI Sector programmes/ projects	Reports detailing the progress/ status of Sector programmes/ projects	Output	2	2	2	2	2	Nationwide	Annually	PPMED
Approved sector budget	Date of Approval of Sector Budget by Parliament	Output	March, 2017	Dec. 2017	Dec. 2018	Dec. 2019	Dec. 2020	Sectoral	Annually	PPMED
Annual Sector Performance Report (APR) submitted to OHCS	Date of submission of MESTI APR to OHCS	Output	Jan. 2018	Jan. 2019	Jan. 2020	Jan. 2021	Jan. 2022	Sectoral	Annually	PPMED
Annual Sector Progress Report (APR) submitted to NDPC	Date of submission of MESTI APR to NDPC	Output	Apr. 2018	Apr 2019	Apr 2020	Apr 2021	Apr 2022	Sectoral	Annually	PPMED

1.3. Data Collection, Collation, Analysis and Utilisation

6.3.1 Data Collection

For every monitoring process, the collection of data is critical as it provides the information needed to access the progress or other wise of the intervention. Within the plan period, the Ministry would develop templates for its agencies and departments to utilize in providing data on critical indicators. The template as designed will allow the agencies and departments to report on their programmes, projects and activities (on-going or completed). Data would be sourced from primary and secondary sources. Much of the data would be collected on quarterly and annual basis. Table 6.2 provides the data collection matrix outlining the data collection period and method, how data would be disaggregated and the expected results from the indicators to be tracked.

Table 6.2: Data collection matrix

Indicators	Data Collection period	Data Collection method	Data Disaggregation	Results
% level of conformity to Structure Plans/ local plans	Annual	Questionnaire/Reports	District Region	100% conformity

6.3.2 Data Analysis

The PPME Directorate of the Ministry would take responsibility for the collation and analyses of the data generated during the plan period. The analysis will focus on ensuring that the data are made presentable and useable to all stakeholders. The directorate will rely on the appropriate software for the analysis. Analysis would be performed on all programmes and projects outlined in the MTDP to allow for a clear assessment of the performance of the sector and allow for bottlenecks to be resolved to enhance performance in the subsequent years.

6.3.3 Data Validation

To ensure the integrity of data received from varied sources, it is critical that all players are consulted. Thus, the Ministry would consult all its departments and agencies on primary and secondary data received. The Ministry would organize validation workshops with key stakeholders to review the data received and also in the review of the draft report. This would be done to ensure that all discrepancies are corrected.

1.4. Reporting Arrangements

Providing stakeholders with timely information, is an essential part of every M&E system. Effective reporting allows for all stakeholders to have a common understanding of the direction of the sector and the challenges thereof. The Ministry will ensure that quarterly and annual reports on performance of the sector is produced and shared with stakeholders to inform decision-making. The quarterly and annual reports would be produced using the format provided by NDPC. Figure 6.1 provides the reporting format.

Figure 6.1: Quarterly and Annual Progress Reports Format

Title Page

- i. Name of the MDA
- ii. Time period for the M&E report

Introduction

- i. Summary of achievements and challenges with the implementation of the SMTDP
- ii. Purpose of the M&E for the stated period
- iii. Processes involved and difficulties encountered

M&E Activities Report

- i. Programme/Project status for the quarter or year
- ii. Update on funding sources and disbursements
- iii. Update on indicators and targets
- iv. Update on critical development and poverty issues
- v. Evaluations conducted; their findings and recommendations
- vi. Participatory M&E undertaken and their results

The Way Forward

- i. Key issues addressed and those yet to be addressed
- ii. Recommendations

1.5. Dissemination & Communication Strategy

The purpose of this section is to formulate strategies and to bring the approved Sector Medium Term Development Plan (SMTDP) to all stakeholders with the view of soliciting the co-operation and collaboration of all stakeholders so as to facilitate successful implementation of planned programmes and projects, disseminate sector policies, programmes, projects, and progress reports to inform, educate and create awareness. This is to create awareness on the expected roles of all stakeholders in the implementation of sector programmes and projects, promote dialogue and generate feedback on the performance of the sector, and to assess and manage the expectation of the public concerning the services of MESTI

A number of communication strategies would be adopted to facilitate the dissemination and communication of the outcomes of the implementation of the sector's monitoring and evaluation plan.

The dissemination will highlight the successes chalked and the challenges faced in the implementation of the SMTDP in relation to the Agenda for Jobs, 2018-2021. Some of the strategies would include Meet the Press Fora, audio–visual documentaries through the electronic media, development of simplified versions of policies being pursued, flyers, internet publications, publications in the print media, radio and TV programmes through Education, Information and

Communication process (EIC) etc. Community Fora/Durbars will also be organised to disseminate the M&E results.

Additionally, the PPME Directorate working with the Research, Statistics and Information Management Directorate shall target other collaborating stakeholders who will require strategies other than those mentioned above.

This will be in accordance with standard communication delivery methods such as:

- **Public Sensitisation** – reaching out to MMDAs, MDAs, NGOs, DPs, etc. with information on the Ministry’s sector plan.
- **Media Advocacy** – talk shows, discussions and advocacy on policies, programmes and projects of the Ministry on radio /TV and adverts in the press.
- **Ministerial Lobbying** - identify informal influencers in key MDAs, Parliament, NGOs, CSOs, Traditional Authorities (TAs) and Development Partners (DPs).
- **Programmed communication** – running public relations programs on selected campaign themes during meetings and outreaches. (Information Communication Unit)
- **Events** – promoting the campaign objectives to external stakeholders during official and community events. Such events may include the following;
 - Environmental Days celebration (World Environment Day, Biodiversity Day, Day to Combat Drought and Desertification, Wetland Days, World Water Day, World Ozone Day, etc.)
 - Africa Scientific Renaissance Day celebration
 - Review meetings with selected MDAs, MMDAs, and Parliamentary Select Committee on MESTI and DPs.
 - Web site.

1.6. Evaluation Arrangements

Evaluations will be conducted as ex-ante, mid-term, terminal or ex-post. In this regard, the policy objectives of the Sector as contained in the SMTDP will be evaluated to determine their relevance, impacts and sustainability. The outcome will provide feedback into policy formulation and implementation.

The Sector shall use both quantitative and qualitative methods to conduct the evaluations. Quality standards such as transparency, ethics, impartiality, timeliness, relevance and value for money shall be considered in the performance of any evaluation exercise during the plan period.

1.7. Participatory Monitoring and Evaluation Arrangement

Participatory Monitoring and Evaluation (PM&E) will be undertaken mainly in the natural resource management programmes (mining areas, coastal and oil belts, etc.), agricultural/farming

communities and the private sector. This will require building the capacity of the relevant communities to equip them with the requisite skills to undertake regular Participatory M&E.

PPMED shall embark on PM&E to capture perceptions and assess whether interventions contained in the SMTDP met expectations of all stakeholders, especially at the local level where the poor and vulnerable can be identified. Awareness would also be created among all stakeholders and beneficiaries of the sector's interventions. The PPMED will promote partnership between the Private Sector, NGOs and CSOs to facilitate the roll out of PM&E in the Sector.

The tools to be used to establish an efficient monitoring system to track all activities and ensure Citizen Driven Accountability will include the under listed, among others;

- Community score cards
- Use of ICT and mobile phones, to build the relationship between service providers and the user community
- Establish a Grievance Redress Mechanism
- Focus group discussions

The Ministry would use the following procedures to conduct the PM&E.

- Establish the need for PM&E
- Decide on the PM&E tool(s) to use
- Identify the key stakeholders
- Identify a lead facilitator
- Determine the performance questions
- Establish the resources and time available
- Define a TOR for the lead Facilitator or Consultant
- Train the team to carry out the PM&E
- Disseminate the results and act on the findings and recommendations.

ANNEX 1

INTERNAL CONSISTENCY OF ISSUES

ANNEX: INTERNAL CONSISTENCY MATRIX OF ISSUES																								
NO	Adopted Issues Adopted Issues	Low transfer and uptake of research findings	Limited application of science and technology	Environmental degradation	Upsurge in Illegal Mining (Galamsey)	enforcement of environmental and mining laws and regulations	Weak Natural Resource Management Systems	Improper disposal of solid and liquid waste	Impact of Plastic Waste on Terrestrial, aquatic and marine ecosystems	Air and Noise Pollution, especially in urban areas	Improper management of E-waste	Emissions from poorly maintained vehicles	Vulnerability to climate change	Low institutional/economic capacity to adapt to climate change and undertake mitigation actions	Loss of trees and vegetation cover	Inadequate capacity to manage environmental impacts of Oil and Gas Industry	Limited collaboration between public research institutions and businesses on product, service and process innovation	High cost electricity generation	Unreliable power supply	Weak enforcement of planning and building regulations	Inadequate spatial plans for regions and MMDAs	Ineffective M&E and implementation of development policies and plans	Weak research capacity of MMDAs and MMDAs	Inadequate financial resources
1	Low transfer and uptake of research findings	X	X	O	O	O	X	X	O	O	O	O	X	O	O	O	X	X	X	O	O	O	X	X
2	Limited application of science and technology	X	X	X	X	O	X	X	O	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X
3	Environmental degradation	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	O	O	X	X	X	O	O
4	Upsurge in Illegal Mining (Galamsey)	O	X	X	X	X	X	X	O	O	O	O	X	O	X	O	O	O	O	O	X	X	O	O
5	Weak enforcement of environmental and mining laws and regulations	O	O	X	X	X	X	X	X	X	X	X	X	O-	X	X	O	O	O	O-	O-	O	O	O
6	Weak Natural Resource Management Systems	X	X	X	X	X	X	O	X	O	O	O	X	O-	X	X	O	O	O	O	O	O	O	O-
7	Improper disposal of solid and liquid waste	O-	X	X	X	X	O	X	X	O	X	O	X	X	O	O	O	O-	O-	X	X	O	O	X
8	Destructive Impact of Plastic Waste on Terrestrial, aquatic and marine ecosystems	X	O-	X	O	X	X	X	X	O	O	O	X	X	O	O	O	O	O	O	O	O	X	O-
9	Air and Noise Pollution, especially in urban areas	O-	X	X	O	X	O	O	O	X	X	X	X	X	O	O	O	O	O	X	O-	O	O	O
10	Improper management of E-waste	O-	X	X	O	X	O	X	X	O	X	O	X	X	O	O	O	O	O	O-	O-	O	O	O-
11	Emissions from poorly maintained vehicles	O	X	X	O	X	O	O	O	O	O	X	X	X	O	X	O	O	O	O	O	O	O	O
12	Vulnerability to climate change	O	O	X	X	X	X	O	O	O	X	X	X	X	X	X	O	O	O	O	O	O	O	X
13	Low institutional/economic capacity to adapt to climate change and undertake mitigation actions	X	X	O-	X	X	O	O	O	O	X	X	X	X	X	X	O	O-	O	O	O	O	O	O-
14	Loss of trees and vegetation cover	O	O	X	X	X	X	O	O	O	O	X	X	X	X	O	O	O	O	O	X	O-	O	O
15	Inadequate capacity to manage environmental impacts of Oil and Gas Industry	O	X	X	O	X	X	O	O	O	O	X	X	X	X	X	X	X	O-	O	O	O	O	O-
16	Limited collaboration between public research institutions and businesses on product, service and process innovation	X	O-	O	O	O	O	X	O	O	X	O	O	O	O	O	X	O	O	O	O	O	X	X
17	High cost electricity generation	X	X	O	O	O	O	O	O	O	O	O	-	O	O	X	O	X	X	O	O	O	O	X
18	Unreliable power supply	X	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X	O	O	O	O	X
19	Weak enforcement of planning and building regulations	O	X	X	X	X	X	O-	O	O-	O	O	O	O	O	O	O	O	O	X	X	X	O	X
20	Inadequate spatial plans for regions and MMDAs	O	X	X	X	X	X	O	O	O	O	O	O	O-	X	O	O	O	O	X	X	O	O	X
21	Ineffective M&E and implementation of development policies and plans	O-	O	O	X	O	O	O	O	O	O	X	X	X	X	O	O	O	O	X	X	X	O	X
22	Weak research capacity of MMDAs and MMDAs	O-	X	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X	O	O	O	X	X
23	Inadequate financial resources	X	X	O	O	O	O	X	O	-	-	-	-	-	O	X	X	X	X	O	X	O	O	X

